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**THE RELATIONSHIP BETWEEN CHILD CARE AND BREASTFEEDING FOR
WORKING MOTHERS IN THE UNITED STATES**

by

Patricia Wonch Hill

A DISSERTATION

**Presented to the Faculty of Nebraska
In Partial Fulfillment of Requirements
For the Degree of Doctor of Philosophy**

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Under the Supervision of Professor Julia McQuillan

Lincoln, Nebraska

August, 2010

THE RELATIONSHIP BETWEEN CHILD CARE AND BREASTFEEDING FOR
WORKING MOTHERS IN THE UNITED STATES

Patricia Wonch Hill, Ph.D.

University of Nebraska, 2010

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Whether or not child care provider characteristics and factors related to the care giving environment impact breastfeeding duration for working mothers has not been systematically studied. In this dissertation, I use Ecological Health Promotion Theory to explore the relationship between child care and breastfeeding through three different analyses. First, I interviewed nine child care providers to assess their knowledge, attitudes and beliefs about infant feeding and whether they vary on these factors across individuals and child care licensing types. Second, I conducted a small mail survey of 93 licensed child care providers in order to create a scale measuring attitudes on the importance of breastfeeding, breastfeeding program supports, and confidence in providing breast milk to infants in their care, and also to assess whether their attitudes and beliefs about breastfeeding are related to overall child care quality. Third, I use the National Institutes of Child Health and Development's Study of Early Child Care to assess whether quality child care is associated with increased breastfeeding duration after controlling for work, demographic, and socioeconomic maternal characteristics. Through these three analyses, I found that child care providers to vary in their attitudes and programmatic supports of breastfeeding. Their personal experience breastfeeding their own infants was correlated with the proportion of infants breastfed in their program, and their attitudes, beliefs, program supports, and confidence in providing breast milk. Overall child care quality, as measured by traditional

indicators (education/experience), were not associated with proportion of infants breastfed, personal experience, or breastfeeding attitudes and beliefs. In the third analysis, among working and non-working mothers, the proportion of time an infant spent in relative child care was associated with longer breastfeeding duration. Also, the younger the child when full-time child care first began, the sooner their mother weaned. However, when child care onset preceded work onset, breastfeeding duration increased. Finally, among working mothers, caregiver characteristics associated with quality had no significant association with breastfeeding after controlling for maternal characteristics. Proportion of time in a child care home was negatively associated with breastfeeding, but not for care giving in relative homes, or child care centers.

Dedication

This dissertation is dedicated to my daughter, Simone, and to my son, Myles.

I carry your heart with me (I carry it in my heart)

*i carry your heart with me (i carry it in
my heart) i am never without it (anywhere
i go you go, my dear; and whatever is done
by only me is your doing, my darling)*

*i fear
no fate (for you are my fate, my sweet) i want
no world (for beautiful you are my world, my true)
and it's you are whatever a moon has always meant
and whatever a sun will always sing is you*

*here is the deepest secret nobody knows
(here is the root of the root and the bud of the bud
and the sky of the sky of a tree called life; which grows
higher than the soul can hope or mind can hide)
and this is the wonder that's keeping the stars apart*

i carry your heart (i carry it in my heart)

-E.E. Cummings

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Granting Institution

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Chapter I

Introduction

“Integrating breastfeeding into child care settings promotes good health for the baby and mother, saves money, and contributes to the overall wellbeing of a community. It is not just a parent issue, a child care issue, or a health and nutrition issue, but ultimately an important public health issue that affects everyone.”
- United States Breastfeeding Committee 2002.

Do child care providers play a role in facilitating or inhibiting employed mothers’ ability to continue breastfeeding? Employment status has been shown to be one of the most important predictors of breastfeeding initiation and duration. Employed mothers of preschool age children most often must rely on some form of child care – whether it be a spouse/partner, grandparent, or increasingly, non-relative child care. Despite growing research and public health focus on breastfeeding as a major component of Healthy Kids 2010 goals, I know of no studies that have focused on the affect of child care arrangements on breastfeeding for employed mothers. In this dissertation I will detail the affects of maternal employment on breastfeeding, and provide a unique contribution – the assessment of the affects of child care arrangements on breastfeeding for employed mothers. Furthermore, I will outline the potential affect that child care providers can play during this crucial transitional period.

A major goal of Healthy Kids 2010, the Federal Government’s blueprint for a healthy American population, is to increase the initiation and duration of breastfeeding in the United States to 75% of mothers initiating breastfeeding, 50% continuing to six months, and 25% continuing to 12 months (Healthy People 2010). In Nebraska, according to the most recent state wide statistics in 2005, we have partially achieved the goals, :78.8% of children were breastfed at birth, 54.9% at 6 months, and 23.3% at 12 months (CDC, 200). These goals are in all actuality quite modest, however, considering the American Academy of Pediatrics (AAP) recommends all children be breastfed for a *minimum* of 12 months, with exclusive breastfeeding for at least six

months (AAP Policy Statement, 2005). The AAP's goals are even modest when compared to other organizations, such as La Leche League and the World Health Organization, who advocate that breastfeeding occur for a minimum of two years. Although breastfeeding initiation has improved in the US as a whole, increasing duration is particularly challenging, only 43.1% of mothers are still breastfeeding when their child is six months, and 24.1% at 12 months (CDC, 2008).

Promoting breastfeeding is a worthwhile public health goal; the health and developmental benefits are such that promoting breastfeeding could help to prevent numerous short and long term negative health outcomes. Breastfeeding provides nutritional, physical, and emotional benefits to mothers and children. Breastfeeding protects infants against numerous infectious diseases including otitis media (Scariati, Grummer-Strawn, & Fein, 1997), respiratory infections (Cushing, et al., 1998), and diarrhea (Scariati, et al., 1997). Breastfeeding also lowers children's risk of chronic conditions such as diabetes (Gerstein, 1994), asthma (Chen & Kaplan, 2003), and cardiovascular risk factors (Ravelli, van der Meulen, Osmond, Barker, & Bleker, 2000). In addition, the health benefits of breastfeeding for infants of employed-mothers translates into fewer missed work days due to illness and lower health care costs for the nation (Ball & Wright, 1999).

Efforts to promote breastfeeding have historically focused on enhancing the knowledge, attitudes, and beliefs of individual mothers as the primary mechanisms for increasing initiation and duration rates. Especially for working mothers, researchers are discovering that breastfeeding choice is significantly affected by structural factors (McKinley and Hyde, 2005). Focusing solely on the individual may limit the effectiveness of any health promotion program. Ecological health promotion theory (EHPT) suggests broadening health promotion programs

beyond the individual to include the environmental and social influences that affect individual behavior (McLaren & HaI, 2005). The EHPT approach has been used for breastfeeding promotion before. UNICEF began the *baby friendly hospital initiative* in order to facilitate and eliminate barriers to breastfeeding for new mothers who have just given birth and was effective in increasing breastfeeding initiation in hospitals through structural and policy changes (Philipp, et al., 2001).

Recognition of the importance of the social environment to mother's initiation and duration of breastfeeding has not translated into a focus on the role of child care providers for employed-mothers. I could not find any scientific research on how child care provider use or characteristics may affect breastfeeding duration. Consequently, the availability and accessibility to quality child care, and more importantly, the structural characteristics of a given provider, have not yet been included within the structural factors that may affect breastfeeding duration. It is likely that child care providers who value and understand the dynamics of breastfeeding should be better able to facilitate employed-mothers continued breastfeeding better than providers who are less knowledgeable or supportive. It is even possible that ill-trained and unprepared providers could create barriers for employed-mothers who want to maintain breastfeeding once they reenter the workforce. Other structural factors related to the child care environment are also likely to influence breastfeeding duration, including child care quality, type (relative home vs. family home vs. child care center), licensing and policies.

The rate of employment for mothers with children under 3 years of age rose dramatically in the last century, from 34.3% in 1975, to 57.3% in 2004 (U.S. Department of Labor Statistics, 2007). Approximately 60% of children age 3 and younger are in some form of non-parental child care (U.S. Department of Health and Human Services, 2004). The association between

breastfeeding duration and employment status has been studied extensively. These studies, however, have not included information on child care. Because child care is a venue ripe for institutional change to support employed and breastfeeding mothers, it is important to explore how child care arrangements are associated with breastfeeding duration in addition to employment situation. There is recent evidence of the potential that child care providers have for helping mothers continue to breastfeed infants once they return to paid work. Rosenthal, Croley & Curry (2008) found that family child care providers view themselves as facilitating health promotion with the children in their care, either directly by affecting the child's physical health, or indirectly by supporting and educating parents.

My goal in this dissertation is to explore the potential of conceptualizing child care providers as health promotion agents who can support mothers in continuing to breastfeed after returning to paid work, and justify the child care environments inclusion in a large ecological framework that affect women's ability to continue breastfeeding. To do this I utilize three studies that cover separate but related aspects of this goal. In Chapter two, I document the rise of women in the workforce, and their parallel increased use of child care as well as trends in type of care utilized. I will discuss the role of employment on breastfeeding initiation and duration, and the potential health and monetary benefits to increasing breastfeeding among children in child care. The purpose of chapter two is to document that a large proportion of infants in the United States spend varying degrees of time with non-maternal caregivers, and that the type, duration, and quality of this care may influence the infant feeding decision making of mothers. In Chapter three, I utilize Ecological Health Promotion Theory to integrate child care givers, child care environments, and child care policies into a larger contextual framework on breastfeeding decision-making. In this chapter, I will also use this theory to outline my research questions, and

to discuss how each of my analyses inform and support child care providers to be included in an ecological model for breastfeeding .

My first analysis is qualitative analysis of 9 interviews conducted on three types of licensed child care providers in Nebraska. Together, Dr. Julia McQuillan and I interviewed these nine providers to assess their attitudes and beliefs about the importance of breastfeeding in general, perceptions of the importance of breastfeeding as a health behavior within the child care facility and their role in promoting breastfeeding among their clientele. Using MAX QDA, I identify and document these themes in Chapter four. These interviews informed the creation of a survey aimed at assessing child care provider's experiences, attitudes, and beliefs about infant feeding. I use the data collected with these mail surveys for the analysis in chapter five. I sent this mail survey to 113 child care providers in Nebraska who were participants in an ongoing study of child care quality. My goal with the mail survey of child care providers was to better understand how the patterns in child care provider breastfeeding attitudes and beliefs identified in the qualitative interviews are associated with child care type, setting, and child care provider characteristics. Utilizing this information, I create a construct to measure child care provider attitudes and beliefs on the importance of breastfeeding. I assess the validity of the resulting scale using factor analysis, cronbach's alpha, and associations with theoretically relevant variables such as; personal experience breastfeeding, proportion in care who received only formula, proportion in care who received breast milk, programmatic support for breastfeeding, and child care provider confidence in feeding infants breast milk.

For the final analysis in chapter six I utilize the National Institute of Child and Human Development's Study of Early Child Care and Youth Development (NICHD SECCYD) to test the ecological model of breastfeeding. This final substantive chapter evaluates components of

Ecological Health Promotion Theory. I use variables related to mothers, child care providers, and organizations to assess if associations predicted by EHPT exist with breastfeeding duration. For women who re-enter the workforce after the birth of a child, I will assess if child care type, quality, and organization affect breastfeeding duration.

Chapter II

Literature Review

The choice to breastfeed is only one of many decisions parents make. Studies of breastfeeding show that this decision is often influenced by other choices parents make. For example couples make decisions about who will be in the workforce and who will care for the child. If there are two parents, both parents are in the workforce couples need to alternate schedules or find child care. Parents also need to decide how soon children need to start child care, who will provide care, and how many hours the child will be in care. The EHPT highlights how choices are constrained and facilitated by individual and social location characteristics such as wages, race, age, marital status, social networks, and family support. Larger social institutions provide additional important social context for seemingly private decisions. For example, are employers child friendly? Is their paid leave available? Is it a workplace that is required by FMLA to provide unpaid leave and job protection during the 12 weeks after birth? Finally, is there accessible and affordable quality child care available?

In this chapter, I will document the rise of women in the workforce, and their parallel increased use of child care as well as trends in type of care utilized. I will discuss the role of employment on breastfeeding initiation and duration, and the potential health and monetary benefits to increasing breastfeeding among children in child care. Finally, I will discuss how child care providers fit into an Ecological Health Promotion model to facilitate breastfeeding, a model that takes into account all the complex decisions that take place in a social ecological environment.

Women and Work

There is a greater need to understand the role of child care in infant feeding because the majority of mothers today are employed and using child care. Women have been entering the workforce in a greater number with the pace picking up dramatically during the early 1940's. Though some women have always depended upon paid employment for their families' survival, today, the vast majority of women have paid work. The transition of women into the workforce is particularly pronounced for married women and mothers. As shown in table 1, in 1900 43.5% of single women were employed and only 5.6% of married women were employed, these numbers grew to 46.3% and 23% in only 50 years, and by the end of the 20th century to 68.9% of single women and 61.1% of married women were employed (US Census Bureau, 2003).

--Table 1--

Marriage has been historically tied to parenthood, and these numbers are an approximate representation of the rise of working mothers during the course of the 20th century. Indeed, as Figure 2.1 indicates, the dramatic rise of women in the workforce in only the last 25 years, rates of labor force participation are actually higher when we include all mothers, regardless of marital status. In addition, these numbers have increased appreciably for mothers of children of all ages, but particularly for young children. In 2003, 77.8% of mothers with children age six to eighteen were employed. The number of mothers with younger children used child care a little less, on average, but the trend is the similar for younger children.

--Figure 2.1--

In 2007, 63.5% of women with a child under age six were employed, while 60.1% of mothers with a child under the age of three worked. Since the late 90's, the numbers have declined slightly, but have remained steady until 2009. In a recent analysis, Cohany and Sok (2007) used the Current Population Survey to assess labor force participation of married mothers of infants

(<12 months) between 1997 and 2005. They found that labor force participation for this subgroup of mothers, though still high, actually decreased slightly after the late 90's across all education levels, maternal age levels, and most income levels. Surprisingly, even among mothers with husband's whose income is in the top 20th percentile, labor force participation of mothers of an infant was 48 percent, almost identical to those with husbands whose earnings were in the lowest quintile (47%). Therefore employment for women is only sometimes about economic need.

In the United States, race and gender have strong associations with workforce participation. Cohany and Sok (2007) found that African American married mothers of infants were more likely to be employed than white women, and much more likely to be employed than Hispanic women. "In 2005, 65 percent of black non-Hispanic married mothers of infants were in the labor force, compared with 58 percent among white non-Hispanic married mothers, 51 percent among Asian non-Hispanic mothers, and 34 percent among Hispanic mothers. The participation rate of white mothers fell by 4.5 percentage points since 1997, while the rate for black mothers stayed about the same," (2007, pg. 12).

As Cohany and Sock's study indicates by its focus on only married mothers, the affect of family structure, or whether there are two parents in the household, on labor force participation and child care is an important factor. Compared to preschool age children in married households, preschool age children in single parent homes are four times less likely to be cared for by their fathers while mothers work (Chaudry, 2004). Children in single parent families are cared for by their fathers 6%, and by their mothers only 3%, compared to 6% and 23% for married couples (Chaudry, 2004).

Family structure affects the use of child care in other ways. For married households, or other types of households with two incomes, the opportunity costs for working are higher, child care affordability and the earnings of both paid workers influence whether, and for how long, a parent leaves the workforce. In single parent households, the impact of earnings and child care cost and accessibility on workforce participation is less, (Blau, 2001). The poverty rates among single parent families are six times that of married couples (Hoynes, Page & Huff Stevens, 2006). Thus welfare policy and child care subsidization disproportionately affect this group. Since the enactment of the Personal Responsibility and Work Opportunity Reconciliation Act PROWRA in 1996, there has been an increased focus on facilitating participation in employment and employment-related activities such as education and training. According to Blau (2001), in 1992 the labor participation rate of single mothers was 12 percentage points lower than for married mothers, but by 1998 it was 4 percentage points higher. Mothers more likely to be employed or in school than mothers who do not receive such subsidies (cite). Blau and Tekin (2007) found that welfare participants are much less likely to be employed than are non-participants, but the increase in employment associated with receiving a child care subsidy among welfare recipients is larger than among non-recipients. The National Research Council and Institute of medicine (2003) estimates that in the U.S., one third of the costs of child care for children under age six is paid for by government subsidies.

Federal and state laws influence the work decisions of mothers of very young children. Currently, in the United States, there are two federal laws that *may* have ramifications for both pregnant women and families experiencing the birth of a child. The Pregnancy Discrimination Act was added as an Amendment to the Civil Rights Act in 1975. Not only does it prohibit employer discrimination toward pregnant women in hiring and firing, but it also requires that

firms that provide Temporary Disability Insurance (TDI) must cover pregnancy as a temporary disability. Employees are still required to use vacation and sick time before they are covered, and this type of income replacement only applies to workers who have access to this benefit. The Family Medical Leave Act FMLA was passed in 1993. This bill guarantees 12 weeks of unpaid, job protected leave, to individuals experiencing a birth, adoption, or serious illness in their family. It only applies to employers with 50 or more employees, and thus excludes an estimated 40% of the workforce (Waldfogel, 1999). US women whose jobs provide leave coverage are less likely to return to work in the first 12 weeks after giving birth – the length of federally provided leave under the FMLA – but then return more quickly thereafter (Berger and Waldfogel, 2004).

The majority of women return to work rather quickly after giving birth, which influences breastfeeding duration and exclusivity. Klerman and Liebowitz (1999) found that at 1-month after childbirth, 48% of women were employed, though only 15% were physically working (the rest were on leave). Whether women returned to the same job was largely a function of their pre-pregnancy working status. Less than 10% of women working part-time pre-pregnancy returned to the same job, while 60% of full-time workers returned to the same employer 6 months after birth. Employment is a function of both individual and structural factors in the communities in which workers reside.

Women in the United States with very young children very often choose to combine paid work and parenting. Often, this means the child will require care while the mother is at work. The use of child care has increased dramatically. After discussing the parallel increase in the use of child care, I will discuss the research on work and breastfeeding, and I will argue for the

inclusion of child care as a unique and separate influence that is necessarily intertwined with work.

Child Care in America

Understanding how child care characteristics are associated with infant feeding is particularly important in the United States where child care use is relatively high, and regulation low, compared to most other developed countries. In a study comparing 22 countries, America ranked second highest in the proportion of children <3 in child care, an estimated 31% (Bradshaw & Finch, 2002). Among these 22 countries, the US had the highest cost of care by a large margin; a two earner family can expect to pay 68% more for a child in the US than the second costliest country, the UK. There are 11.3 million children under the age of five in all types of child care in the United States. According to the National Survey of America's Families, an estimated 60% of children under the age of five have some form of non-parental care arrangement, with 60% of those in center based care. Figure 2.2 summarizes these findings by income.

--Figure 2.2 --

Higher income families with children under 5 are more likely to utilize center based care and family child care (in the provider's home, provider is non-relative), while lower income families use relative or parental care. According to the survey of Income and program Participation (SIPP), among employed mothers, 16.2% of children under the age of 1 are in child care centers, with the number in formal centers increasing to 21% for children age 1 or 2. The rest are taken care of by other parents, or other relatives. Grandparents care for 25% of children under 1 and 21% of 1 to 2 year olds. Mothers who are lower income and who receive TANF, who are black, and who are employed full-time in a day shift are much more likely to use center

care (U.S. Census Bureau, 2004). For children under age 5 in all forms of care the average weekly expense is \$128, though this estimate is low as it includes part-time care and unpaid care provided by relatives. Cost of child care depends upon income and subsidies. The higher a persons' or families' income, the more they generally pay for care and the higher quality of care they receive.

One of the key factors enabling mothers to work is access to child care for their children, particularly for preschool aged children. Insufficient child care options are commonly cited as a barrier to employment, particularly for married mothers (Kimmel, 1997). Unlike K-12 schools, in the United States, child care is a private enterprise that is for profit, and being such, the cost, availability, and quality are theoretically linked to market forces, supply and demand. With the increase in the labor force participation of women with children, this demand has increased. One of the major trends in the change of demand during the last 30 years is the shift from informal relative care and/or non relative care in a family home, to formal care in child care centers (Blau, 2001). Between 1965 and 1997, the use of organized child care centers increased from 6 percent to 25 percent (Smith, 2002). During the same time period the percent of children in relative care decreased from 33 to 21 percent of all care providers. Amount of hours in relative care and the types of hours the mother is employed also affect child care demand and use. Women who are employed part-time or night shifts are much more likely to use informal types of child care.

In the US, child care arrangements are vast and varied. Unlike some industrialized countries with nationally state provided healthcare (Norway, for example) there is no centralized system even monitoring the cost, quality, or access of preschool care. Indeed, until the National Institute of Child Health and Development (NICHD) began its longitudinal Study of Early Child Care and Youth Development (SECCYD) in 1991, little was known about the array of child care

arrangements most families use, nor the affect of child care use on child health and developmental outcomes.

The NICHD study includes types of non-maternal care received by more than 1000 U.S. children, studied from birth to 54 months in the NICHD SECCYD. Researchers found very little evidence to support a clear pattern of non-maternal caregiving in the first year of life (2007). The majority of children experienced multiple types of care with varying degrees of structure. Individual children tended to experience a variety of different types of care and not to fit into clear patterns of either stable care types or progressive patterns of movement from less structured to more highly structured care settings. They found that hours in center care tended to be higher during the preschool age, while relative care remained stable and home based child care decreased as children aged from birth to 12 months. Mothers who were single, had higher SES and fewer children were more likely to use center care, while single mothers and those with fewer children also used more hours of care in child care homes (NICHD Early Child Care Research Network, 2004). Thus child care providers spend a considerable amount of time caring for children in our country, and may be an important but overlooked influence on many parental choices. In the NICHD SECC, 81% of infants experienced regular nonmaternal child care during the first 12 months, with most starting prior to 4 months of age and enrolled for close to 30 hours per week. Fewer than one in five infants spent the entire first year at home with no supplemental care. Almost 50% were cared for by a relative when they first entered care. Infants in child care experienced, on average, more than two nonparental arrangements during the first year. The results reveal high reliance on infant care, very rapid entry into care post-birth, and substantial instability in care (NICHD Early Child Care Research Network, 2004).

Thus there is a patchwork of care in the US, with little regulation regarding quality. It is likely, however, that higher quality child care will positively influence breastfeeding duration for employed mothers. Quality child care can be defined in a number of ways. A child care arrangement is considered to be of high quality when they meet maximum child-staff ratios and group sizes by age of the children in care; curriculum content; minimum staff qualifications for alternative levels of responsibility; health and safety standards; and standards for other program characteristics (Hayes, et al., 1990). Unfortunately, relatively little is known about quality of child care in the US, especially in family care homes and for infants (Blau & Currie, 2003). In Blau and Currie's research links the economics of paid work and early child care and the quality and developmental outcomes associated with non-parental care. They assessed two highly regarded studies on child care quality and found that the overall average rating of quality in the center's studied was between minimal and good. Preschool age children are almost always rated to be of higher quality than infant-toddler rooms, by a fairly wide margin. With only a few exceptions, non-profit centers receive higher average quality ratings than for-profits. Similar analyses assessing quality of child care arrangements were assessed by the NICHD Study of Early Child Care. This study assessed standards using child staff ratios, group sizes, caregiver training, caregiver education, and children's development at 24 and 36 months of age. They found that most classes that they observed did not meet recommended standards, and similar to other studies of quality, compliance to these standards was inversely associated with child age. Compliance ranged from 10% at 6 months of age to 34% at 36 months of age. Though the majority of U.S. children receive non maternal care by 12 months of age, factors influencing the quality of care a child receives varies significantly. The United States does not have a coordinated and comprehensive child care regulatory system. There is some regulation, however.

The National Association for the Education of Young Children (NAEYC) is a voluntary accreditation organization that specifies quality indicators. Other variables to consider in addition to quality are the number of hours in care, and the number of care arrangements.

In conclusion, many factors affect the timing, type, and usage of child care in America; work shift, supply, age of child, work schedule, and cost of care all influence the type and quality of care infants receive. These factors sort women into different types of care, bringing into question whether women who want to continue breastfeeding are able to choose care based on their preference, or, whether they must negotiate their preferences with the care setting that is available to them. Studies suggest that few women are able to achieve their preferred care. Riley and Glass (2002), in a regional sample of 268 employed mothers who indicated they intended to use child care during the prenatal period, a full 78% did not end up achieving their preferred type of care (father/relative care) at 6 months. In this study, factors that influenced whether they found their match were number of hours worked by the mother, and type of shift worked by the mother.

The decision to breastfeed is often conceptualized as personal and based on individual preferences, however, research has indicated social constraints related to work, family structure, economic inequality and child care also play a role in breastfeeding initiation and duration. Ecological health promotion theory indicates that there are layers of factors that constrain individual breastfeeding choices. The CDC's national immunization survey indicates that women who are primiparous, are white, educated, are married, have a higher income, and who are older are much more likely to breastfeed than other mothers (CDC, 2005).

My focus is on the effect of child care on breastfeeding duration, but the causal direction could be in the opposite direction. Some mothers are likely to select care to accommodate their

infant feeding choices. I do not have data to assess this rival hypothesis, but recognize that as a limitation of my work. Because many mothers are not able to obtain their preferred care arrangement, however, it is likely that at least some of the association (if there is one) will be in the proposed direction – provider characteristics to infant feeding practices. Additionally, one way that providers can be health promotion agents is to be more forthright in advertising “breastfeeding friendliness” – thereby helping mothers looking for support to find it, and planting seeds for other mothers that this may be an important criterion for seeking child care. In addition, our theoretical model indicates that the selection hypothesis need not be excluded from our theory for our other hypotheses to be supported. All could theoretically be integrated into a larger ecological perspective of health behavior. It is a constraint on the current analyses that we can not assess child care preference, work preference or how breastfeeding intentions affect those choices (and vice versa).

The Importance of Breastfeeding Promotion for Working Mothers

Why facilitate breastfeeding for working mothers in child care settings? Reasons include maternal and infant health, public health care savings, employer savings (less sick time), and social justice. For example, there is considerable evidence (outlined below) increasing breastfeeding duration among duration for infants in child care should lower healthcare costs and missed days of work.

Many factors influence mothers’ decision to breastfeed. On average, women who are first-time mothers, who are older, more educated, from non-minority groups, and from the west are much more likely to initiate breastfeeding, breastfeed exclusively, and breastfeed for longer durations than other mothers in the United States (CDC, NIS, 2008). An important factor

associated with the initiation and duration of breastfeeding is employment status, shift, and number of hours of work. Women working full-time prior to their pregnancy were much less likely to breastfeed, but women working part-time were not significantly different from women without employment (Fein & Roe, 1998). In addition, women who worked full-time at 3 months postpartum breastfed for 8.6 fewer weeks than women who were not working or who were working part-time (<4 hours a day). A recent study had similar findings, using the National Longitudinal Survey of youth, researchers utilized propensity score matching in order to control for selection effects related to breastfeeding and employment (Waldfogel, Hill and Berger 2005). They found that women who returned to work within 12 weeks were 13% less likely to breastfeed and breastfed for 41% fewer weeks than women who returned to work after 12 weeks.

There has been considerable research as to the health risks of the use of child care, evidence from this research indicates that rates of communicable illnesses are higher for children enrolled in daycare, but could be buffered by increasing rates of breastfeeding for mothers who use care. In a study using the NICHD SECC (2001), researchers found that Rates of illness were higher in children in child care than for children reared exclusively at home during the first 2 years of life, but the differences were non-significant by age 3 years. Number of hours in child care per week during the first year and number of other children in the child care arrangement were positively associated with the rates of illness. In a study conducted by the same research network (NICHD, 2003) looking at children entering care after 3 years of age found that for children ages 36 to 54 months old, rates of upper respiratory illness, gastrointestinal illness, and ear infections were higher in children enrolled in child care arrangements with more than 6 children.

These findings show conflicting results even with the same sample of children (though at different ages). Child care is associated with greater risk of communicable diseases based on the

size of the center and the age of the child, but children who entered care sooner than age three were at a reduced risk compared to those who entered only after age 3. This is commonly referred to as the hygiene hypothesis. Given the health benefits of breastfeeding, it is possible that children who enter center care later but who were breastfed may have more immune protection than children who enter child care later but were not breastfed. Also, children who enter child care before age 3 but were not breastfed should experience more illnesses than those who enter early and are breastfed.

Unfortunately, there are few studies that I could find looking at an interaction between daycare communicable illness, and breastfeeding as a buffer. Some studies hint at this relationship. Pettigrew et al. (2003) found fewer physician visits for communicable illnesses (otitis media, respiratory infection, et cet.), for mothers who breastfed with a significant dose response, but the caveat was that this was only for first born children without siblings in outside care. Similarly, Duffy et al. (1997) noted a two fold risk for otitis media children who were exclusively formula fed in the first 3 months, with daycare outside the home as an additional competing risk factor. Neither of these studies reported testing whether breastfeeding remained a protective factor against otitis media for infants who attended daycare outside the home. Health outcomes are not assessed in this study, but these studies of child care and communicable illness show that child care itself may be a risk factor for illnesses that breastfeeding appears to reduce. Increasing breastfeeding in child care settings could have an effect on these illnesses and should be studied further as a protective mechanism so that rates of communicable illness in the child care population could be reduced.

In addition to possibly lowering the incidence of some infections in the child care setting, there are other benefits to facilitating breastfeeding for working mothers. A study assessing

maternal absenteeism related to child illness found that working mothers who breastfed accounted for 25% of absences while non-breastfeeding mothers accounted for the remaining 75% (Cohen, Mrtek & Mrtek, 1995). Unfortunately, this study was not experimental and relied on comparison groups and convenience samples; more studies need to be conducted in this area.

These studies indicate a benefit to mothers, children, child care providers, and employers in increasing and supporting continuation of breastfeeding after mothers return to work. Though the scope and impact have not yet been empirically quantified, what has been done indicates that promoting breastfeeding among working mothers is a worthwhile and important endeavor in our society. The vast majority of women intend to breastfeed, many do not achieve their goal. If unnecessary social structures are inhibiting maternal preferences to engage in behaviors that are beneficial to their own and their infant's health, it is important to change those social structures.

“When child care settings become strong partners and advocates in encouraging mothers to continue to breastfeed, the benefits to families and communities are likely to be enormous. And child care settings themselves benefit from the improved health status of the children in their care.” – Committee on Breastfeeding 2002

Current Child Care Breastfeeding Policy

A link between breastfeeding promotion and the enhancement of child care access, quality, and affordability in the US has not been clearly and forcibly advocated within the community of researchers focused on each of these areas. For many employed mothers, however, child care and breastfeeding policies intersect in important ways. There are popular press articles that suggest conflicts between breastfeeding mothers and their child care providers. A news story originating from Ohio that received national publicity detailed one mother's experience (2007, - looking for original source). In this case, the mother was charged an extra \$50 dollars a week to

care for her three month old infant, with the child care center's rationale being that her pumped breast milk was biohazard and required special storage and handling. Although this story is not representative of the majority of providers, it highlights the ambiguity of handling feeding human milk in a child care setting. The Ohio rules of Administrative code for licensed child care providers indicate that there are procedures and rules in place for the safe handling of human milk; they were not followed in this instance, however.

Indeed, agencies such as the National Association for the Education of Young Children (NAEYC) has a detailed guideline on the use of human milk in NAEYC accredited center with the specific goal of promoting breastfeeding, (NAEYC, 2009).

The program supports breastfeeding by:

- accepting, storing, and serving expressed human milk for feedings;
- accepting human milk in ready-to-feed sanitary containers labeled with the infant's name and date and storing it in a refrigerator for no longer than 48 hours (or no more than 24 hours if the breast milk was previously frozen) or in a freezer at 0 degrees F or below for no longer than 3 months;
- ensuring that staff gently mix, not shake, the milk before feeding to preserve special infection-fighting and nutritional components in human milk; and providing a comfortable place for breastfeeding and coordinating feedings with the infant's mother.

These practices, however, are not evidence based, and consequently, some of their recommendations are counter to what lactation experts would recommend. For example, in NAEYC guidelines further outlining infant feeding policy, they require that, "Staff discard after 1 hour any formula or human milk that is served but not completely consumed or is not refrigerated." This recommendation is counter to evidence that demonstrates the resilience of human milk at room temperature (for up to 8 hours). Yet Ohio's guidelines, for example, require refrigeration of human milk in all cases, even if mother expressed the milk that morning, again ignoring guidelines about the safe storage of human milk. If providers follow these guidelines, at

worse they may throw away perfectly safe human milk and they are undermining the work and effort that is often expended by working mothers to express milk only to achieve a congruence with standards designed for infant formula.

With the patchwork of care within and between states in the US, and with varied licensing conditions and rigor of enforcement, it is difficult to truly know how breastfeeding is addressed by different child care providers. The one aspect of continuity across the US within the majority of child care programs is the USDA Child and Adult Care Food Program (CACFP). This program is administered in most States by State educational agencies. This program reimburses daycare providers, including in-home family care providers and child care centers, with meals and snacks for eligible participants. CACFP reimburses providers for administering infant formula. Beginning in 2000, in order to promote breastfeeding as a health and nutritious meal, CACFP began reimbursing child care providers for providing breast milk to infants at the same rate they reimburse for formula. Given the high cost of formula, and that breast milk is free and provided by the mother, this is a bold reinforcement for providers to promote breastfeeding (U.S. Dept. of Agriculture, 2000).

The evidence for breastfeedings health benefits is overwhelming, and the potential for cost savings in health care dollars, reduced absenteeism, and fewer communicable illnesses in child care are strong. Many influences impact breastfeeding intentions, however, and women's choices are constrained by numerous factors related to the availability of paid employment, paid leave off work, quality infant care (either by a relative, in a home or center). How do all of these influences work to influence breastfeeding duration? In the next chapter, I discuss a broad theoretical model that incorporates influences ranging from individual, to the societal. I will use

this theory to guide and interpret my research and findings in the following chapters and analyses.

Chapter III

In this chapter, I explore the ways in which non-maternal child care for employed mothers is embedded within a framework breastfeeding decision making that includes individual, social, and societal influences research has already shown impacts breastfeeding duration.

Bronfenbrenner's Ecological health promotion theory (EHPT) is a multilevel, multidisciplinary theory that focuses on different levels of influence on individual health (Bronfenbrenner, 1986). Individual decisions about health are complex, and often happen in contexts where beliefs or intentions are constrained by other social forces. This theory guides my conceptual model of breastfeeding duration. I begin this conceptual model by focusing on personal beliefs and intentions regarding breastfeeding, consistent with the EHPT focus on individual health behaviors. The first dimension is individual characteristics, labeled the microsystem, it includes sociodemographic characteristics of the mother, as well as those of other individuals with who she interacts. For new mothers considering infant feeding, this inner circle includes the infant, and other individuals who make up their social supports. I argue that for mothers who are employed, this inner circle should also include the child care provider. The microsystem also includes psychological characteristics of the mother such as attitudes, beliefs, intentions, self efficacy and medical locus of control. Some dimensions are both individual and social, such as labor force participation and work hours (Grzywacz & Fuqua, 2000).

Bronfenbrenner classifies the mesosystem as the relationship between different structures of the microsystem, such as the interconnection between work and family structure, or for the current study, the intersection of work and child care (Berk, 2007). Child care environment (type, quality) may also be influenced by the quantity and quality of the interaction between child caregivers, mothers, and infants. placing this in the mesosystem as well. Microsystem

variables interact to form the mesosystem; although distinctions can theoretically be made between these different variables, there is no clear distinction in the real world where health decisions actually occur. Therefore, certain variables may fall into more than one category in Bronfenbrenner's theory, and there may be disagreements about where a specific variable might influence the individual's health behavior. Although many of the same variables are at the micro and meso system, the microsystem focus is on the individual alone, the mesosystem's primary focus is on relationships among elements in the individual systems embedded within it.

The outer circle consists of the exosystem, which encompasses both the mesosystem and the microsystem. These can include formal and informal surroundings and policies affecting child care centers such as licensing and accreditation. Finally, the macrosystem contains all lower order systems, but aggregated to the highest social level. The macrosystem therefore includes cultural ideology, belief systems, and large scale social policy.

Figure 3.1 is a conceptual model that includes the many social and structural influences related to child care at each level, and that ultimately may be related to breastfeeding duration. This dissertation focuses on the microsystem, mesosystem and exosystem. I am unable to include important macrosystem factors because of data limitations, but plan to study them in the future.

--Figure 3.1 here--

As we have seen thus far, child care providers are just one of many factors within the ecological framework that EHPT suggests should influence breastfeeding duration. Figure 3 is not representative of all the factors influencing infant feeding decisions. Instead I focus only on relevant child care variables suggested by the ecological model. Prior studies of breastfeeding duration have shown the importance of spouse support, hospital practices, employment and

employment characteristics, plus laws and policies. Child care providers have not been explicitly studied but are potentially an important component in the ecological system. It is likely that providers encourage or discourage particular infant feeding practices. Because of the large number of infants in child care and the large numbers of mothers with paid work who return to employment in the first year after giving birth, it is important to assess the whole ecology of infant feeding that includes child care – not just mother characteristics, family characteristics, or employer characteristics.

In the ecological model I place mother individual characteristics in the center, or in the microsystem. These characteristics include age, education, income, timing of return to work, work hours and work hours, as well as her attitudes and beliefs about raising children. Also, at the individual level, I place characteristics of the child care providers; education, experience, race, relationship to the mother, and attitudes and beliefs about raising children. I focus on child care providers because I have not found any literature on child care provider attitudes about infant feeding. Also, I wanted to assess if providers perceive themselves health facilitators through their interactions with parents.

If child care providers already influence breastfeeding duration, then building on this correlation should leverage longer breastfeeding duration for employed mothers. Therefore I will assess if provider beliefs are correlated with breastfeeding friendly behaviors such as providing a place to nurse, giving information about breastfeeding, and communicating about infant feeding. The role of child care providers as facilitators of breastfeeding is the bridge that connects the microsystems of provider and mother, to the mesosystem where the two interact. All of these variables take place in a negotiated setting between provider, mother, and infant. Other variables at the mesosystem level are age of onset of child care, hours in child care, child care structural

characteristics that relate to quality (licensing and type of care), and child caregiver interaction/communication. At the exosystem, I include child care licensing, accreditation policies, and informal to formal types of care. I conceptualize cultural practices and beliefs about breastfeeding at the macrosystem, but I have no measures of this concept for the following analyses. An important benefit of applying an ecological model to understanding health behaviors is its ability to provide program planner with a perspective that requires the design of multiple intervention strategies to address health promotion. Often, the focus of health promotion is on changing individual attitudes and beliefs about the health behavior. This often ignores the social and structural influences, and places the blame and responsibility on the individual. Thus, if a mother succeeds or fails at achieving her goals for infant feeding, the blame is solely on her and the structural factors ignored. The EHPT requires policy planners to take the focus off of individuals and to place the focus on the numerous influences research shows are related health behavior, specifically in the social environment (Eddie, Donahue, Webster & Bjornstad, 2002). Placing child care within this ecological model affecting breastfeeding is an important recognition of the role of child care in health promotion in general.

From a sociological perspective, it is important to understand how structural changes can influence individual health behaviors. Based on past research and EHPT, I expect to find that variables associated with type and quality of care will have an important influence on breastfeeding duration for employed mothers who use non-maternal care. If there are modifiable structural factors within centers or work places, these are very important to identify for policy makers. The goal of this dissertation is to assess whether the characteristics of child care providers facilitate or inhibit employed-mothers continued breastfeeding. If child care providers do vary in their ability to facilitate or inhibit breastfeeding, it is important to identify which

factors may be most amenable to change in order to not discourage and perhaps even promote breastfeeding. Thus, the long term goal would be to use the evidence gathered in this study and future studies to create a focused intervention aimed at increasing breastfeeding in the child care setting. Prior to doing this, we need to better understand whether child care providers view themselves as influences on infant feeding choice, and whether they vary in their health promotion beliefs and programmatic policies. If they do vary in their perceptions, and policies, do these variations have any relationship to breastfeeding duration in their centers, and do they view their current policies as negatively or positively influencing breastfeeding? Whether they view themselves as lay health advisors, do their policies result in the cessation of breastfeeding, are they neutral, or are some providers more likely to promote breastfeeding as a positive goal for their clientele? Child care is a crucial link between mothers, employers, and children, and it may be an ideal setting in which to implement programs aimed at increasing breastfeeding duration. My specific goals are to:

1. Assess how child care providers see their role in infant feeding and in facilitating breastfeeding duration for employed mothers. (Chapter 4)
2. Assess if child care providers vary in their ability to support employed-mothers ability to continue breastfeeding after the return to work. (Chapter 4 and 5)
3. Develop an instrument for measuring child care provider attitudes, beliefs and practices that is associated with provider reported breastfeeding in centers. (Chapter 5)
4. Assess if there is a connection between child care type and quality and child care breastfeeding friendliness. (Chapter 5)

5. To test a multivariate ecological model predicting breastfeeding duration that includes work variables, maternal characteristics, child care provider characteristics, and child care use and type. (Chapter 6)

These steps suggest that there is a connection between child care quality (measured by caregiver characteristics such as education, experience, motivation, center type, and accreditation) and the promotion of breastfeeding. The next three chapters provide the results from three substantive studies.

CHAPTER IV

Analysis I

In this chapter I will discuss a series of interviews conducted with nine child care providers in a mid-size city in eastern Nebraska. The purpose of these interviews is to gain an understanding of the role child care providers potentially play in facilitating good infant nutrition and breastfeeding. How do providers conceptualize their role in infant feeding and in facilitating breastfeeding duration for employed mothers? Do they think of themselves as potentially have a role in facilitating continued nursing between mother and child? These interviews have been analyzed and presented at the National Council on Family Relations (Hill, McQuillan 2007), and they were integral to the formation of the questionnaire used in the study and analysis I will be discussing in Chapter 5 of this dissertation. For this analysis, I used the program, MAXQDA 2007, to analyze and code all nine interviews. The general interview guideline we used during the course of these interviews is in Appendix A. MAX QDA is a program that allows researchers to easily search, and code themes and topics from transcribed qualitative interviews. Numerous themes emerged during the course of the interviews. The interviews were recorded and transcribed by trained transcribers. Initially, I read the interviews in their entirety to search for emerging themes and MAX QDA aided in sorting and managing the data in order to better organize the analytical categories. Definitions of the categories of analysis were developed and refined based on the analysis.

I chose the sample of child care providers from a publicly available list of licensed centers provided by the local health department. All of the child care providers on the list were licensed to care for infants during the study period (June 2006). There are three types of childcare licenses in Nebraska that allow infant care: Family Home I, Family Home II, and

Child Care Center. I randomly selected a total of nine providers, prior to selection the list was stratified by licensing type. A broad selection of providers with the different types of licenses was important, as child care program size increases (serves more children), license types change, and organizational and educational requirements mandated by the State of Nebraska increase. Consequently, there may be differences in quality of child care due to variation in age and education of child care providers, particularly due to an increase in formal policies and procedures required at higher licensing types. Child Care type is an important component to the Ecological Health Promotion Theory. In the conceptual model, I placed provider sociodemographics and attitudes/beliefs on infant feeding in the micro-system of the provider, but as center size increases and becomes more regulated, mesosystem licensing requirements begin formalizing child care, which then selects certain providers with more formal training, higher education, and perhaps different infant feeding attitudes and beliefs. In addition, meso system factors related to child care type, licensing, and accreditation also may affect the caregiver and parent interactions, they may also become more formalized.

Initial contact was by phone, potential interviewees were told their participation was completely voluntary and confidential, and that they would receive \$25 as a token of our appreciation for their participation. I offered to interview providers at their child care site, or gave them the opportunity to come to an office on campus. Three providers declined to be interviewed during the initial phone contact and alternates were randomly chosen. All nine providers who eventually agreed to be interviewed during the initial phone contact went on to participate with the in-person interview, although one provider chose to not have their interview recorded.

Childcare programs with a Family Home I licensing are always in the residence of the provider. Providers with a Family Home I license can care for up to eight children, plus two additional school age children during non-school hours. They can have up to three infants, only two of which can be under 12 months of age at one time. If the provider only provides infant care, they can care for up to four (infants are age 18 months and younger). In this study, three of the providers we interviewed had a Family Home I license, all served mixed age groups, and all had cared for infants in the last 12 months.

A provider with a Family Home II license does not have to provide child care in their family home, though all three women we interviewed with Family Home II licenses did so. Programs with a Family Home II license can serve up to 12 children and have up to two staff members. As child care programs grow many opt to transfer licenses from a Family Home I to Family Home II in order to meet higher demands and to have more flexibility regarding the number of children served at any given time. Because many Family Home I providers already have designated someone who can substitute for them, it is relatively easy to include this person as a staff member in Family Home II and to be able to provide care for children during non-school days, during summers, and for children who come to the center only part-time.

In order to apply for any child care license in the state of Nebraska, providers must be certified in CPR, first aid, and attend a pre-service training. All programs must pass an inspection by the state Fire Marshall and Nebraska law requires the Department visit newly licensed Family Child Care Home I and II providers within 60 days after the issuance of a new license. Nebraska law also requires the Department to make at least one unannounced inspection to all Family Child Care Home I and II programs each year.

Child Care Centers are required to have pre-licensing inspections before they can begin operation. Nebraska law also requires the Department to make at least one unannounced inspection to all Child Care Centers who have capacities of less than 30 and two unannounced inspections to programs who are licensed for 30 or more two times each year. Other visits conducted to Child Care Centers include: 1) Complaint investigations (these are unannounced), 2) Change of location, 3) Consultation/Technical Assistance (these are scheduled and conducted only at the request of the provider)

As shown in table 4.1, the nine providers interviewed had over 140 years of informal experience caring for children, and 75 years formal experience as licensed child care providers. The average age of the nine providers we interviewed was 40 years old; the youngest provider we interviewed was 22 and the oldest was 59. Three of the nine providers had Associates degrees in Early Childhood Care, while three other's had Bachelor's degrees. None reported having any formal training specifically on feeding infants, either in their course work, or through continuing education course work offered by the health department that is offered to local providers. Eight of the nine providers had their first experience feeding infants when they themselves were children, all of these discussed helping to care for younger siblings. All but one provider also had personal experience feeding and caring for their own biological children, and the majority of them had some personal experience breastfeeding their own children with one provider. Eight of the nine providers said that breastfeeding was important, all of them also said that 12 months was a good time to wean, though there were mixed opinions on how long was desirable. There was a lot of variation in interview length between providers, and though it was not discussed explicitly, those who had less experience feeding infants breast milk, had less to say about infant feeding. The second provider we interviewed, Jan, had no children, no experience feeding infants breast

milk, and seemed confused by most of our questions, her interview lasted 30 minutes. On the other end of the spectrum, we had Christa, a young mother breastfeeding her 5 month old son, whose awareness of policy, procedure, and communication within the center was extensive, her interview was an hour and a half.

Although our sample of providers came from a list of licensed centers, many of the care providers had cared for their own children in the center with other children, and/or cared for the children of relatives. The first person we interviewed, Kathy, had breastfed all her own infants and cared for her son's and daughter's children in the context of licensed home child care. Sue had a similar story, her daughter's family lived across the street and she provided care for their two children from when they were born. Some providers also cared for the children of friends and neighbors; social networking seemed to play a role in the smaller in-home care centers where word of mouth was generally how families were referred, often prenatally. As centers grew, the more they advertised. One of the child care centers recruited specifically from the low-income community as they belonged to a small local non-profit child welfare organization focusing on prevention of abuse in high risk, low income communities.

All but one provider had reported feeding expressed breast milk to infants and toddlers in their care, and all had experienced feeding infants formula. Although the majority of providers we interviewed discussed having an open door policy and even one boasted having a private space for mothers to nurse infants on-site, few reported mothers preferring to stop in and feed infants. Thus child care providers' primary experience with breastfed children was not accommodating onsite feeding, but feeding the children expressed milk supplied by the mother.

Perceived Barriers

In the context of feeding infants expressed milk, child care providers were asked if feeding infants formula or breast milk was easier, and if they had a preference for one or the other. We asked this question to better understand if the physical difference between preparing breast milk or formula resulted in any preference. Most perceived infant feeding in general as relatively easy compared to feeding older children. Every provider reported wanting to do whatever the mother wanted, although it is likely social desirability plays a part in this universal response. When probed further, some providers did, however, have definite opinions on whether they preferred feeding breast milk or formula. Cindy, a Child Care Home II provider said definitely:

Formula's easier. Plus breast milk usually comes frozen and you have to thaw it out and where formula, at least when they get older, you can use tap water and mix it up. And you can use the right temperature right out of the faucet. It is easier, the formula.

Amanda, a provider in a Child Care Home I indicated that feeding breast milk was more difficult because the infants knew the provider was not their mother, or that the infant preferred the breast over the bottle.

It, it is a little difficult the first couple of weeks, until they get used to you. I notice a lot of infants that are nursed have a really hard time getting used to another female holding the bottle and feeding them. And it probably has something to do with difference in chest size and smell, definitely smell. And, I noticed that my formula infants, I have no problem. They just automatically take the bottle, they're good to go, so.

Sarah discussed that heating up the breast milk using warm water meant it took more forethought and knowledge of the infants eating habits in order to have the breast milk ready before the infant cried to be fed, Sarah continued:

You definitely got to think ahead when it's breast milk, because if it's frozen in your refrigerator and the kids waking up and is going to be starving! You want to be prepared, unless you love to hear him scream. Which most people don't, you know, you want to satisfy them.

Although providers said they had no preference, it seemed that their perception was that infant formula was the norm, and they were quick to point out how breast milk deviated from this.

Communication

It was important for us to understand how providers and mothers communicated about infant feeding, do they see themselves as health promotion agents? Communication about infant feeding is an interaction among microsystems, and could be an important aspect of how mothers navigate breastfeeding, particularly supply and demand, and how this affects duration. Not only was there a lot of variation among providers who initiated communication on infant feeding, providers also indicated there was a lot of variation among parents that came to their centers. Despite the experience among these women, they viewed their role as facilitating and practicing parents' wishes as closely as possible, even when it was counter to their own experience. In this sense, providers did not view themselves in having an explicit role in either facilitating or inhibiting the infant feeding choices of mother, particularly in regards to supporting breastfeeding. Breastfeeding was seen as a preference and a choice made solely by the mother. Even though child care providers did not state that they were influencing parent choice, they often discussed being a source of information and support for parents. In this sense, their support and communication was implicit, but not always acknowledged by all providers. Christa, who worked in a child care center was the most explicit regarding her role in informing parents:

Christa: I would say the parents come to us for advice on a lot of things. I mean, uh---

Interviewer: They're young and they're less educated?

Christa: They're young, they're less educated, and we spend eight, nine, ten, sometimes eleven hours a day with their children. You know, they say 'nobody knows your children better than you do', but, I would say in this case we are on an equal plane, just because we do spend a lot of time with their kids.

In the interview above, the sheer amount of time shared between a provider and child often was cited as giving the provider, not just general expertise, but also child specific expertise in the eyes of parents. Other providers also would give advice when solicited on their own personal experience, or on what they thought based on other infants they cared for. Christa goes into more detail about communication, she says below she advises mothers based not only on personal and professional experience, but also recommends community resources and suggests when medical intervention might be necessary:

Interviewer: Is it ever difficult then, or awkward to talk to parents about infant feeding?

Christa: I really haven't had a problem with any of my parents. We're pretty open, as far as everything. So, I feel like I can say, you know, this is what's happening, I think you need to call the doctor. And they're usually, they're usually okay. I've never had a problem with a parent arguing with me about what my thoughts are as far as their feeding. If anything the parents usually call me on my off hours and ask you, has this occurred when you've been feeding other infants, or is this---

Interviewer: So, you're kind of the expert in some---

Christa: Yeah, sometimes, even on the breast feeding infants. I'm not sure if I answer all their questions correctly, anyway, but.

Interviewer: So, they come to you for information on breast feeding and other things. Do you usually refer them to the doctor, or do you...

Christa: If it's something medical, such as severe diaper rashes, or they're acid reflex is really kicking in. And it's real obvious that's what it is, I'll suggest that maybe they want to just call their doctor and ask. If it's something as simple as their milk letting down and stuff like that, I can give them a couple of suggestions, or tell them who they need to contact like Milk Works¹ and stuff, where they can---

I usually try to direct them where they can get the information. The state is really good about sending out a lot of information in packets. So, I have handouts for the parents, on different resources that are available. And I just try to point them in the right direction. They ultimately have to make the decision for themselves. Cause they're the parent.

It is important to note from this passage that, although Christa was herself a breastfeeding mother, she questioned her own ability answer questions ‘correctly’ about breastfeeding. Although child care providers didn’t explicitly link their communication as influencing (either facilitating or inhibiting) a mother’s ability to successfully combine work, child care, and breastfeeding, communication was very important to most of the providers. Many were reported that communication was very open, particularly during transition periods. For example, discussions often occurred when infants first came to the center, when breastfed infants were weaned from breast milk to formula, and when infants began to eat solid foods. Providers in Child Care Centers seemed to have more formal communication with parents on infant feeding and more opportunity to have an initial discussion regarding feeding preference prior to the child enrolling in their center. For example, April, the Director of a Child Care Center, said:

We usually encourage them to come out and tour before they commit to enrolling. So, it's during the tour that we say that 'we do provide formula, will you be bringing in breast milk, or will you bring, does your child consume formula?', and then it goes from there.

The programs licensed as Family Home I and Family Home II were more likely to already know the families prior to caring for their children, and also to care for siblings, and so had less formal communication prior to enrolling.

For mothers who provided both breast milk and formula, more communication was reported by providers, especially on the amounts to give the infant, and when to give an infant formula or breast milk. Four of the eight providers discussed maternal milk

production. Providers wanted to be sure to have enough milk for the infant when the mother was not available.. This is important because it is an example of infant, caregiver and mother interaction taking place in the mesosystem, and affecting breastfeeding duration.

One provider described this communication as necessary because parents may have more or less breast milk on any given day, particularly if they are struggling to produce enough milk.

She said:

I know when the mother here started to produce less milk, she let us know that hey, we might have to supplement today. She would tell us if she was able to bring in a bottle, or if she was able to come in and nurse, she would let us know ahead of time. At the two o'clock feeding go ahead and give him Similac, or something like that.(Christa)

Communication was also necessary when infants began transitioning either from formula to solids, or from baby food to table food:

And like when they are transitioning from the baby food to the table food, we will always check with the parents to make sure that, that is something they have started at home first so we're not introducing those new things at the center, that they are being exposed to them at home first and then we will go from there.(Christa)

When asked if parents or providers ever disagreed, this was the most common area where disagreement was expressed. The same provider responded:

We always go with the parent's request. We will give suggestions, or we will offer our opinions and say that no, we don't really think they're ready for this yet. But if they want us to try it then we will go with their suggestions.

In general, there was some ambivalence about who gets the final say on what or when infants eat. Although most providers said the parents had the final say, when probed for a hypothetical situation where a disagreement could occur, child care providers would often end up discussing

real world examples, April, the director at of a large center who began her career as an in-home provider explained:

Some parents will tell us that if the baby's hungry feed the baby. Other parents will say no, we have to be on this exact schedule. Then we start pulling our hair out then; "It's four o'clock the child will eat." What do we do? Then we have a mom that's mad, why didn't you feed? And we tried but, ---you know. (April)

Interviewer: Why, where do you think they get that? This schedule. Are you talking about breast fed, moms who are breast feeding, or more the infant formula?

I, I've had it both. Those darn books that say your child needs to be on a set schedule, about drive me crazy. Because babies aren't going to starve themselves. But we do, I mean we currently have a parent right now that the baby has to be fed at four o'clock. No later than four. We have to like practically, I feel like we're gagging the baby between four and 4:15, if it won't eat. So, that's a little frustrating because we don't want to upset mom, but yet I've tried to explain to her, "Well, they weren't hungry." And of course, "Well, you're not holding the bottle right." She'll come in and feed and of course the baby will take it like that. Well, you know it's been an hour since we tried, so of course. I think that's the only thing.

Generally, when there were disagreements, child care providers often cited doctors as the ultimate authority. In fact, seven of the nine providers brought up doctors in regards to infant feeding without any specific probe or reference, this was not something we anticipated prior to the interviews but was one of the most common themes that emerged. When a parent and provider disagree, a doctor's note is the final say. Sara, an in-home provider discusses her frustrations further:

No. The only thing that I cringe about is if they're putting baby food in a bottle. If they're going to eat solid foods I'd rather them eat foods, I would rather them eat with a spoon and not put cereal in a bottle. I do have one parent that brought me a doctor's note that said that she could do that, but I don't like to do that.

Another provider thought parents knew their children best, and that reliance on doctors for infant feeding was questionable, Patty, an infant provider in a larger Child Care Center said:.

No, because it's their child. And I'm finding a lot of parents are asking a doctor when to start feeding them, where in my day we just did it. I started giving my child Pablum, or baby cereal, when he was about three or four months old. And he was on milk, off formula at six months.

April, the Center Director, questioned the science due to the constant revision of guidelines regarding infant nutrition:

No. I think that's one thing about being in child care; things change. I mean I even saw it when I taught for seven years. You know, they'll say, and I was a special ed teacher; they'll say that well this is what we're contributing and then this and that. And then they change their mind. I think it's just; you have to kind of grow with the times I guess. And we, you know, it kind of goes along with one doctor will say one thing and the other doctor will say the other. So you kind of have to outweigh what you think and what the parents want you to do and what the doctor thinks. And sometimes that's hard because, you know, when you have an infant that you know should be eating a whole jar of baby food and they're not, then it's kind of concerning. Now when I nursed you didn't even need to start solids until they were almost eight months old. Well, now you've got babies that are nursed that start cereal at, they'll start the cereal at five, six months old. So, I think it's just kind of, and also I think it depends on the individual child and how they're growing. So you just have to take that into consideration. And the whole center is based on it; that each child learns differently, grows differently.

Sometimes providers were skeptical due to the variability in doctors' recommendations, Cindy, Child Care Home II provider, expressed a lot of frustration with this:

It's so hard. The doctor's are even different, from one pediatric group to another, you know, in what they say. For instance, the peanut butter, one kid says he can have peanut butter, and the other kid can't have peanut butter, and they're the same age. You know, whatever. It's hard then; the parents will say the whatever. I had one that I had to get, this has been many years. I think they were a year, or must have been under a year, and they wouldn't eat the infant cereal, so the mom was giving them the oat cereal and that kind of stuff. And I had to get a doctor's note saying it was okay to give them that stuff, because they were too young to have that. I had to put down infant cereal on the menus for the Food Program. The doctor had to say it was okay to give dry cereal. Because they were, it would have been under a year, because that's when you have to do that. The doctor's 'okay', that you give them---. Now you have to get the parent's signature that the child is ready for, if it's before 4 months. If you're going to give them solids you have to, the parent has to sign that they're developmentally ready

Cindy's frustration was palpable during this interview as she felt like much of what was required was unnecessary. There seems to be two competing forces here, the need for clear and easy to follow guidelines, as well as flexibility for the needs of individual children. If at any point the guidelines seem arbitrary, or require extra work (getting a doctor's note) frustration resulted. This seemed particularly pertinent for in-home providers who do more informal care.

Before doing the interviews with providers, I did not think about doctors as infant feeding authorities. Yet this issue came up so often in the interviews that I added a section to the mail survey about who knows best when infants are ready for solid food. Child care providers usually started by saying that parents should decide, but when pushed for examples, demonstrated that they did not always accept parent's desires as legitimate, but did seek to comply with doctors' orders – even when they seemed inconsistent or unwise.

I was also surprised to learn how much influence the United States Department of Agriculture (USDA) influenced infant feeding. Six of the nine providers participated in the USDA Food Program, but even the centers that weren't income eligible to participate discussed the Food Program and said they followed it to some degree. The Food Program emerged often in these interviews as a way for providers to set boundaries, and to discuss infant feeding and nutrition with parents where the provider had some authority. Christa, a young mother who worked in a child care center said:

I know that when I was in the infant room we had a problem weaning a child off baby food, and they were getting to the point where they would be transitioning to the toddler room. And after 12 months our USDA sheets say that we can no longer provide the baby food. So, we expressed to the parent that they were, we would continue feeding their child the baby food, but they would have to provide it for us. But we did express concern that moving up to the toddler room, they did need to start experiencing the different textures of food, and the different types of

food, that baby food is limited to. That parent did speak with their doctor then, and we got that problem resolved.

The Food Program also requires documentation of all meals, and if the guidelines are not followed correctly, and the meals are not nutritional according to the guidelines, providers are not reimbursed for the meals. The Food Program, thus, was a powerful incentive to both parents and providers and appeared to have a strong influence infant nutrition. As discussed in Chapter 2, the USDA Food Program not only reimburses providers for infant formula, since 2000, it has reimbursed them for providing expressed breast milk. A single provider noted this fact, and had this to say when describing reimbursement for meals:

A partial amount, yeah. Per meal. Then you keep track of your meals. However, you also get reimbursed if they're breast fed, which is stupid. But, a waste of the taxpayers money, but I'll take it you know. Just because you have to prepare it, didn't use to, didn't use to. But if you have a breast fed baby, then you mark it as they are providing breast milk, and you still get paid for that meal even though you had nothing but your time.

The USDA Food Program seemed to shape many of the answers we received from providers during the course of these interviews regarding infant feeding, and thus was a powerful force affecting all aspects of infant and child nutrition in all the centers where it was used. Because the USDA Food Program is open to larger programs with the Child Care Center license, and smaller Family Home I and Family Home II licensed programs, it was often the only macrosystem level variable in the smaller child care program settings.

There were other potential microsystem level factors, beyond licensing and the USDA Food Program that we hypothesized could impact breastfeeding at an organizational level. This might be truer at the larger centers where they may be a part of other government programs, or may voluntarily participate in accreditation. We asked providers if they followed any other guidelines regarding how they physically handled, stored and prepared breast milk that is

different than infant formula. Many of the smaller providers did not have any specific guidelines beyond the Food Program, however, as predicted; providers within the larger Child Care Centers reported other very specific guidelines. Christa was very familiar with these as she navigated them as a provider and as a parent whose child was currently being breastfed and receiving care:

Yes, we do have another breast feeding mother. And we do have specific guidelines, because we are a Head Start Center, we have specific guidelines that are posted on the refrigerator. Just so, if the teacher is not familiar with breast feeding, then they know all of the specific procedures that we have to follow. As far as refrigeration; breast milk does not need to be refrigerated. So, I know this was an issue with me, because at home it says that you can, on my sheet it says that breast milk can set out for ten hours and be perfectly fine. Where as here there was, it's four hours it says on our sheet. So it has to be refrigerated. After it is refrigerated and heated, then we dump the rest out. After a formula bottle is started, no matter if they drink two ounces, four ounces, six ounces, we always dump out the rest of the contents. I know I have experienced in my personal life, you know formula is expensive, and if they start a bottle at two ounces, then that bottle might be refrigerated and saved until the next feeding to conserve formula. Whereas here we don't do that.

This provider had some unique insights due to her dual role as a provider, and also a breastfeeding and working mother using child care. She described a scenario where she effectively navigated their Child Care Center policy and both of her roles in order to request that staff to not dump the leftover breast milk (which was center policy). Here she talks about troubles maintaining her milk supply and how she worked with the center when she became concerned:

Christa: Actually, that is something that goes along with parent requests, you know, I was clocked out and I was speaking as a parent. There was a time when I was kind of worried, I was starting to slow down, because I was being kind of neglectful about going and pumping when---

Interviewer: Because you got so busy?

Provider: And yeah, and so, like if there's like two or three ounces can you not dump that? You know mix that with the fresh. You know they have to, we go by parent request, and so they were. I clocked out and I said I'm speaking as a parent now, because if I was clocked in that would be breaking all of our, you

know. And so, yes, they did do that for me then. I know we had another parent, the parent that would bring in three bottles. Well, her daughter was, she didn't eat a whole lot, she would eat two to three ounces. Well, mom would bring in three six ounce bottles. So, that, we ran into hey, we're running out, because we're having to dump this out but she's only eating two to three ounces out of these bottles and then she did say, "well at home I just save that. If it's been in the refrigerator, I heat it up and then I just let it sit out until the next feeding." And so, then we were able to do that for her too.

For both of these mothers, they were able to effectively communicate with staff members to provide breast milk. These examples demonstrate that providers do not always work hard to figure out how to help promote breastfeeding by working proactively with parents to make the most of their milk supply. They show that there may be room for even small changes that could help providers to support longer duration of breastfeeding – particularly if there are consistent messages from doctors and the USDA about the importance of supporting mother's desires to continue providing breastmilk.

Discussion

As expected, larger centers had more formal policies regarding breastfeeding than in home providers, and communication and policy regarding the handling of human milk. Providers personal experience breastfeeding was extensive, and almost all of them had fed expressed breast milk to infants, but there was variation in how favorably they viewed breastfeeding and policies that support breastfeeding moms. This seemed to vary according their own experiences with breastfeeding. This was consistent with what we expected. The strong role of the USDA food program, and the high reliance on doctors for navigating infant nutrition center policy, and parental preference were unexpected findings.

There was evidence that providers could help facilitate breastfeeding. The best example was when the providers at the Center where Christa worked initiated a conversation with the

mother so that they didn't dump half her expressed milk each feeding. In large centers such as this, clear evidence based and published policies and guidelines for storing and preparing human milk that help mothers make the most of their supply can help mothers extend breastfeeding duration.. In the smaller centers, more regulation may not have the same influence. First, because mothers may either self select into these home providers care based on whom they know, or what they hear from neighbors, friends and relatives, and based on their level of income and marital situation. As discussed in the literature review, higher income families with children under 5 are more likely to utilize center based care and family child care (in the provider's home, provider is non-relative), while lower income families use relative or parental care. This dynamic changes when mothers who are lower income and who receive TANF, and who are employed full-time in a day shift as they are much more likely to use center care (U.S. Census Bureau, 2004).

It is possible that mothers who feel maintaining breastfeeding is important after returning to work select providers who they know helped their friends breastfeed, or who have experience breastfeeding their own children. Mothers who feel maintaining breastfeeding is not possible, or who stopped breastfeeding prior to starting care may not value this in a potential provider and may not look for this when they seek out care. In these situations, its unlikely policy will have a dramatic effect on increasing breastfeeding, though the USDA food program seemed like it could possibly give providers financial incentive to support or promote breastfeeding, particularly if reimbursement was higher than what it was for infant formula.

In the next chapter, we will explore further the variation in providers attitudes and beliefs about breastfeeding, their program supports for breastfeeding, their confidence in providing breast milk, and how that relates to child care center characteristics.

CHAPTER V

Analysis II

Based on the findings from the interviews analyzed in Chapter 4, I created a comprehensive questionnaire to assess the variation in infant feeding experience, and to create a scale to measure child care provider attitudes and beliefs on the importance of breastfeeding. The full questionnaire is included as Attachment B. For this analysis, I will assess whether variations in beliefs, attitudes, and experiences with infant feeding are associated with indicators of child care quality. To do this I will conduct an Exploratory Factor Analysis to create three scales; the first on beliefs about the importance of breastfeeding, the second confidence in providing breast milk to infants, and the third, the level of program supports for breastfeeding. Following guidelines from Carmines and Zeller (1979), I will assess the theoretical and empirical relationship between each of the constructs, as well as how they clarify the predictive validity of my three measures through bivariate analysis assessing their association with reported infant feeding in those centers.

In the second part of this study I assess how these measures are associated with measures of child care quality. To do this, I conduct a bivariate analysis using Pearson's r correlations to assess if better quality child care is associated with more breastfeeding friendliness, confidence in providing breast milk to infants, and breastfeeding program supports. Because I don't have measures of breastfeeding friendliness in the national data set I use in Chapter 6, this analysis will establish if quality child care is associated with the child care provider attitudes, experiences, and program policies that promote breastfeeding.

The multi-levels in Ecological Health Promotion Theory indicate that we test two theoretically important groups of variables related to child care quality for this analysis. The first

set of theoretically important IV's are at the provider level. Here we are assessing how child care provider personal experiences, beliefs, education, experience in child care, are associated with confidence and the promotion of breastfeeding in the providers program. The second group of theoretically implied variables assess how the organization structure of the child care program effects the dependent variable, breastfeeding friendliness. These variables include center type, number of infants served, and accreditation.

Sample

The qualitative interviews in Chapter 4 were used to inform a mail survey of 113 providers leveraged from another study assessing the quality of child care providers in the state of Nebraska. There was an 83% response rate; a total of 93 child care centers returned a completed questionnaire. The providers that made up this sample were already participants in other studies assessing child care quality in licensed child care homes and child care centers which helped to increase response rate, however, all of these providers self selected into their initial studies. This sample was used as a cost saving measure, and as a way to increase response rates to the survey. There were some draw back to using this sample, although 93 of these providers returned a breastfeeding survey, I did not have full information on demographic characteristics for 30 percent of them. In addition, the demographics that were already collected were not set up for the anlysis that I initially intended to do. Due to an error in instructions on the breastfeeding survey, I was also unable to identify in the child care center, which staff's demographics corresponded with the respondent for the breastfeeding survey. Because there were numerous respondent demographic characteristics in the center datasets, I aggregate those up to a center level variable representing the average scores for each of the 21 centers for each provider in the center. This approximates center level quality characteristics. This is actually a

better test of the ecological model because the theory suggests that breastfeeding is affected not by just a single provider, but by the quality of the child care environment in which the provider and child are embedded. It would have been ideal to have demographic data linked to one individual to test for individual provider and aggregate center effects on breastfeeding. In larger centers, however, numerous caregivers often care for one child. Even more ideal would have been to have all the providers respond to the breastfeeding survey so we could have a better approximation of overall breastfeeding friendliness of the center and individual provider confidence.

I chose to display descriptive statistics according to child care type, Child Care Home (N=44) versus Child Care Center (N=21). In addition, in order to assess whether those providers missing on the demographics are different in ways important to the variables on breastfeeding, I have separated them out into their distinct group (N=25). The descriptive statistics table (5.1) includes the variables related to infant feeding prior to the creation of the breastfeeding scales.

-- Table 5.1 --

Measures

Provider Experience with Breastfeeding

Personal Experience with Infant Feeding - Child caregivers were asked what their personal experience was with breastfeeding their own infants. All of the caregivers reported having cared for their own infant, thus, their answers ranged from 1 – ‘Exclusively Formula Fed’ to 7 – ‘Exclusively Breastfed’.

Number of Infants care for in the Last 12 months – Caregivers reported the number of infants they provided care for in the last 12 months. The mean for the whole sample was 4.63

(S.D. 6.89). As expected, child care center cared for significantly more infants in the last year (10.9, $p < .001$) than the Child Care Homes.

Proportion Exclusively Breastfed – Caregivers were asked how many infants in their care in the last 12 months received formula, breast milk or both. Proportion breastfed was created by dividing the number of infants only fed breast milk in the last 12 months by the total number of infants cared for in the last 12 months. The average proportion fed only breast milk in the past 12 months was .21 (S.D. .25). Although the differences between the groups did not reach statistical significance, child care homes reported a higher proportion of exclusively breastfed infants than centers.

Proportion Exclusively Formula fed – Caregivers were asked how many infants in their care in the last 12 months received formula, breast milk or both. The variable was created by dividing the number of infants only fed formula in the last 12 months by the total number of infants cared for in the last 12 months. The average proportion fed only formula in the past 12 months was .41 (S.D. .28). Child Care Centers reported a higher proportion of children fed exclusively formula (.53) than Child Care Homes (.34), this difference was statistically significant ($p < .05$).

Ideal Breastfeeding Duration – Caregivers were asked what the ideal length of breastfeeding was for infants in months. On average, child care providers said 10.63 months (S.D. 2.74). There were no difference among the home, center, and missing samples on this variable.

Confidence in Ability to Prepare Breast Milk – Providers were asked about their agreement with the following statement: “I feel confident in my ability to prepare breast milk for infants.” Their response was a five point likert scale ranging from ‘strongly disagree’ to

‘strongly agree’, average agreement was 3.62 (S.D. .67), or between ‘agree’ and ‘strongly agree’. Child Care Home providers had, on average, higher confidence in their ability to prepare breast milk than Child Care Center providers (3.94 vs. 3.33, $p < .05$).

Confidence in Ability to Feed Breast Milk – Providers were asked about their agreement with the following statement: “I feel confident in my ability to feed breast milk to infants.” Their response was a five point likert scale ranging from ‘strongly disagree’ to ‘strongly agree’, average agreement was 3.7 (S.D. .76), or between ‘agree’ and ‘strongly agree’. There were significant differences between the Child Care Homes, Child Care Centers, and those providers who made up the Missing Sample.

Child Care Infant Feeding Beliefs

Importance – Place for Mothers to Breastfeed - Providers were asked how important they felt it was the Mothers have a place to breastfeed in their programs. Their response was a five point likert scale ranging from ‘not very important’ to ‘very important’, the average importance was 3.24 (S.D. .1.06), or between ‘somewhat important’ and ‘very important’. Those in the QUINCE sample were significantly less likely to rate this as important than the other home and center samples, though they were not significantly different than the missing sample.

Importance – Infant Feeding Discussed - Providers were asked how important they felt it was that infant feeding be discussed with new parents in their programs. Their response was a five point likert scale ranging from ‘not very important’ to ‘very important’, the average importance was 3.46 (S.D. .83), or between ‘somewhat important’ and ‘very important’. There were no significant group differences on this variable.

Importance – Infant Receive Some Breast Milk - Providers were asked how important they felt it was that infants receive at least some breast milk. Their response was a five point

likert scale ranging from 'not very important' to 'very important', the average importance was 2.63 (S.D. 1.06), or between 'neither important nor unimportant' and 'somewhat important'. Those in the QUINCE sample were significantly less likely to believe this was important compared to the other samples, there were no other group difference on this variable.

Importance – Provider Training in Infant Feeding - Providers were asked how important they felt it was that child care providers receive training in infant feeding. Their response was a five point likert scale ranging from 'not very important' to 'very important', the average importance was 2.80 (S.D. 1.06), or between 'neither important nor unimportant' and 'somewhat important'. There were no significant group differences on this variable.

Importance – Child Care Provider Encourage Breastfeeding - Providers were asked how important they felt it was that providers encourage breastfeeding. Their response was a five point likert scale ranging from 'not very important' to 'very important', the average importance was 2.39 (S.D. 1.11), or between 'neither important nor unimportant' and 'somewhat important'. There were no significant group differences on this variable.

Program supports for Breastfeeding

Respondents were asked to check yes or no on a series of items about their program, 21.9% of the programs reported having information sheets available on breastfeeding, 77.5% of the programs said they had a place for mothers to nurse, 74.2% reported that they talk to parents about infant feeding when they call, and 21.3% reported that they promote breastfeeding in their program. There were no statistically significant differences between the different samples on any of these breastfeeding program supports.

Confirmatory Factor Analysis

Child Care Beliefs on the Importance of Breastfeeding - The following four items comprised the this scale; a) 'It is important that child care providers encourage the use of breast milk', b) 'It is important that infants receive at least some breast milk', c) 'It is important that mothers have a place to nurse in a child care facility', d) 'It is important that infant feeding options are discussed with new parents at your program'. Exploratory factor analysis revealed that these four variables represented a single component, it explained 57.8% of the variance in the latent construct, *Importance of Breastfeeding*. The Chronbach's alpha is .75, which indicates strong reliability. The scale for this variable was created by multiplying the mean of the variables for each provider that had answered at least 3 of the four items.

Child Care Provider Confidence- The following items comprised the scale of breastfeeding confidence, a) 'I am confident in my ability to prepare breast milk for infants in my program', b) 'I am confident in my ability to feed breast milk to infants in my program'. Exploratory factor analysis revealed that these two variables represented a single component, it explained 91.7% of the variance in the latent construct, *Confidence in Providing Breast Milk*. The Chronbach's alpha is .91, which indicates a very strong reliability. The scale for this variable was created by multiplying the mean of the variables for each provider that had answered at least 1 of the two items.

Program supports for Breastfeeding - All four variables are indicator variables, providers answered yes or no on whether their center had certain supports for breastfeeding. These variables are; a) 'My program provides a place for mothers to nurse,' b) 'My program discusses infant feeding with new parents when they enroll', c) 'My program provides information sheets on breast milk.', d) 'My program promotes breast milk.'. Exploratory factor analysis revealed that these four variables represented two components. The first component had high correlations

for all four variables. It explained approximately 40% of the latent variable. The second component explained another 27% of the latent construct (67% total variance explained). The second construct had negative correlations on the first two variables; providing a place for mothers to nurse, and discussing infant feeding with new parents. Over 70% of the providers said 'yes' to each of these, perhaps indicating low discriminant validity on these two particular items. Only 1 in 5 centers said they have information sheets on breastfeeding, and that they promote breastfeeding, these items had strong positive correlations on component 2. The Chronbach's alpha for this scale is .51, which indicates a weak to moderate reliability. The scale for this variable was created by adding each of the four indicator variables.

Scale Predictive Validity

Table 5.2 shows Pearson's r correlations for the each of the three scales, and with important variables related to breastfeeding experience. We would expect these scales to have a positive association with personal breastfeeding experience and that they be associated with the number of infants fed formula or breast milk.

--Table 5.2 here--

First, among the three scales, there were moderate to strong correlations. Child Caregiver attitudes on breastfeeding was positively associated with program supports for breastfeeding ($r=.355$, $p<.001$). Caregivers with positive attitudes about breastfeeding also had more confidence in providing breast milk for infants ($r=.262$, $p<.01$), and confidence was correlated with program supports ($r=.35$, $p<.001$). Thus, there is a relationship between positive attitudes about the importance of breastfeeding for child care providers, and their program having supports, as well as their level of confidence providing breast milk. Not surprisingly, Personal experience with breastfeeding their own infants was a strong predictor of all three scales. The

more personal experience a child care provider had with feeding their own infants breast milk the more program supports they had for breastfeeding ($r=.139$, $p<.10$), the more positive their attitudes were toward breastfeeding ($r=.149$, $p<.10$), and the more confidence they had in providing infants in their care breast milk ($r=.255$, $p<.01$).

One of the more counterintuitive findings was that there was a weak negative association between the proportion of infants who were exclusively breastfed, and the number of breastfeeding supports in a program ($r=-.187$, $p<.10$). The fewer infants there were fed exclusively breast milk the more program supports. There was not a significant association between breastfeeding attitudes and beliefs and the proportion fed exclusively breast milk, though as the proportion of infants fed exclusively breast milk in the program increased, so did provider confidence in providing breast milk to infants ($r=.212$, $p<.01$). Personal experience with breastfeeding was associated with a higher proportion of infants fed breast milk in a program. As providers' personal experience feeding their own children breast milk increased, so did the proportion of infants exclusively breastfed in their program ($r=.189$, $p<.05$).

There was no significant association with breastfeeding attitudes, program supports or confidence and proportion exclusively fed formula. Again personal experience emerged as a significant predictor, the more experience a provider had providing breast milk to her own children, the smaller proportion of infants that were exclusively fed formula in her program ($r=-.204$, $p<.05$). As caregivers with positive attitudes and beliefs about breastfeeding increased, so did the duration that they believed was ideal ($r=.162$, $p<.10$). There was a moderate positive association between ideal breastfeeding months and caregiver confidence providing breast milk ($r=.342$, $p<.001$) and personal experience breastfeeding ($r=.307$, $p<.001$). As program supports for breastfeeding increased, so did the belief that infant caregivers receive training in infant

feeding ($r=.180$, $p<.10$). As Caregiver Attitudes and beliefs about the importance of infant breastfeeding increased, so did the belief that infant caregivers receive training infant feeding ($r=.324$, $p<.001$). In addition, as the number of infants providers cared for in the past year increased, so did the belief providers should receive training in infant feeding ($r=.136$, $p<.10$).

Finally, as the number of infants cared for in the last 12 months increased, the number fed exclusively infant formula also increased ($r=.327$, $p<.001$), indicating larger centers had fewer infants receiving at least some breast milk. Caregivers who preferred that infants in their program receive mostly infant formula were less likely to have confidence in providing breast milk to infants ($r=-.204$, $p<.01$).

Results

The scales related to attitudes and beliefs about the importance of breastfeeding, breastfeeding program supports, and confidence in providing breast milk all had good face validity. The breastfeeding beliefs scale and confidence scale had good reliability and were correlated with each other, and also program supports, though it had weaker reliability. All were strongly correlated with the caregiver's personal experience breastfeeding infants, though none of the scales predicted proportion of infants fed breast milk in a center. One of the most important findings from this initial analysis is that the level that a provider experienced feeding their own children breast milk was the only significant predictor of the proportion of infants fed breast milk in their program.

Child Care Quality and Breastfeeding Beliefs, Confidence, and Program Supports

The next part of this analysis is to assess whether child care quality variables are associated with child care attitudes and beliefs about breastfeeding, breastfeeding program supports and confidence in breastfeeding. Due to the predictive validity between personal

experience and breastfeeding and the proportion breastfed in a program, I will also include this variable. Means and Standard Deviations by Child Care Type are shown in Table 5.3

--Table 5.3 here--

Quality Measures

Caregiver Experience – Caregiver level of experience was measured by the months they've worked in child care. The average for the whole sample is 158.33 (S.D. 99.45), approximately 13 years. Those in Child Care Homes had significantly more experience than those in Child Care Centers (180 months vs. 110 months Center average, $p < .05$).

Caregiver level of Education – Level of education is measured by a series of indicator variables indicating the highest level of education completed; High School, Some College/1 year Certification, Associates Degree, and Bachelors degree. Overall, 22.06% of the sample had a High School education or less, 33.8% had some college or a 1-year certification, 22.6% had an associates degree, and 21% had completed a Bachelors degree.

Motivations for child care work - Motivations for child care work was assessed by five questions (Kontos et al., 1994). Providers were asked to rate on a scale from (1) “definitely does not represent” to (5) “definitely represents” how well each of the following statements describes their motivation for child care work:

1) *My career or profession* – The average score for the entire sample on this variable is 4.57 (S.D. .064). Providers in Child Care Homes were more likely to view their work as a career or profession when compared to the average score on this variable for center providers (4.7 vs. 4.3, $p < .05$).

2) *A stepping stone to a related career or profession* – The average score for the entire sample on this variable is 2.35 (S.D. 1.16). Providers in Child Care Homes were less likely to view their

work as a stepping stone when compared to the average score on this variable for center providers (2.2 vs. 2.7, $p < .05$).

3) *A job with a paycheck* - The average score for the entire sample on this variable is 2.51 (S.D. 1.41). Providers in Child Care Homes were more likely to view their work as a job with a paycheck when compared to the average score on this variable for center providers (2.8 vs. 1.8, $p < .05$).

4) *Work to do while my children are young* - The average score for the entire sample on this variable is 2.41 (S.D. .064). Providers in the Child Care Homes were more likely to view their work as a job with a paycheck when compared to the average score on this variable for center providers (2.8 vs. 1.8, $p < .05$).

5) *A way of helping a family member, neighbor, friend, or other adult* - The average score for the entire sample on this variable is 4.71 (S.D. 1.04).

Accreditation

NAEYC – Thirty Eight percent of the total sample was accredited by National Association for the Education of Young Children (NAEYC), the vast majority of these were child care centers (66.7%).

NAFCC – Almost 18% of the total sample was accredited by the National Association of Family Child Care (NAFCC), none of the Child Care Centers were NAFCC accredited.

Methods

To test whether quality indicators are associated with child care provider breastfeeding beliefs, practices, confidence, and experience, I assessed bivariate associations using Pearson's r . The results are in the bivariate correlation Table 5.4. Because the dichotomous variables (education, accreditation) are mutually exclusive and not part of an underlying scale, results of

the correlation matrix between these variables and the continuous variables are interpreted as point-biserial r correlations, and I do not interpret correlations between dichotomous variables. Inter-correlations between the three scales and personal breastfeeding experience are the same as from Table 5.3.

--Table 5.4--

My interpretations for this analysis will focus solely on the provider quality characteristics and their association with the three breastfeeding variables. Length of work experience was not significantly associated with any of the breastfeeding variables. Among the education variables, having some college or a 1-year accreditation was positively associated with breastfeeding supports in programs ($r=.170$, $p<.10$), while having a bachelor's degree was associated with having fewer program supports for breastfeeding ($r=-.294$, $p<.01$). Those with an Associates Degree had higher agreement with importance of breastfeeding scale ($r=.174$, $p<.10$), while those with a bachelors degree were much more likely to have experience breastfeeding their own children ($r=.288$, $p<.01$).

For the variables on child care motivation, those who saw their job as a paycheck were less likely to have positive attitudes about the importance of breastfeeding ($r=-.161$, $p<.10$). Those who saw their job as a stepping stone to another career had much less experience breastfeeding ($r=-.162$, $p<.10$). Those who saw their work as something to do while their children were young, or as a way to help out a family member or friend, were more likely to have program supports for breastfeeding ($r=.200$, $p<.05$, $r=.253$, $p<.05$). Also, those who saw their work as helping out a family member or friend had more personal experience breastfeeding ($r=.183$). Finally, accreditation among child care homes (NAFCC) was positively associated with confidence in providing breast milk ($r=.183$, $p<.10$).

Discussion

By and large, I did not find evidence to support that child care quality is associated with pro-breastfeeding attitudes, confidence in providing breast milk, or program supports that are designed to facilitate breastfeeding. Child care provider personal experience with breastfeeding was associated with a higher proportion of infants who received only breast milk in their program. Those with a Bachelor's degree were less likely to promote breastfeeding in their center, but more likely to have personal experience breastfeeding. Individuals working in child care centers also had less personal experience breastfeeding than those who work in child care homes. Although being accredited by NAFCC seemed to be positively associated with breastfeeding, this is likely due to the fact that only in home child care providers were NAFCC accredited. Although the motivational factor of wanting to help out a family member or friend by providing child care was positively associated with breastfeeding program supports, this is likely due to the propensity of Child Care Homes to also provide relative care, as we saw in chapter four.

CHAPTER VI

Analysis III

In the previous two chapters I explored through both qualitative interviews, and a small pilot study of licensed child care providers. I wanted to understand how child care providers perceived their role in infant feeding choice, and whether child care quality variables were predictors of child care provider attitudes, policies, and confidence providing breast milk. Chapter six I shift the focus of the study to include maternal characteristics related to socioeconomic status and employment to assess if child care type and quality has an association with the dependent variable, breastfeeding duration, after including variables to control for potential confounding factors. Ecological Health Promotion Theory indicates that health decision making that occurs under multiple levels of influence. When assessing any relationship between child care and breastfeeding, maternal employment must be taken into account. In fact, research indicates that returning to work and the timing of return to work are major influences the decision to initiate breastfeeding, to introduce infant formula, and to wean children off of breast milk entirely (Fein & Roe, 1998; Berger, 2005). For this chapter I will be able to look at differences in breastfeeding between mothers who do and do not return to work, mothers who do and do not use child care in the first six months, and to assess variation among mothers who the vast majority of mothers who both return to work and use child care.

Most importantly, however, the purpose of this chapter is to assess if child care plays any role whatsoever in infant feeding duration once maternal employment and demographics are accounted for. Only after I assess this association can I better understand whether factors related to child care and breastfeeding are amenable to change (an intervention) and whether or not child

care providers facilitation of breastfeeding should be a priority focus for public health officials interested in helping mothers to sustain breastfeeding.

The present investigation utilizes a large sample from the National Institute of Child Health and Human Development's Study of Early Child Care (NICHD SECC). This nationally recognized research initiative began with the initial recruitment in 1991 of nearly 9,000 mothers who had recently given birth in hospitals from 10 different sites across the U.S. More information on the sampling and selection is available in NICHD Early Child Care Research Network/school (1997). Participants for the study were recruited from designated hospitals at the 10 data collection sites. Recruitment began in January 1991 and was completed in November 1991. A total of 1364 families with full-term healthy newborns were enrolled. Participants were selected in accordance with a conditionally random sampling plan, which was designed to ensure that the recruited families: (a) included mothers who planned to work or to go to school full time (60%) or part time (20%) in the child's first year, as well as some who planned to stay at home with the child (20%), and (b) reflected the demographic diversity (economic, educational, and ethnic) of the sites. Both two-parent and single-parent families were included. Because of these exclusions, this diverse sample does not generalize to the population as a whole.

--Figure 6a--

Each of the three parts of this study build up to the final evaluation of the social ecological theoretical model in which I assess if child care usage, type, and quality affect breastfeeding duration among employed mothers.

I conduct two multivariate analyses using these data. First, I use the full sample and OLS regression to assess if child care type, onset, and average number of hours in child care per week are associated with breastfeeding duration. Additionally, I assess if controlling for the timing of

return to work/school/school after birth, number of hours of work/school/school, the mother's ideal work/school status after birth, demographics and Socioeconomic factors explain this association, and if variables related to the onset, type, and frequency/duration of child care are significant predictors of breastfeeding after accounting for these work related variables. For the second analysis I use a sample of mothers with data available in the combined child care rating at 6 months (N=750). Among this group of women who used child care within the first 6 months following their child's birth, I assess if characteristics of child care providers and child care quality predict breastfeeding duration.

Analysis I Work/school, Breastfeeding, and Child care Onset and Type

How does child care affect the relationship between the return to work/school and breastfeeding duration? Early return to work/school is associated with shorter duration of breastfeeding (Fink and Roe, 1991; Berger, Waldfogel, 2006). There is a strong association between returning to work/school and child care onset. Therefore to fully understand the relationship between work/schooling and breastfeeding it is important to fully understand the relationship between child care and breastfeeding.

Focal Dependent Variable

Breastfeeding Duration

The focal Dependent Variable for all analyses in this chapter is Breastfeeding duration. In the NICHD SECC, data on breastfeeding duration was available for 1,311 of participants; it is unclear why the remaining 3.8% of the sample did not have data on breastfeeding. Participants were asked during the first interview (when the child was 1 month old) if the child was ever breastfed; 390 of the 1,311 mothers reported no breastfeeding (30%). At 3 months, 6 months,

and approximately every six months after until 36 months, participants were asked if their child was still breastfeeding, and if they responded that they had stopped, they were asked at what age they stopped breastfeeding, this variable ranged from 0 up to 144 weeks (36 months). It is important to note that breastfeeding initiation in this sample is higher than what was reported in the population at the time (70% versus 53.3%) according to data collected in 1991 by Ross Laboratories. This likely represents the non-random sampling used by the NICHD SECC. The NICHD SECC, by design, excludes women who are less likely to initiate breastfeeding (e.g. women <18 years of age and infants who had health problems at birth).

In Table 6.1, Descriptive Statistics are displayed for all variables included in Analysis I. Breastfeeding has a positive skew, women stopped breastfeeding, on average, at 16 weeks (S.D. 22.05). Roughly 30% of the sample did not breastfeed. Due to this skew, breastfeeding was transformed using the natural log for multivariate analyses.

--Table 6.1--

Demographics/Microsystem factors

Father/Partner in Household - This is an indicator variable where 0=the mother and focal child do not share a household with child's father or mother's partner, and 1=the mother and focal child do share a household with the child's father or mother's partner. Approximately 84% of the sample children (S.D. .37) lived with their biological father or mother's partner.

Maternal Age at Birth - Mom's age at birth had a range of 18 to 46. Average age at birth was 28.503 (S.D. 5.47). Those included in the NICHD sample (N=750) were, on average older than those excluded from this analysis (27.62, $p < .01$).

Maternal Age at Birth - Maternal age at birth ranged from 18 to 46. Average age at birth was 28.11 (S.D. 5.63).

Maternal Education at Birth – Only one case was missing data on maternal education, the range was from seven to 21 years of school. Mean of schooling at the time of the focal child's birth was 14 years (S.D. 2.51). Education was also skewed positively and so transformed using the square root for multivariate analyses, because this transformation produced the distribution that was closest to normal.

Total Family Income – Total Family Income was measured when the focal child was one month old. The average income was \$37,947 (S.D. \$34,102). Due to a positive skew, this variable was transformed using the natural log.

Minority – Approximately 83 percent of the sample was white and 17 percent were another race/ethnicity. This variable is an indicator variable where minority=1 and white=0. Although the largest disparities between racial groups on breastfeeding are between whites and African Americans, there were not large enough categories of any of the racial groups to test racial differences among the minority subgroups.

Employment

Timing of Return to Work/school – This variable is measured as the child's age (in months) when mom returns to work/school. Initially this variable had a range of 0 to 36 and only included individuals who returned to work/school and/or school within the first 36 months after the birth of the child (N=1,057, 77.5%), and those who did not return in that time frame were missing values (N=307 or 22.5% of the total sample). On average, children were 7.58 months of age when mother's returned to work/school (S.D. .26). I recoded the variable so that those who returned to work/school or school anytime after 36 months (or who never returned) have a score of 37. For the recoded variable, the mean increased substantially to 14.2 months old (S.D. 14.38) representing the large group of mothers who were added to the analysis as returning to

work/school or school after 36 months. The recoded variable had a positive skew and was transformed using the natural log prior to multivariate analysis.

Average Hours at Work and/or School – There was full information on hours/week at work/school at 3 months on 1,331 mothers. Fifty five percent of the sample returned to work/school at or prior to 12 weeks after birth, those who had not yet returned are coded as having zero hours. On average, when the child was 3 months of age, mothers went to work or attended school for 18.9 (S.D. 21.38).. Due to a positive skew, this variable was transformed using the natural log for multivariate analysis.

Ideal Work/school Situation – When the focal child was one month old, respondents were asked what would be their ideal work/school situation. Respondents could respond that they preferred work full time, to go to school full-time, or work and school full-time, or if they preferred to work part-time, go to school part-time, or go to work AND school part-time, or if they preferred to stay at home. I recoded this variable into two indicator variables. The first is whether they prefer work and/or school part-time, and the second if they prefer work/school and/or school full-time, with the omitted category preferring to stay at home. The majority of the sample said they ideally would like to go to school or work/school part-time (53%); and an additional 1/5th of the sample would prefer school and/or work full-time (13%). The remainder would prefer to stay home with their child (33%).

Average Hour at Work and/ or School by Ideal Work/school Category – To assess whether the relationship between average hours of work/school at 3 months and breastfeeding duration is moderated by mother ideal work/school preference (FT/PT/none) at 1 month, I created two interaction variables out of the ideal preference categories and the average hours of work/school/school continuous variable. Prior to creating this variable I mean centered average

hours of work/school/school at three months in order to reduce type I error associated with multicollinearity. The mean for the average work/school hours at 3 months and ideal work/school preference of full-time was .0149 (S.D. .6359), and for average work/school hours at 3 months and ideal work/school preference of full-time was .0898 (S.D. 1.269) with a range of 5.21, and 4.92 respectively.

Child Care

The NICHD lead research group created a number of variables on child care type, hours, and onset from all of Wave I. From these variables, I utilized three measuring the proportion of time in three Child Care Types when the child was between the age of 0 and 15 months. This variable was created based on a complex analysis incorporating the type and number of care arrangements and starts and stops within the time frame.

Proportion of time in Child Care Center – On average, children between the ages of 0 and 15 months spent roughly 9% (S.D. .38) of their time in Child Care Centers. Centers are generally distinguished from child care homes by licensing and size.

Proportion of time in Relative Home Care – On average, of children in some type of non-parental care, children between the ages of 0 and 15 months spent roughly 37% (S.D. .26) of their time in Relative Home Care, defined as care received by Father's, Grandparents, or other Relatives in their home or the child's home.

Proportion of time in Child Care Home – On average, children between the ages of 0 and 15 months spent roughly 22% (S.D. .34) of their time in a Child Care Home.

Child care onset >30 hrs/wk – This variable is measured as the focal child's age (in months) when they began at least 30 hours/wk of child care. Like the variable on timing of return to work/school, this variable originally had a range of 0 to 36 months, and only included

individuals who began at least 30 hours a week of child care within the first 36 months (N=1,000 or 73%). On average, women began at least 30 hours of child care when the focal child was 7.33 months old (S.D. .26). I recoded this variable so that those who began child care after 36 months (or who never used child care) had a score of 37 (N=364 or 26.7% of the sample). After including these cases, the mean increases substantially to 15.25 months (S.D. 14.89). This variable had a positive skew and was transformed using the natural log prior to multivariate analyses.

Child Care Hours - Average Number of Hours/Week in Child Care (0-6months of age) – This variable was created from all wave I responses on all child care arrangements and hours when the child was between 0 and 6 months of age. On average, between 0-6 months of age, children spent roughly 15 hours a week (S.D. 14.03) in a center, child care home, or receiving relative care. This variable had a positive skew and so transformed using the natural log for multivariate analyses.

Methods

Prior to multivariate analysis, I explored bivariate associations using Pearson's R among all the variables in Analysis I. The results are in the bivariate correlation Table 6.2. Because the dichotomous variables (ideal work/school status, race) are mutually exclusive and not part of an underlying scale, results of the correlation matrix between these variables and the continuous variables are interpreted as point-biserial r correlations, and I do not interpret correlations between dichotomous variables.

---Table 6.2 ---

As expected from previous research, there are moderate positive correlations between the demographic/SES control variables and breastfeeding duration; Maternal age ($r=.36, p<.001$),

Maternal Education ($r=.42, p<.001$), and Family Income ($r=.33, p<.001$). Also as expected, minority status is associated with lower duration of breastfeeding ($r=-.26, p<.001$). As age, income, and education increase, so does breastfeeding duration. Minorities, on average, breastfed for shorter periods of time than Whites. Children whose fathers or mothers' partners lived in their household at 1 month had longer breastfeeding than children whose mothers lived without a partner ($r=.220, p<.001$).

There was no bivariate association between age at return to work/school and breastfeeding duration at the bivariate level. There was a weak yet significant negative association between the average number of hours a week engaged in work/school at 3 months and breastfeeding duration ($r=.075, p<.01$). In addition, the more mothers preferred to work or go to school, the lower their breastfeeding duration ($r=-.151, p<.001$), women who wanted to go back to work/school full-time breastfed less than women who did not ideally want to go back to work/school full-time. There was no bivariate association between preferring part-time hours and breastfeeding duration. There are also no bivariate associations between the proportion of time a child spends in any of the three child care types breastfeeding duration. The more hours children spend in child care when they are between 0-6 months of age, however, the less time they spend breastfeeding ($r=-.126, p<.001$). There was also a weak to moderate association between child care onset of 30 hours a/week and breastfeeding duration ($r=.190, p<.001$). As the age at which a child began spending 30 or more hours a week of care increased, breastfeeding duration also increased. This indicates that delaying the onset of child care may prolong breastfeeding.

There were some interesting correlations among the continuous Independent Variables that are important to explore prior to the multivariate analysis. I first focus on the demographics and how they relate to work/school and child care variables. There is a positive association

between maternal age and age at return to work/school, ($r=.166$, $p<.01$). This correlation indicates that mothers who were older when they gave birth also waited until their child was older to go back to work and school. There was a weak negative association between maternal age and preferring full-time work/school as the ideal ($r=-.166$, $p<.001$), and a weak positive association between age and preferring part-time work/school ($r=.078$, $p<.01$). Finally, maternal age was associated with a higher proportion of time in Child Care Centers between the ages of 0 to 15 months ($r=.096$, $p<.001$) and Child Care homes ($r=.056$, $p<.05$), indicating that as maternal age increases, so does the proportion of time a child spends in formal/licensed child care.

Maternal Education was positively associated with average hours in work and school at 3 months ($r=.100$, $p<.001$), and negatively associated with preferring full-time work/school as the ideal ($r=-.166$, $p<.001$). Women who preferred work/school part-time hours as their ideal had higher average education than those who preferred to stay home or work full-time ($r=.077$, $p<.01$). Maternal Education had a weak and positive association with the proportion of time spent in Child Care Centers ($r=.107$, $p<.001$), Relative Homes ($r=.126$, $p<.001$), Child Care Homes ($r=.100$, $p<.001$), and hours in Care at 6 months ($r=.112$, $p<.001$).

Women who reported higher incomes were more likely to prefer working part-time ($r=.117$, $p<.001$), and less likely to prefer full-time work ($r=-.182$, $p<.001$). Women with higher incomes were more likely to have their children spend a higher proportion of time in Center care ($r=.055$, $p<.05$), and relative care ($r=.061$, $p<.05$), but not Child Care homes. Minorities, on average, returned to work/school after whites (i.e. when their children were older) ($r=.075$, $p<.01$), and spent fewer average hours in work and school at 3 months ($r=-.051$, $p<.05$), and their infants spent less of their time in Child Care Centers ($r=-.064$, $p<.05$) and in Child Care Homes ($r=-.057$, $p<.05$), than whites.

Looking at the relationship among the work and child care variables, generally speaking, more work/school is related with higher use of child care. As the age of the child when the mother returned to work/school increased, average hours of work/school at 3 months decreased ($r = -.253, p < .001$). Mothers who returned to work when their child was older were less likely to prefer working part-time as their ideal when compared to women who preferred full-time work or preferred to stay at home ($r = -.107, p < .001$). In general, returning to work when the child was older was associated with a decrease in the proportion of time spent both in relative home care ($r = -.221, p < .001$), and in a child care home ($r = -.155, p < .001$), though there was a positive association with proportion of time spent in child care center ($r = .058, p < .05$). This is an interesting finding and indicates that the early return to work is associated with a higher use of informal care arrangements and a later return with more formal types of care arrangements (Center Care). Returning to work when the child was older was negatively associated with average hours of child care between 0-6 months ($r = -.306, p < .001$). In addition, there was a positive association between child care onset of 30 hours/week and age of return to work/school ($r = .254, p < .001$), children whose mothers waited to begin work and school until the child was older were also more likely to wait to begin 30 or more hours/week until the child was older.

Average hours of work at 3 months was positively associated with preferring part-time work as the ideal ($r = .107, p < .001$), but not with preferring full-time work as the ideal. As average hours of work at 3 months increased, there was an increase in proportion of time children spent in center care ($r = .180, p < .001$), and an even stronger increase in the proportion of time that children spent in relative home care ($r = .332, p < .001$), or a child care home ($r = .314, p < .001$). There was a strong positive association between average hours of work a week at three months and average hours of child care between 0-6 months ($r = .699, p < .001$). There was a

strong negative association between average hours of work and child care onset of 30 hours/week ($r = -.625$, $p < .001$). The higher their working hours were at 3 months, the younger the child was when the mom began 30 hours a week of care or more.

Reporting that working full-time was ideal at the 1 month interview was associated with subsequent higher average child care use ($r = .061$, $p < .05$) and with younger age of children when they began 30 or more hours/week of care ($r = -.104$, $p < .001$). Those who reported that working part-time would be ideal at the 1 month interview had children with a higher proportion of time in child care centers ($r = .051$, $p < .05$), relative care ($r = .119$, $p < .001$), and/or child care homes ($r = .064$, $p < .01$), and they also had children who were younger when they began at least 30 hours/week of child care ($r = -.114$, $p < .001$).

Finally, among the child care variables, as we would expect, time spent in one form of child care is associated with less time spent in another type of child care setting. For example, the proportion of time in child care centers was negatively associated with the proportion of time in relative home care ($r = -.164$, $p < .001$), and child care homes ($r = -.159$, $p < .001$), but a higher association with average child care hours/week between 0-6 months ($r = .272$, $p < .001$). The younger a child was when they began >30 hours a week of care, the higher their proportion of time in child care centers ($r = -.217$, $p < .001$). Proportion of time in relative home care was negatively associated with proportion of time in child care homes ($r = -.085$, $p < .01$), and there was an even stronger positive relationship between proportion of time in relative home care and average child care hours ($r = .425$, $p < .001$) than with child care centers, indicating relative home care is used more often than other types of care. Proportion of time in a child care home also had a moderate positive association with average child care hours ($r = .400$, $p < .001$). Similar to those who use child care centers, a higher proportion of time in relative home care and child care

homes was negatively associated with the child's age when they began 30 hours/week of care ($r=-.272$, $p<.001$ and $r=-.395$, $p<.001$). This means that children began relative care at a younger age than center care. Generally speaking, the pattern between each of the proportion of time in types of care variables were associated with more average number of child care hours younger age of onset of care. Also, having a high proportion of time in one type of care made it less likely there was a high proportion of time spent in another type of care.

Finally, there was a strong negative association between average hours of child care a week between 0 and 6 months, and age of onset of child care at 30 hours a week or more ($r=-.838$, $p<.001$). As average hours increase, the younger the child was when they began care. This association is likely to cause problems with multicollinearity and a type I error in multivariate models, but each were theoretically important enough to include separately, and as you will see, each remained independent and significant predictors of breastfeeding cessation in the multivariate model.

For Multivariate analysis I use SPSS version 17 and OLS regression with the dependent variable the natural log of breastfeeding duration. Item level missing did not exceed 5% for any individual variable, so cases were excluded list wise in the multivariate model resulting in a sample size of 1,202. To meet the assumption of normality in the Independent variables, I transformed any continuous variable when the skew divided by the standard error of skew was greater than 2. I did this either using the natural log or square root depending upon which ever transformation created a more normal distribution (see Descriptives Table %). To reduce multicollinearity, and type I error, I mean centered all continuous variables. The constant can therefore be interpreted as the natural log of breastfeeding duration when all the variables in the

model equal zero (i.e. are the omitted category for indicator variables, and are the average for continuous variables). The results of Multivariate Analysis are shown in Table 6.3.

--Table 6.3 --

Included here, but not shown as part of the analysis, are a series of indicator variables that control for the 10 sites the NICHD SECC study was conducted. Though these need to be controlled for, their association with breastfeeding duration is not shown here and will not be interpreted. The omitted study site is Washington State, these sites were significant predictors of breastfeeding duration and explained 5% of the variation in breastfeeding duration

In Model 1, I included all of the demographic and socioeconomic variables I identified as related to the maternal microsystem level of EHPT. As maternal age ($b=.133$, $p<.001$), education ($b=.238$, $p<.001$), and income ($b=.078$, $p<.01$) increase, breastfeeding also increases. Minority status is associated with lower breastfeeding duration when compared to white respondents ($b=-.164$, $p.001$). Overall, maternal demographic and socioeconomic variables (and study site) explained roughly 26% of the variation in breastfeeding duration (adjusted r -squared $=.263$, $p<001$). The constant ($B=2.522$, $p<.001$) represents the natural log of breastfeeding duration in weeks for women in Washington State, who have average age, income, education, and who are white; approximately 13 weeks of breastfeeding.

In Model 2, I included work/school related variables. After controls, the younger a child was when the mother returned to work/school, the longer breastfeeding duration ($b=-.079$, $p<.01$). This was in the opposite direction expected and this variable was not significantly associated with breastfeeding in the bivariate model. This finding is contrary to what past studies indicate, however, it is a weak association and further interpretation of this divergent and unexpected finding will be addressed in the discussion section. There was a moderate negative

association between breastfeeding duration and average hours of work/school at 3 months ($b = -.204$, $p < .001$), as average hours of work increased, breastfeeding duration decreased. Preferring to work full-time as the ideal at 1 month was negatively associated with breastfeeding duration when compared to mother's who would prefer to stay at home ($b = -.088$, $p < .01$), and there was a similar negative association between preferring to work full-time and breastfeeding duration ($b = -.09$, $p < .01$). Even after demographic controls, the relationship between the work related variables and breastfeeding all remained statistically significant. The work related variables explained an additional 3% of the variation in breastfeeding duration (adjusted $r^2 = .289$, $p < .001$).

In Model 3, the work interaction variables were included by themselves in order to assess if they significantly add to the explained variance in breastfeeding duration. Theoretically, these variables are meant to assess whether the relationship between average hours of child care and breastfeeding duration are moderated by the perceived ideal future work/school status reported by mothers at the one month interview. In model 3, ideally preferring to go to work/school part-time and actual work hours at 3 months are negatively associated with breastfeeding duration, This interaction explained an additional .2% of the variation in breastfeeding duration (adjusted $r^2 = .291$, $p < .05$). After the child care variables and child care interaction terms are included in Models 4 and 5, this interaction will be plotted and explored further.

In Model 4, child care variables are included in the multivariate analysis. After controlling for demographics, socioeconomic status, and work related variables, there were significant relationships between child care related variables and breastfeeding. Although none of the variables measuring proportion of time in the three different types of child care were significant predictors of breastfeeding duration in bivariate analysis, a moderate positive relationship between the proportion of time in relative home care and breastfeeding emerged in

the multivariate model. As the proportion of time a child spends in a relative home child care setting increases, breastfeeding also increases ($b=.082$, $p<.001$). Neither of the other child care types were significantly associated with breastfeeding duration in model 4. Average hours of child care between 0-6 months was associated with lower breastfeeding duration ($b=-.119$, $p<.001$). The older a child was when a mother started 30 or more hours a week of child care, the longer she breastfed ($b=.116$, $p<.001$). In Model 4, all of the demographic and socioeconomic variables remained statistically significant, with the exception of income. The relationship between income and breastfeeding duration was no longer significant. Although all of the work related variables were attenuated in this model, all remained significant predictors of breastfeeding duration even after child care variables were added to the model. The interaction term for preferring to work full-time and actual average work hours at 3 months emerged as a marginally significant in this model ($b=.051$, $p<.10$). The addition of these child care variables explained an additional 2% of the variation in breastfeeding duration (adjusted r -squared $=.310$, $p<.001$).

In Model 5, I included a variable to assess whether the relationship between child age when a mother returned to work/school and breastfeeding was moderated by age of child at child care onset. Basically, this variable measures how the timing of child care impacts the timing of the return to work on breastfeeding. There was a weak negative association between child care onset/and mom's return to work, and how both affected breastfeeding duration ($b=-.065$, $p<.05$), and it explained an additional .2% of the variation in breastfeeding duration (adjusted r -squared $=.312$, $p<.05$). All other associations remained relatively unaffected by the addition of this interaction term.

Moderators

Because breastfeeding intention is influenced by other contextual variables in the prenatal and immediate postnatal planning related to employment and child care, it was important to capture how women's ideal work environment aligned with their actual work environment 2 months later. This variable therefore adds a dimension of expected or desired work situation with real work situation. In figure 6a, I plotted the work interaction variables assessing the relationship between average child care hours at three months and breastfeeding duration by ideal work status using the coefficients from the final model (Model 5). Although the interaction term between average hours and ideally working full-time was only marginally significant, I chose to plot it along with the significant interaction of average hours and the ideal work status of part time.

-- Figure 6a--

I chose to plot the interactions based on the most common work schedules (part-time=20 hours a week, full-time=40 hours a week). Women who did not work at 3 months and whose ideal is to stay at home had, on average, the highest number of weeks breastfeeding (13.8 weeks). Women who were not working at 3 months but whose ideal was to work or go to school either full or part-time, breastfed for fewer weeks (12.5). Women who worked 20 hours a week at 3 months, but whose ideal was to stay at home had lower breastfeeding duration than women who worked 20 hours a week who preferred to work part-time (6.6 weeks versus 8.3 weeks). Overall, women who worked or went to school full-time, on average, breastfed fewer weeks than those who worked or went school only part-time or who stayed at home. Women who worked 40 hours a week at 3 months but who would've preferred ideally to stay at home breastfed for two weeks less than women who worked 40 hours a week when their child was 3 months old, who ideally preferred to work full-time (4 weeks versus 6 weeks). Thus, the relationship between

average hours of work when the child was 3 months old and breastfeeding is moderated by the mother's preference or ideal/desired work status at 1 month. Among all three groups of women who stay at home, go to work/school part-time (20 hours), or go to work/school full-time (40 hours), the women whose ideal matches up with their actual conditions actually breastfeed longer than women whose ideal work preference does not align at 3 months.

In Figure 6b I plotted the interaction between age of the child when the mother returned to work and age of onset of 30 or more hours of child care a week.

--Figure 6b--

In the model, EM stands for employment/school start measured by the age of the child (in months), CC stands for child care start (also measured by the age of the child in months). Beginning at the bottom of figure 6b, we have women who began child care when their child was one month old, along with when they began employment. The first bar is women who began employment prior to when the child was one month old ($N=42$). The next bar up represents women who began both child care and employment at one month, and the next represents women who began child care at one month, but who began work after one month. Women who were employed prior to month one ($EM < 1$), but who didn't start >30 hours a week of child care until month 1 had lower breastfeeding rates than those who started work and child care at the same time ($CC=1$ $EM=1$), this was a difference of about $3/4$ ths of week (11.92 weeks versus 12.66 weeks of breastfeeding on average). Those who began child care when their child was one month old and waited to begin employment until the child was two months old breastfed longer than those who began both employment/school and child care at 1 month (12.66 versus 13.72 weeks).

The middle three bars represent those who began child care in month two after birth, and follows the same pattern of employment among this group (employment before child care, employment start at the same time as child care start, and employment start after child care start). Again, women who began working prior to starting child care had lower breastfeeding duration (12.73 weeks) than women who started work and child care at the same time (13.14 weeks). Women who began child care in month two and waited until month three or after to go back to work had the highest breastfeeding duration of those who began child care in month two (16.61 weeks).

Finally for those who began child care in month three, the same pattern emerges. Women who begin working before they begin 30 hours/week of child care have lower breastfeeding rates than women who began 30 or more weeks of care at the same time they began employment (month three), and women who began child care when their child is three months old but waited until their child was four months old to return to work/school had the highest breastfeeding rate of any group. Thus, child care onset of 30 or more hours per week is associated with longer duration of breastfeeding when it accompanies or occurs prior to the woman's return to work/school.

These patterns capture the experiences of at least 20 mothers in each category. Therefore the patterns in this figure are not simply driven by a handful of outlying cases in any category.

Analysis I Discussion

The demographic and socioeconomic variables were all associated with breastfeeding duration in the expected direction. Prior research using large population based random samples in the US consistently reveal that breastfeeding is higher among women who are older, more highly educated, have higher incomes, and who are non-Hispanic white (CDC, 2005).

Bivariate analysis revealed that race, age, and education are associated with work status and child care type. Women with higher income and education breastfeed longer, and are also more likely to return to a work situation that is their ideal. Also, women who are older, more educated and have higher incomes have children who spend more time in all three types of child care settings. Higher SES seems to buffer the negative associations between work, child care and breastfeeding. This was revealed first in the interaction with ideal and real work. In the bivariate analysis having real and ideal work align was associated with longer breastfeeding duration. These findings suggest that women with higher SES may have more control over their work hours and more sway in aligning their ideal preferences with actual work conditions, whereas women with less education (who are more likely to be home when they wish to be employed, or to be employed when they wish to be at home) have little choice and less agency in work and child care conditions after a child is born. It is possible that women with the autonomy to align their work goals with their actual work are able to better anticipate and plan on how to combine breastfeeding and working.

We saw a similar story emerge with the interaction between the timing of return to work and the onset of >30 hrs/wk of child care on breastfeeding duration. Women who were able to begin child care prior to beginning work breastfed longer. Therefore it is important to consider the association between the onset of child care use in the context of starting employment or school following the birth of a child. In this context, starting child care before employment or school operates as a protective mechanism to sustained breastfeeding or reflects women who have more options, and therefore can also exercise more control over breastfeeding. Considering the high cost of child care, and the inability to afford it when you are not employed, more education or income also seem to play a part in these processes, but they do not explain all of

them because the association was significant after controlling for income, education, age and minority status. Having the ability to start child care prior to starting work either requires the social support of a non-working relative, or access to wealth or income that would allow beginning to pay for child care prior to regaining the full income that was lost during maternity leave.

One of the most interesting findings to come out of this analysis was the positive association between use of relative care and breastfeeding. Amount of time in relative child care had a positive influence on breastfeeding duration after controlling for maternal and work related variables. Because there is little prior research into the relationship between breastfeeding and child care in general, this finding needs to be explored more fully in future research. Neither the ecological perspective nor prior research suggested that as the proportion of time in relative care increases breastfeeding duration should increase, particularly because this is time away from the breastfeeding mother. The previous two chapters, however, lend support to the idea that women who choose to breastfeed may choose relative child care in order to facilitate breastfeeding. Just as likely, and as I already discussed, being able to choose relative child care necessitates access to a non-working relative who can provide full-time and/or one on one care during the mother's working hours. Because for most families, both individuals work full-time, this finding suggests access to grandparent care or spouse/partners working different shifts.

Contrary to past research, the older the child when the mother returns to employment, the shorter the duration of breastfeeding. In the initial bivariate analysis there was no significant association between the two variables. A plot of the bivariate association shows no clear pattern of association between child age at mother employment/school initiation following birth (see Figure 6b). Although the relationship was in the opposite direction in the multivariate model,

plotting the association in figure 4 reveals a pattern that is consistent with past research; delaying onset of work, for the vast majority of mothers, increases breastfeeding duration. Although I wasn't able to test this in this model, I question how many of the sample were able to take their children to work with them, and how this affected breastfeeding? One possible explanation is that women who work from home could return to work much sooner, and perhaps even control their own hours and therefore would be able to breastfeed as long as they chose with out the context of having to use much child care. If I were able to account for these early starters, I think perhaps this finding would no longer be significant.

Analysis II

In the first analysis using the NICHD SECC data, it was important to get a macro perspective to understand the effect of child care on breastfeeding for everyone in the sample; particularly differences in breastfeeding between women who used child care and women who did not. A major task of this dissertation, however, is to explore the variation among those who use child care, and how different child care environments and non-maternal child caregivers effect child breastfeeding duration. This particular analysis is also important because it will allow me to assess what is driving the relationship between child care type and breastfeeding duration, and will allow me to assess if there is a relationship between child care quality and breastfeeding in a larger sample.

As I discussed in Chapter 2, there are two things that theoretically might be driving a correlation between child care and breastfeeding; depending on maternal socioeconomic status, women have varying levels of access to child care. Women who are more highly educated and have higher incomes may have access to different types of child care for their infants, allowing them to choose the best fit for them regarding their child rearing practices. Because higher

education, income, and living with a partner and are all associated with breastfeeding and with access to higher quality child care, we would expect that any association between child care quality and breastfeeding to be explained by maternal demographic and household characteristics. This part of the analysis, therefore, focuses only on women whose child was in at least 10 hours of non-maternal child care a week (average) when the child was between 0 and 6 months of age.

The NICHD data contains information on numerous caregivers and numerous child care environments for all children in non-maternal care. For infants who had more than one caregiver, either due to changes in child care utilization in the first 6 months, or because they are in an environment where more than one caregiver interacts with the infant; there was often numerous caregivers reporting on a single child. This complexity made it difficult to study the effect of child care in a systematic way among all the waves of data and among all the sites. The NICHD SECC research team, therefore, created a dataset that simplified analysis by creating variables based on specific criteria so that the most information possible on child care variables for each child at each time period could be accessed more easily by researchers.

For the second analysis I use data gathered on child care quality for 750 of the infants in the study. This sample was created by the NICHD SECC research network in order to prioritize a subsection of variables and to facilitated secondary analysis by other researchers by compiling the data in a large summary datasets for different waves of the study. The dataset I use for this analysis was collected when the focal child was between 0 and 6 months of age. The sample of caregiver data was created in order to have only one caregiver record per study child, and so that the caregiver with the most information was given priority in this selection. They selected caregiver based on numerous criteria related to time spent in care, as well as by prioritizing

certain key quality variables with non-missing data in the caregiver records and compiled by the NICHD SECC Research Network. Identified as the highest priority the NICHD, they first chose to include the record that had the most information scored on the ORCE (Observational Record of Caregiving Environment) quality rating (N=593). Any child care setting that was observed at 6 months using this measure was included in the summary. In order to be eligible to be scored on this measure the children had to be in non-maternal care for more than 10 hours a week. If more than one child care setting was assessed per child, NICHD used the assessment with the most available information. After assuring the most ORCE information was retained in the caregiver quality sample, priority was then given to caregivers who had the most non-missing values on 13 key variables that have been shown to predict quality child care in past research. This analysis includes four of these 13; caregiver education, caregiver years of experience, caregiver monthly wage and the caregiver modernity scale - attitudes and beliefs on raising children. In the case where there was no ORCE observed score but where the environment met the criteria where the ORCE was observable (>10 hours of non-maternal child care a week), individuals with the most information on the 13 variables were included.

All of this was to ensure that the most relevant and useful information on child care quality with the most non-missing data was included for each child. Despite this, missing data was an issue with the 0 to 6 month caregiver quality dataset. In order to better understand how missing data effected my sample, I conducted two missing data analyses. First, to assess how this sample of 750 differs from the sample of 1,364, I assessed if those excluded from the child care quality sample were significantly different on breastfeeding, maternal characteristics, and proportion of time in child than those included. Because one is a group who used child care for 10 or more hours a week in the first six months, and the other did not, there were many

statistically significant differences between cases included in this sample, and those excluded as you can see in descriptives table 6.4.

Second, within the NICHD SECC 6 month caregiver quality sample, I assessed if those who were missing on those variables scored significantly different than those who had full information on those variables. Caregivers were missing data for complex reasons, some are refusals, while some are because the child care environment where the ORCE was scored was missing the child caregiver interview. This creates bias in the sample as the missing are a function of the prioritization of retaining information on certain variables over others; they are not simply random. Missing values on the quality variables was substantial; it ranged from 20% to greater than 35% for some variables. Infants with missing caregiver data were breastfed significantly less than those with full information, though there was not an association between the number of missing data for respondents and breastfeeding duration (as the number of variables missing increased, breastfeeding duration neither increased nor decreased significantly). I describe the nature of the missing data fore each variable below.

- - 6.3- -

Focal Dependent Variable

Breastfeeding Duration

The focal Dependent Variable for the second analysis is the same as Analysis I; breastfeeding duration. In the sample of observed child care at 6 months NICHD SECC, data on breastfeeding duration was available for 731 of the 750 respondents (2.5% missing). Infants who had care provider observed data in the 6 months summary caregiver dataset created by NICHD, were breastfed for significantly fewer weeks than those whose environment did not reach the criteria to be observed. There was a quite a large difference between these groups, on average,

those in the NICHD SECC 6 month caregiver quality sample breastfed for 5.25 weeks less than those who were not included in this sample (13.755 vs. 19.038, $p < .001$).

Maternal Characteristics

Father or Partner Lives with Mother – This is an indicator variable where 0=the mother and focal child do not share a household with the child's father or mother's partner, and 1=the mother and focal child do share a household with the child's father or mother's partner. Approximately 84% of the sample children (S.D. .37) lived with their biological father or mother's partner.

Maternal Age at Birth - Mom's age at birth had a range of 18 to 46. Average age at birth was 28.503 (S.D. 5.47). Those included in the NICHD sample (N=750) were, on average older than those excluded from this analysis (27.62, $p < .01$).

Maternal Education at Birth – There was one item-missing on maternal education, the range was from seven to 21 years of school. Mean years of schooling at the time of the focal child's birth was 14.63 years (S.D. 2.43). Those included in the NICHD sample (N=750) were, on average, more educated than those excluded from this analysis (13.75, $p < .001$). Education was also skewed positively and so transformed using the square root for multivariate analysis.

Total Family Income – Total Family Income was measured when the focal child was one month old. The average income was \$37,947 (S.D. \$34,102). Due to a positive skew, this variable was transformed using the natural log.

Minority – This is an indicator variable where minority=1 and white=0. Approximately 84 percent of the sample was white and 16 percent were another race/ethnicity. Individuals included in the NICHD dataset (N=750) were more likely to be white than those excluded from this analysis.

Maternal Modernity Scale: Attitudes and Beliefs on Raising Children - Mothers completed this thirty-item, Likert-type questionnaire during the one-month home visit. The instrument was designed to measure traditional authoritarian (reflects attitudes that child behavior should follow adult directives) and progressive democratic beliefs (reflects attitudes favoring self-directed child behavior) on childrearing. This scale was included because past research identified by the NICHD SECC found that parents with more progressive/democratic beliefs and less traditional/authoritarian beliefs will select higher quality child care programs for their children. Thus, this variable teases out whether or not it is child care environments that affect breastfeeding, or whether it is maternal choice on child care environments that affect breastfeeding.

This scale has two components . The NICHD researchers found good internal consistency using Cronbach's alpha and split-half Spearman -Brown correction; reliability's were obtained and varied from .88 to .94. Test-retest reliability was derived from correlation's of scores for Fall and Spring and was .84.

The average score on this scale for the sample of 750 was 3.142 (S.D. .45). A low score indicates belief in more progressive child directed parenting style while a high score indicates the belief in a more traditional/authoritarian adult directed parenting style. Individuals included in this sample had, on average, less authoritarian beliefs than those excluded from this sample (3.15, $p < .001$). This scale was positively skewed and so transformed using the square root for multivariate analysis.

Child Care

Proportion of time in Relative Home Care – On average, children between the ages of 0 and 15 months spent roughly 49% (S.D. .36) of their time in Relative Home Care, defined as care

received by Father's, Grandparents, or other Relatives in their home or the child's home. Those included in the NICHD child care quality sample (N=750) spent, on average, a much higher proportion of their time in Relative Home care than those excluded from this analysis (23%, $p < .001$).

Proportion of time in Child Care Home – On average, children between the ages of 0 and 15 months spent roughly 34% (S.D. .39) of their time in a Child Care Home. Those included in the NICHD child care quality sample (N=750) spent, on average, a much higher proportion of their time in a Child Care Home than those excluded from this analysis (7%, $p < .001$). Proportion of Time in Child Care Home was positively skewed and so transformed using the natural log for multivariate analysis.

Proportion of time in Child Care Center – On average, children between the ages of 0 and 15 months spent roughly 15% (S.D. .31) of their time in Child Care Centers. Centers are generally distinguished from child care homes by licensing and size. Those included in the NICHD sample (N=750) spent, on average, a much higher proportion of their time in Center care than those excluded from this analysis (4%, $p < .001$) (4%). Proportion of Time in a Child Care Center was positively skewed and so transformed using the natural log for multivariate analysis.

Child Care Quality

Caregiver Gender – This is an indicator variable where 0=male and 1=Female. Approximately 84% of the sample of caregivers was Female (S.D. .36). Twenty two percent of the caregiver sample was missing on this variable, individuals who were missing on this variable breastfed on average for 4.78 fewer weeks ($p < .01$) than those who were not missing data on this variable.

Caregiver Minority – This is an indicator variable where 0=white and 1=minority.

Approximately 22% of the sample of caregivers were minorities. Individuals who were missing on this variable breastfed on average for 4.88 fewer weeks ($p < .01$) than those who were not missing data on this variable.

Caregiver Education – Caregiver education is an ordinal variables measured on a 6-point scale ranging from 0 (High School, GED or less) to 5 (more than a Master's Degree). Average caregiver education was 2.68 (S.D. 1.12). Over 22% of the sample was missing on this variable, individuals who were missing on this variable breastfed on average for 5.06 fewer weeks ($p < .01$) than those who were not missing data on this variable. Caregiver education was positively skewed and so transformed using the natural log for multivariate analysis.

Caregiver Years Experience – Caregiver years of experience ranged from zero to 44 years, mean years of experience was 3.98 (S.D. 6.6). Caregiver Years Experience was positively skewed and so transformed using the natural log for multivariate analysis. Over 22% of the sample was missing on this variable, individuals who were missing on this variable breastfed on average for 4.92 fewer weeks ($p < .01$) than those who were not missing data on this variable.

Caregiver Monthly Wage – Caregiver monthly wage ranged from \$0 to \$5,000 a month, the average monthly wage in this sample was \$605 (S.D. \$586). Thirty five percent of the sample was missing on this variable, however, those missing were not significantly different on the dependent variable, breastfeeding duration. Caregiver monthly wage was positively skewed and so transformed using the square root for multivariate analysis.

Caregiver Infant Experience – This was an indicator variable where 0=no infant caregiving experience and 1= infant caregiving experience. Eighty one percent of the caregivers in this sample reported have experience caring for infants. Thirty five percent of the sample was

missing on this variable; however, those missing were not significantly different on the dependent variable, breastfeeding duration.

Caregiver Modernity Scale: Attitudes and Beliefs on Raising Children – The Parental Modernity questions were asked of caregivers during the 6 month interview (see information on scale above). This scale has two components . The NICHD researchers found good internal consistency using Cronbach's alpha and split-half Spearman -Brown correction; reliability's were obtained and varied from .88 to .94. Test-retest reliability was derived from correlation's of scores for Fall and Spring and was .84. The average caregiver score was 78.27 (S.D. 19.68). Thirty five percent of the sample was missing on this variable, however, those missing were not significantly different on the dependent variable, breastfeeding duration.

ORCE Average Amount of Caregiver Infant Interaction - ORCE quality observer ratings were created specifically by the NICHD SECC Research Network to measure quality across different types of child care environments (Relative Home, Child Care Home, Child Care Center). There were numerous dimensions to this instrument (Qualitative, Behavioral and Structural). Average Amount of Caregiver Interaction w/child was part of the Structural observations, number of caregiver child interactions in a 44 minute time period were recorded.

The average amount of child caregiver, infant interactions was 14.9 (S.D. 7.68). Over 20% of the sample was missing on this specific ORCE measure, individuals who were missing on this variable breastfed on average for 4.89 fewer weeks ($p < .01$) than those who were not missing data on this variable.

Methods

Prior to OLS regression, I conducted bivariate analyses using Pearson's R correlations. The results are found in the bivariate correlation Table 6.5. Because the dichotomous variables

(maternal minority, living with father or partner, caregiver gender, caregiver minority, and caregiver experience) are mutually exclusive and not part of an underlying scale, results of the correlation matrix between these variables and the continuous variables are interpreted as point-biserial r correlations, and I do not interpret correlations between dichotomous variables.

---Table 6.5--

Similar to Analysis I and other breastfeeding research, maternal socioeconomic status and demographics were all strong predictors of breastfeeding duration; Maternal age ($r=.33$, $p<.001$), Maternal Education ($r=.45$, $p<.001$), Family Income ($r=.25$, $p<.001$) and Minority Status ($r=-.263$, $p<.001$). Maternal traditional childrearing beliefs were negatively associated with breastfeeding ($r=-.350$, $p<.001$). As a mother's beliefs in authoritarian/adult directed parenting increased, breastfeeding duration decreased.

Similar to Analysis I, Proportion of Time spent in the three different types of child care setting were not significant predictors of breastfeeding in bivariate analyses. Minority caregivers were less likely to have mother's they serve breastfeed when compared to white caregivers ($r=-.151$, $p<.001$). Caregiver Education was positively associated with maternal breastfeeding duration ($r=.211$, $p<.001$) as was caregiver wage ($r=.151$, $p<.001$). Caregivers belief in traditional/authoritarian parenting style was negatively associated with breastfeeding duration ($r=-.225$, $p<.001$). In addition, average amount of caregiver child interaction was positively associated with breastfeeding duration ($r=.097$, $p<.05$). As the number of observed interactions between the caregiver and child increased, so did breastfeeding duration.

There were numerous associations among the Independent Variables that are important to explore to better understand the results of multivariate OLS regression. I will focus on the variables that are related to child care quality and that were not used in Analysis I. In general,

mother's with higher age, education, and income were associated with indicators of higher child care quality. As maternal age increases, so does proportion of time spent in Centers ($r=.103, p<.01$), the likelihood the caregiver is female ($r=.102, p<.05$), as does caregiver education ($r=.146, p<.001$), experience ($r=.165, p<.001$), and wage ($r=.281$). As maternal age increases, maternal beliefs in traditional/authoritarian parenting beliefs decreases ($r=-.379, p<.001$) and caregiver belief in traditional/authoritarian childrearing ($r=-.133, p<.001$). As maternal education increases, proportion of time in Center care increases ($r=.082, p<.05$), as does caregiver education ($r=.298, p<.001$), experience ($r=.114, p<.01$), and wage ($r=.281, p<.001$). As total family income increases, so does the likelihood the caregiver is female ($r=.126, p<.001$) and so does caregiver experience ($r=.131, p<.01$) and wage ($r=.196, p<.001$). Moms who are minority's had children who spent less time in Centers than whites ($r=-.095, p<.01$), and had caregivers who had less education ($r=-.152, p<.001$), less experience ($r=-.115, p<.01$), and lower wages ($r=-.243, p<.001$) than white mothers. Mothers who were minorities were much more likely to have caregivers who were minorities ($r=.533, p<.001$) and the mother and caregiver were more likely to have more traditional/authoritarian parenting beliefs ($r=.324, p<.001$ and $r=.172, p<.001$). Mothers with stronger beliefs on traditional/authoritarian childrearing were more likely to have a caregiver that was a minority ($r=.241, p<.001$), and also had caregivers who had stronger authoritarian/traditionally childrearing beliefs ($r=.172, p<.001$). When the mom had more authoritarian/traditional childrearing beliefs, the child caregiver also scored more strongly on the beliefs scale ($r=.397, p<.001$). More traditional/authoritarian beliefs in mothers was associated with child care providers with less education ($r=-.273, p<.001$), less experience ($r=-.141, p<.001$), and lower wages ($r=-.291, p<.001$).

Caregiver characteristics were highly correlated with each other, and with more formal child care arrangements. Those with female caregivers spent significantly less time in Relative Home Care ($r = -.345, p < .001$), and significantly more time in Child Care Homes ($r = .178, p < .001$), and Centers ($r = .166, p < .001$). As caregiver education increases proportion of time in child care center increases ($r = .104, p < .001$) and so does caregiver wage (). There was a negative association between caregiver education mom's traditional/authoritarian parenting beliefs ($r = -.273, p < .001$), caregiver gender ($r = -.205, p < .001$), caregiver minority status ($r = -.211, p < .001$). As caregiver experience increases, proportion of time infants spent in Centers increases ($r = .104, p < .001$) and so does caregiver wage ($r = .283, p < .001$). As caregiver experience increases, the amount of infant caregiver child interaction decreased ($r = -.222, p < .001$). As caregiver wage increases, so does proportion of time in Child Care Homes ($r = .151, p < .01$), Centers ($r = .373, p < .001$). As caregiver wage increases, the amount of infant caregiver child interaction decreased ($r = -.284, p < .001$).

Proportion of time in Relative home had a moderate positive relationship with the average amount of child/caregiver interactions ($r = .333, p < .001$). Proportion of time in child care homes was not significantly associated with Child Care Homes. There was a moderate to strong negative association between proportion of time in a Center and average amount of caregiver/child interactions ($r = .455, p < .001$).

I used multivariate OLS regression to assess the relationship between child care quality and breastfeeding duration controlling for maternal characteristics. Due to the missing data, using listwise deletion would have resulted in the loss over almost 50% of the cases ($N = 384$). Because of the non-random nature of the missing data and statistical power issues, I used

STATA for this analysis, and the ICE missing data module to conduct multiple imputation.

Results are shown in Table 6.6

- - Table 6.6 here - -

Prior to multivariate analysis, I mean centered all continuous level independent variables in order to reduce multicollinearity and the likelihood of type I error. Because of this, the constant is interpreted as logged breastfeeding for those individuals who have the average score on all continuous IV's, and are the omitted category for the indicated variables. In Model 1, I enter child caregiver characteristics that are structural indicators of child care quality. Child caregivers who are minorities are significantly less likely to breastfeed ($B=-.466$, $p<.001$) in the multivariate model even after controlling for caregiver age, education, wage, and infant experience. Similar to in bivariate analysis, caregiver education remained a positive and significant predictor of breastfeeding duration after controlling for other caregiver variables ($B=.691$, $p<.001$). Although caregiver experience was not significant in the bivariate model, it emerged as a positive significant predictor of breastfeeding duration in Model 1 ($B=.729$, $p<.001$). Therefore, controlling for other variables, more experienced providers are associated with mother's longer duration of breastfeeding. As we will see later, this is likely a selection, not a causation pattern (mothers planning to breastfeed longer select more experienced child care providers). Conversely, child caregiver wage failed to significantly predict breastfeeding duration in the multivariate model after controlling for minority status, education and experience.

In the Model 2, I included two key variables assessing caregiver attitudes beliefs, and the average amount of child/caregiver interactions. After controlling for child caregiver experience and demographic characteristics, child caregiver traditional attitudes and beliefs remained as a negative and significant predictor of breastfeeding duration ($B=-.007$, $p<.01$). As child caregiver

traditional authoritarian attitudes increases, breastfeeding duration of the children in their care decreases. ORCE average amount of child/caregiver interaction was also a significant predictor of breastfeeding even after controlling for child care provider authoritarian beliefs, and other caregiver characteristics ($B=.018$, $p<.001$). Caregiver years of experience was no longer significant in Model 2.

In Model 3, I included the three variables on type of child care and proportion of time in child care. Proportion of Time in a Child Care Home emerged as a negative predictor of breastfeeding duration ($B=-.051$, $p<.001$). Child care education was no longer significant in this model, though caregiver wage emerged as a significant predictor. Caregiver traditional attitudes and beliefs and ORCE average amount of child/caregiver interaction both remained significant predictors of breastfeeding in Model 3.

In Model 4, I introduced the variable measuring maternal traditional beliefs in child rearing. This model is an attempt to test for selection effects of mother's choosing providers based on their beliefs on child rearing. Upon the inclusion of this variable, none of the caregiver characteristics, nor the caregiver attitudes beliefs on child rearing significantly predicted breastfeeding duration. This supports the hypothesis that maternal attitudes and beliefs effect child care type, and child caregiver qualities, and therefore explain the association between child care and breastfeeding. The one exception is proportion of time in a Child Care Home. This moderate negative association remained statistically significant even after controlling for maternal attitudes and beliefs ($B=-.475$, $p<.05$).

Finally, in Model 5, after controlling for maternal age, education and race, maternal attitudes and beliefs on child rearing also was no longer significant. This indicates that maternal attitudes on childrearing mediates the association between maternal age, education, race and

breastfeeding duration. Although almost none of the child care quality variables were significant in Model 5, proportion of time in a Child Care Home was still associated with shorter duration of breastfeeding..

Discussion Analysis II

Among mothers who use at least 10 hours of child care a week, on average, during the first few weeks of life, maternal demographics largely explain the association between child care provider characteristics and maternal breastfeeding duration. This supports the theory that mothers who intend to continue breastfeeding after they return to work choose child care providers who will be more likely to facilitate breastfeeding. There remained a statistically significant negative association between the proportion of time spent in non-relative child care homes and breastfeeding duration after controlling for maternal demographics. This indicates that the use of non-relative child care homes inhibit continued breastfeeding, however, I am unable to do anything but speculate as to why based on the findings from the previous chapters.

CHAPTER VII

Discussion and Conclusions

Mothers in the US return to work quickly after the birth of the child, consequently, child care use is high and often costly for non-relative care, though child care regulation is low. There have been no previous studies exploring the role of child care on breastfeeding duration for working mothers. Additionally, this is the first use of the Ecological Health Perspective to study breastfeeding duration in social context. This dissertation contributes to the understanding of the relationship that child care has on inhibiting or facilitating breastfeeding for working mothers.

Ecological Health Promotion Theory suggests that Child Care Providers are embedded in a larger system, and that interactions between providers, mothers, and infants, should affect infant feeding, particularly the choice to wean or begin infant formula feeding. Qualitative Interviews of the nine providers described in Chapter four revealed that they did not recognize themselves within this system; indeed, they often explicitly state that their role is simply to be an extension of the parent, following only parental wishes. Implicitly, however, all of the providers described situations in which they influenced infant feeding. Additionally, they described their role relative to other actors such as doctors, and the USDA food program. Communication between mothers and providers was important for the duration of in infant feeding. None the providers said that they felt their own experiences, attitudes or beliefs regarding infant feeding had any influence in facilitating or inhibiting breastfeeding, although attitudes and knowledge about breastfeeding all varied across the individual providers. Despite how child care providers see themselves in relation to breastfeeding, these interviews revealed that they are independent actors. Their behaviors were often shaped by mesosystem forces, such as licensing type (center versus home), and through the USDA Food Program. Though they collectively shared decades of

experience feeding infants, they nevertheless (and sometimes reluctantly) accepted doctors as the final authority on infant feeding.

In Chapter five I used a mail survey of child care providers in the Midwest to assess if insights gleaned from the in depth interviews were supported in a broader sample. I found significant variation among 93 providers in their beliefs about the importance of breastfeeding, the number of program supports, and their confidence in providing breast milk to infants. As personal experience providing breast milk to their own children increased, their beliefs about the importance of breastfeeding, number of program supports, and confidence providing milk also increased. Indeed, level of personal experience providing breast milk emerged as the only significant predictor of the proportion of infants' breastfed in their child care program. None of these variables, however, were related to child care quality as measured by provider education, experience, motivation, or accreditation. Those who worked in Child Care Centers had less personal experience feeding infants overall, and had a smaller proportion of their infants breastfed than Child Care Homes. Thus, I failed to find support for the hypothesis that child care quality indicators were related to breastfeeding friendliness, or a program that provides structural supports to facilitate breastfeeding. Support for the maternal selection hypothesis emerged in Chapter 5. There is a link between provider personal experience breastfeeding and proportion of infants breastfed in a child care program. This association seems to be explained by mother's who value and want to continue breastfeeding selecting providers who have experience with breastfeeding infants and who also personally value breastfeeding.

In my final substantive chapter I planned to replicate my findings from chapters 4 and 5 could be evaluated on a much larger sample. Chapter 6 was initially designed based upon the expected results from Chapters four and five. I expected a link between child care quality

variables and actual breastfeeding duration in mothers was mediated through breastfeeding friendliness. Although I failed to find support for a link between breastfeeding friendliness and child care quality, I nevertheless assessed whether there was any relationship between child care type and quality and breastfeeding duration. While the findings in Chapter five did not support this association through the mechanism I anticipated, exploring whether there was a relationship between child care quality and breastfeeding in a larger sample remained important due to a lack of empirical research exploring this relationship. I also included an additional set of variables in the model to assess if the relationship between child care quality variables and breastfeeding could be explained by maternal characteristics. I presume that if maternal characteristics are associated with breastfeeding duration but child care characteristics are not associated with duration, then there is support for the selection perspective. This would support the hypothesis that mothers who want to continue breastfeeding select providers who will help to accommodate and perhaps even facilitate breastfeeding. If provider characteristics were associated with duration, then there is more support for a causation hypothesis – that providers can make a difference in helping mothers to persist in breastfeeding infants. Before I could evaluate these possibilities, I first assessed a baseline model of all mothers (employed/in school and stay-at-home) and the general impact of the initiation and average use of child care. I assessed primarily working preferences and actual employment status.

In the first analysis of all mother I found that as average number of maternal working hours and child care hours increased, breastfeeding duration decreased. Both associations (work and child care) were independent and negatively associated with breastfeeding duration. Although the average number of working hours reduced breastfeeding duration overall, this was modified by the mother's preferred working hours at one month. Mothers who preferred to be

employed part time or full time, and were working their preferred hours at 4 months, breastfed longer than mothers who were employed the same hours, but had said they preferred fewer hours or that they wished to stay at home. Another important finding related to timing of child care and timing of the return to work emerged in this baseline analysis. Although starting child care early resulted in fewer weeks of breastfeeding in general, for mothers who returned to work, earlier child care onset buffered the relationship. If child care onset preceded returning to work, mothers actually breastfed long than when child care and employment began at the same time, and particularly when child care began after the mother returned to work.

This is an important finding as perhaps increasing access and lowering child care cost could help mothers transition into child care prior to transitioning back to work, thereby increasing breastfeeding duration for working mothers. Finally, in this analysis of employed and unemployed mothers, the proportion of time in a relative child care had a positive influence on breastfeeding duration after controlling for maternal and work related variables. Because there is little prior research into the relationship between breastfeeding and child care in general, these latter two findings are an important contribution to the scientific literature.

The second analysis in chapter 6 was of only women who averaged 10 or more hours of non-maternal care giving and who were employed or in school. Here I set up the model to test if the child care variables remained associated with breastfeeding after maternal characteristics were accounted for. As expected from the results of Chapter 5, I failed to find support for an association between child care quality and breastfeeding duration. Instead, I found further support for the maternal selection hypothesis. The only child care variable associated with breastfeeding that remained significant in the final model was the proportion of time spent in a child care home. Unlike in the first analysis in Chapter 6, proportion of time in a relative home

did not facilitate breastfeeding among working mothers. Although it is possible that there are other variables related to overall child care quality that may impact breastfeeding duration that I did not include in this analysis, more research needs to be conducted to know what these variables are, and whether or not they can be influenced to help better facilitate breastfeeding in child care for working mothers.

Limitations

Each of these analyses had strengths and weaknesses. Chapter four was a random sample of licensed providers in a small Midwestern town. They were diverse in age education and experience, and compared to the provider data in Chapter 6, the information is relatively recent. Unfortunately, the sample excluded unlicensed relative home caregiving, or basic unlicensed non-relative home providers. Although some of the providers I selected also cared for the children of relatives and their own children, I was unable to separate that out and explore as much as I wanted to after the analyses in Chapter 6.

The analysis in Chapter 5 was also timely, and provided important insight into the attitudes, beliefs and experiences regarding breastfeeding in their programs. It was unfortunate that the sample size was so small, and that I was unable to include all of the quality variables I had initially wanted to include due to data access limitations.

As with most studies with unexpected findings, it is unclear if the theory is wrong or the data is inadequate to adjudicate the theory. I did not find support for an association between child care quality and breastfeeding friendliness of providers, and child care quality and breastfeeding duration in mothers..The United States does not have a coordinated and comprehensive child care regulatory system, and therefore there might not be much variation in quality on any variables, particularly ones that influence nutrition. First, prior research indicates that virtually

no child care programs meet recommended standards and that compliance to these standards was inversely associated with child age. Compliance ranged from 10% at 6 months of age to 34% at 36 months of age (NICHD SECC, 1997). For example, in chapter five, I did not include a variable on the USDA food program participation because of the respondents with information, 100% participated in the food program. Because of limited variation in child care quality, the small sample size in chapter five for the child care quality indicators (N=68) is unlikely to discriminate between centers.

These pilot studies will be useful for conducting power analyses for future research to ensure an adequate sample size with sufficient power to test hypotheses. Another limitation in Chapter five was a lack of quality indicators available across all providers. Future studies should seek better measures of child care quality and breastfeeding friendliness of providers.

In chapter 6, the data was somewhat dated (1991), particularly because there were important changes in the United States since 1991 that are relevant to breastfeeding (e.g.g work place leave (1993 FMLA) and the resurgence of breastfeeding in the United States. There are more mothers breastfeeding now, and more mothers attempting to combine work and breastfeeding than 20 years ago. Although this sample has elicited important findings regarding child care use, and quality in the US, they cannot be generalized to mothers and children in the general population due to the sampling methods.

Future Research

There are qualitative differences between relative home care, child care homes, and child care centers. It is likely that how continued breastfeeding is facilitated or inhibited varies as function of the type of care available and chosen by mothers before birth. Because different factors may influence breastfeeding in the different types of care, it might be that different

quality variables influence breastfeeding friendliness and therefore duration within types. The quality and variability in regulation across child care home providers is vast, but in child care centers, which are more highly regulated, there may be less variation. It is possible that in child care centers variation may be a function of policies where in homes it might be a function of personal networks and provider personal experience. Although facilitating breastfeeding in child care programs should remain an important goal, these results suggests that there are limits to this approach to supporting mothers infant feeding choices. More formal care does not equal more breastfeeding, and policies and procedures formalizing care may not promote breastfeeding. Any breastfeeding promotion should be targeted and thoughtful, more qualitative interviews should be conducted. For example, because of the strong influence of maternal characteristics, the focus should be more on helping mothers who want to continue to breastfeed try to find supportive providers rather than using providers to influence mothers. Because child care centers were most likely to have infants who are exclusively formula fed, and had providers with less confidence in providing breast milk, there is much room for improvement in this area center care.

More qualitative work needs to be conducted with breastfeeding mothers on how and why they choose child care providers, and what their experiences are with child care providers and breastfeeding. What did mothers perceive as barriers to using child care and providing breast milk? What barriers did they experience? How did child care providers facilitate their continued breastfeeding? A network analysis based on findings from these qualitative studies could help us better understand the links between providers and mothers in their care, and the networks among friends and acquaintances who choose to combine breastfeeding and work.

Studies that assess the relationship between child care, work and breastfeeding should include nesting of maternal/infant dyads within centers. Prospective studies should be conducted, or detailed retrospective information on all types of prenatal (and pre-pregnancy) maternal intentions should be included. Models that include propensity score matching in order to control for selection seem to be the most practical method of separating selection affects related to child care type and quality and breastfeeding duration.

Variables that should be included in futures studies are; prenatal intentions to breastfeed, and differences between planned, mistimed, and unintended pregnancies. It is likely that pregnancies that are planned also include planning for time off work, post birth employment options, and/or child care use intentions. The more mistimed the pregnancy, the less time a mother has to save money, arrange care, and may limit her ability to access paid, job protected, time off work.

The impact of the inclusion of breast milk for reimbursement in child care centers is an important area for future research, particularly using experimental design to assess how the amount reimbursed may change behaviors of providers and influence breastfeeding.

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**Table 1.1 Marital Status of Women in the
Labor Force: 1900-2000**

	Single	Married	Other
1900	43.5	5.6	32.5
1910	51.1	10.7	34.1
1920	46.4	9.0	-
1930	50.5	11.7	34.4
1940	45.5	15.6	30.2
1950	46.3	23.0	32.7
1960	42.9	31.7	36.1
1970	50.9	40.2	36.8
1980	64.4	49.9	43.6
1990	66.7	58.4	47.2
2000	68.9	61.1	49.0

Source: U.S. Census Bureau, 1900-1930, U.S. Census of Population: 1930 Vol. IV.; 1940-1970, U.S. Census of Population: 1970, Vol. I; and 1940-1954, Current Population Reports, Series P-50.

Table 4.1 Qualitative Provider Sample Characteristics

Provider	Child Care Type	Provider Age	Years in Licensed Care	Education	Years Informal Experience	Number of Children	Personal Experience Breastfeeding	Professional Experience Providing Breast Milk?
Kathy	Child Care Home I	59	19	Bachelors	19	6	1	1
Jan	Child Care Home I	46	3	GED	8	0	0	0
Cindy	Child Care Home II	48	17	Bachelors	18	4	1	1
Sara	Child Care Home II	24	1	Associates	1	0	0	1
Christa	Child Care Center	22	3	Associates	10	1	1	1
April	Child Care Center	35	7	Bachelors	24	1	1	1
Sue	Child Care Home II	58	20	HS	20	1	1	1
Amanda	Child Care Home I	30	2	Associates	15	2	1	1
Patty	Child Care Center	50	3	Associates	32	7	0	1
Average		41.3	8.3		16.3	2.4	0.7	0.9

Table 5.1 Demographics and Missing Analysis for Provider Breastfeeding Survey

	Total N=93			Child Care Home N=47			Child Care Center N=21			Missing N=25		
<u>Experience with Breastfeeding</u>	<u>Mean / %</u>	<u>SD</u>		<u>Mean / %</u>	<u>SD</u>		<u>Mean / %</u>	<u>SD</u>		<u>Mean / %</u>	<u>SD</u>	
Personal Experience	2.04	0.21		3.91	2.05		3.24	2.05		3.16	1.97	
Number of Infants	4.63	6.89	***	2.33	1.75		10.90	11.89		3.54	2.98	
Proportion Breastfed	0.21	0.25		0.23	0.27		0.16	0.17		0.19	0.27	
Proportion Formula	0.41	0.28	*	0.34	0.26		0.53	0.31		0.47	0.25	
Preference	-0.81	0.52		-0.77	0.60		-0.82	0.53		-0.88	0.33	
Months breastfeeding	10.63	2.74		10.83	2.33		10.79	2.84		10.05	3.43	
Confidence in Ability to Prepare	3.62	0.76	*	3.79	0.62		3.29	1.06		3.60	0.65	
Confidence in Ability to Feed	3.70	0.67	**	3.94	0.25		3.33	1.06		3.56	0.65	*
<u>Child Care Infant Feeding Beliefs</u>												
Importance - That mothers have a place to nurse in a child care facility	3.24	1.06		3.09	1.14		3.38	0.97		3.40	0.96	
Importance - That infant feeding options are discussed with new parents at your program	3.46	0.83		3.51	0.75		3.45	1.00		3.36	0.86	
Importance - That infants receive at least some breast milk	2.63	1.06	+	2.38	1.15		2.86	1.01		2.92	0.81	*
Importance - That child care providers receive training in infant feeding	2.80	1.06		2.72	1.10		3.19	0.75		2.60	1.15	
Importance - That child care providers encourage the use of breast milk	2.39	1.11		2.19	1.17		2.43	1.21		2.72	0.84	

**Programmatic Support
for Breastfeeding**

My program provides information sheets on breast milk	21.9%	23.9%	16.7%	24.0%
My program provides a place for mothers to nurse	77.5%	78.3%	72.2%	80.0%
When prospective parents call to enroll, we discuss infant feeding	74.2%	73.9%	77.8%	72.0%
My program promotes breast milk	21.3%	21.7%	16.7%	24.0%

+ p<.10

*p<.05

Table 5.2 Bivariate Correlations Breastfeeding Scales

	Program Promotes Breastfeeding	Beliefs of Importance of Breastfeeding	Confidence in Providing Breast Milk	Personal Experience Feeding Infants	Number of infants Cared for (past 12 months)	Proportion of Infants Exclusively Breastfed	Proportion of Infants Exclusively Formula Fed.	Ideal breastfeeding Duration (months)
Beliefs of Importance of Breastfeeding	0.355 ***							
N	89							
Confidence in Providing Breast Milk	0.35 ***	0.262 **						
N	89	93						
Personal Experience Feeding Infants	0.149 +	0.139 +	0.252 **					
N	89	93	93					
Number of infants Cared for (past 12 months)	0.132	0.039	0.084	-0.013				
N	87	91	91	91				
Proportion of Infants Exclusively Breastfed	-0.187 +	0.046	.212* *	0.189 *	0.045			
N	76	77	77	77	77			
Proportion of Infants Exclusively Formula Fed.	0.024	-0.058	0.009	-0.204 *	0.327 **	-0.438 ***		
N	78	79	79	79	79	75		
Ideal breastfeeding Duration (months)	0.101	0.162 +	0.342 **	0.307 **	0.044	0.054	0.021	
N	84	88	88	88	87	73	75	
Importance that Child Care Providers Receive Training in Infant Feeding	0.180 *	0.324 **	0.061	-0.077	0.136 +	0.000	0.015	0.123
N	89	93	93	93	91	77	79	88

+ p<.10
*p<.05
**p<.01
***p<.001

Table 5.3 Descriptives for Child Care Provider Experience, Motivation/Quality and Accreditation

	Total N=93			Child Care Home N=47		Child Care Center N=21		Missing N=25	
Provider	Mean / %	SD		Mean / %	SD	Mean / %	SD		
<u>Experience/Motivation/Quality</u>									
Months in Field	158.33	99.45	**	179.85	108.12	110.15	52.18	-	-
<u>Education</u>									
High School	22.06%			26.80%		9.52%		-	-
Some College or 1-year Certification	33.82%			34.10%		38.10%		-	-
Associates Degree	22.58%			17.10%		33.33%		-	-
Bachelors Degree	20.97%			22.00%		19.05%		-	-
<u>Caregiver Motivation (Kontos, 1995)</u>									
My career or profession	4.57	0.64	*	4.70	0.66	4.31	0.53	-	-
Stepping stone to a related career or profession	2.35	1.16	+	2.16	1.20	2.68	0.96	-	-
A job with a paycheck	2.51	1.41	*	2.84	1.57	1.81	0.63	-	-
Work to do while my children are young	2.41	1.40	*	2.74	1.57	1.75	0.62	-	-
A way of helping a family member, neighbor, friend, or other adult	4.10	0.92		4.16	1.04	4.02	0.57	-	-
<u>Accreditation</u>									
NAEYC Accredited	38.2%	**		25.5%		66.7%		-	-
NAFCC Accredited	17.9%	**		26.1%		0.0%		-	-

+ p<.10

*p<.05

**p<.01

Table 5.4 Breastfeeding Attitudes, Program Supports, Confidence and Personal Experience with Child Care Quality

	Program Promotes Breastfeeding	Beliefs of Importance of Breastfeeding	Confidence in Providing Breast Milk	Personal Experience Breastfeeding	Child Care Center	Work Experience (months)	High School	Some College	Associates Degree	Bachelors Degree	My career or profession	Stepping stone to a related career or profession	A job with a paycheck	Work to do while my children are young	A way of helping a family member or friend	NAEYC Accredited
Beliefs of Importance of Breastfeeding	0.305 **															
N	89															
Confidence in Providing Breast Milk	0.350 **	0.194 +														
N	89	93														
Personal Experience Breastfeeding	0.149	0.134	0.252 *													
N	89	93	93													
Child Care Center	-0.063	0.142	-0.363 **	-0.153												
N	64	68	68	68												
Work Experience (months)	0.002	-0.097	0.012	0.034	-0.326 **											
N	64	68	68	68	68											
High School	0.022	-0.179	-0.018	-0.081	-0.201	0.526 ***										
N	65	68	68	68	62	62										
Some College	0.170	-0.077	0.070	-0.142	0.039	-0.294 *	-0.380									
N	65	68	68	68	62	62	68									
Associates Degree	0.057	0.166	-0.076	-0.037	0.184	-0.135	-0.295 *	-0.397								
N	65	68	68	68	62	62	68	68								
Bachelors Degree	-0.294 *	0.100	0.017	0.288 ***	-0.034	-0.042	-0.271 *	-0.364	-0.282							
N	65	68	68	68	62	62	68	68	68							
My career or profession	-0.040	-0.031	0.056	0.054	-0.279 *	0.406	0.159	-0.279 *	0.050	0.119						
N	64	68	68	68	67	67	61	61	61	61						
Stepping stone to a related career or profession	0.078	-0.073	-0.151	-0.162	0.215 +	-0.499 ***	-0.125	0.214	0.061	-0.201	-0.141					
N	62	66	66	66	65	65	60	60	60	60	66					
A job with a paycheck	0.034	-0.034	0.087	0.068	-0.191	-0.004	0.164	-0.074	-0.096	0.022	-0.057	-0.071				
N	64	68	68	68	67	67	61	61	61	61	68	66				
Work to do while my children are young	-0.012	-0.146	0.081	0.097	-0.343 **	0.098	0.310 *	-0.072	-0.294 *	0.070	0.005	-0.039	0.207 +			
N	62	66	66	66	65	65	60	60	60	60	66	65	66			
A way of helping a family member or friend	0.200 +	0.125	0.120	0.183	-0.333 **	-0.243 +	-0.013	-0.146	-0.013	0.202	-0.124	0.116	0.424	0.253		
N	61	65	65	65	64	64	59	59	59	59	65	64	65	65		
NAEYC Accredited	-0.076	0.073	-0.055	-0.113	0.391 ***	-0.112	-0.084	-0.036	0.204	-0.084	0.160	0.267 *	-0.215 +	-0.267 *	-0.014 **	
N	65	69	69	69	68	68	62	62	62	62	68	66	68	66	69	
NAFCC Accredited	0.076	-0.078	0.183 +	-0.126	-0.316 **	0.202	0.145	0.058	0.045	-0.258	0.321	-0.148	0.022	-0.148	-0.086	0.047
N	64	68	68	68	67	67	61	61	61	61	67	65	67	65	68	68

+ p<.10

*p<.05

**p<.01

***p<.001

Table 6.1 Descriptive Statistics for Stay at Home Moms and Employed Moms (Full Sample)

Dependent Variable	N		Mean/Proportion	SD	Skew	Range
	Valid	Missing				
Breastfeeding Duration (weeks)	1311	53	16.09	22.05	2.197	144
<i>Natural Log</i>	1311	53	1.87	1.54	0.027	4.98
Demographic Controls						
Father/Partner at Home	1364	0	0.85	0.36	-	1
Maternal Age	1364	0	28.11	5.63	0.056	28
Maternal Education	1363	1	14.23	2.51	0.148	14
<i>Square Root</i>	1363	1	3.76	0.34	-0.124	1.94
Total Family Income	1273	91	\$37,947.77	\$34,102.36	2.43	\$272,501.00
<i>Natural Log</i>	1273	91	10.17	0.95	-0.687	4.7
Minority	1364	0	0.1738	0.01026	-	1
Employment						
Age Return to work/School (child's age in months)	1057	307	7.58	0.26	1.527	36
<i>Recode: Age Return to work/School (child's age in months)</i>	1364	0	14.2	14.38	0.692	37
<i>Natural Log</i>	1364	0	2.15	1.15	-0.005	3.64
Hour per week spent working or in school at 3 months	1331	33	18.9932	21.32750	1.100	183.00
<i>Natural Log</i>	1331	33	1.8719	1.77484	-0.031	5.21
Ideal PT Work or School	1364	0	.5271	.49945	-	1.00
Ideal FT Work or School	1364	0	.1312	.33778	-	1.00
Employment Interactions						
work Hours X Ideal Work Situation PT	1350	12	0.0898	1.26996	-0.116	5.21
Average Hours X Ideal Work Situation FT	1352	14	0.0149	0.6359	0.145	4.62
Child Care						
Prop. time in Center	1364	0	.0994	.24807	2.603	1.00
<i>Natural Log</i>	1364	0	.0758	.18138	2.393	.69
Prop. time in Relative Home	1364	0	.3691	.38007	.521	1.00
<i>Natural Log</i>	1364	0	.2771	.26927	.341	.69
Prop. Time in CC Home	1364	0	.2230	.33626	1.261	1.00
<i>Natural Log</i>	1364	0	.1692	.24358	1.090	.69
Child care Onset	1000	364	7.33	0.259	1.654	36
<i>Recode: Child care Onset (child's age in months)</i>	1364	0	15.25	14.89	0.57	37
<i>Natural Log</i>	1364	0	2.24	1.11	0.068	3.64
Hours in Child Care	1364	0	14.69	14.03	0.532	64.29
<i>Natural Log</i>	1364	0	2.02	1.45	-0.402	4.18
Child Care Interactions						
Age return to work/School X Child Care Onset	1364	0	0.3604	1.31362	-0.23	7.25

Table 6.2 Bivariate Analysis for Stay at Home Moms and Employed Moms (Full Sample)

N=1202	Breastfeeding Duration	Father/ Partner at Home	Maternal Age	Maternal Education	Family Income	Minority	Age Return to Work or School	Hours in Work or School	Ideal FT Work/Sc hool	Ideal PT Work/Sc hool	Work Hours X Ideal Work PT	Work Hours X Ideal Work FT	Prop. time in Center	Prop. Time in Relative Home	Prop. time in CC Home	Hours in Child Care	Child Care Onset
Father/Partner at Home	.220 ***																
Maternal Age	.364 ***	.311 ***															
Maternal Education	.422 ***	.291 ***	.530 ***														
Family Income	.327 ***	.555 ***	.494 ***	.458 ***													
Minority	-.257 ***	-.290 ***	-.213 ***	-.129 ***	-.292 ***												
Age Return to Work or School	-.037	-.014	.116 ***	.009	-.021	.075 **											
Hours in Work or School	-.075 **	.068 **	.010	.100 ***	.034	-.051 *	-.253 ***										
Ideal FT Work/School	-.151 ***	-.240 ***	-.166 ***	-.090 **	-.182 ***	.202 ***	-.004	.023									
Ideal PT Work/School	-.014	.106 ***	.078 **	.091 **	.117 ***	.006	-.107 ***	.107 ***	-.399 ***								
Work Hours X Ideal Work PT	-.002	.050 *	.077 **	.114 ***	.061 *	-.041	-.140 ***	.727 ***	-.026	.065 *							
Work Hours X Ideal Work FT	.007	.120 ***	.035	.055 *	.086 *	-.040	-.090 **	.357 ***	.051 *	-.020	-.001						
Prop. time in Center	.013	.058 *	.096 ***	.107 ***	.055 *	-.064 *	.058 *	.180 ***	.013	.051 *	.141 ***	.080 **					
Prop. Time in Relative Home	.028	.069 **	.001	.126 ***	.061 *	.019	-.221 ***	.332 ***	.000	.119 ***	.239 ***	.100 ***	-.164 ***				
Prop. time in CC Home	-.022	.013	.056 *	.100 ***	-.015	-.057 *	-.155 ***	.314 ***	.019	.064 *	.161 ***	.123 ***	-.159 ***	-.085 **			
Hours in Child Care	-.126 ***	.026	.000	.112 ***	-.005	.000	-.306 ***	.699 ***	.061 *	.148 ***	.467 ***	.273 ***	.232 ***	.425 ***	.400 ***		
Child care Onset	.190 ***	.031	.045	-.021	.089 **	-.076 **	.254 ***	-.625 ***	-.104 ***	-.114 ***	-.410 ***	-.265 ***	-.217 ***	-.272 ***	-.395 ***	-.838 ***	
OnsetXAge Return to Work/School	-.064 *	-.075 **	-.033	-.096 ***	-.025	.009	-.053 *	-.165 ***	.007	-.071 **	-.091 **	-.027	-.127 ***	-.186 ***	-.033	-.143 ***	.058 *

*** p<.001
 ** p<.01
 * p<.05

Table 6.4 Descriptive Statistics NICHD Child Care Quality Sample (6 months) and Missing Analysis

	NICHD Child Care Quality Sample (6 months) N=750							Excluded Cases N=614				
	Valid	N Missing	Mean/Prop.	SD	Skew	Range	% Missing	Valid	N Missing	Mean/Prop.	SD	
<u>Dependent Variable</u>												
Breastfeeding Duration	731	19	13.76	18.44	2.16	144.00	2.5%	580	34	19.04	25.61	***
<i>Natural Log</i>	731	19	1.82	1.44	0.00	4.98	2.5%	-	-	-	-	
<u>Demographic Controls</u>												
Father/Partner at Home	750	0	0.84	0.37	-	-	0.0%	614	0	0.86	0.35	
Maternal Age	750	0	28.51	5.47	0.01	28.00	0.0%	614	0	27.62	5.47	**
Maternal Education	750	0	14.63	2.43	0.30	14.00	0.0%	613	1	13.75	2.53	***
<i>Square Root</i>	750	0	3.81	0.32	0.07	1.94	-	-	-	-	-	
Family Income	696	54	\$38,222	\$34,452	2.61	\$272,501	7.2%	577	37	\$37,616	\$33,702	
<i>Natural Log</i>	696	54	10.21	0.89	0.64	4.70	-	-	-	-	-	
Minority	750	0	0.16	0.37	-	-	0.0%	614	0	0.19	0.39	**
Maternal Traditional Beliefs	749	1	93.02	14.22	0.21	88.00	0.0%	614	0	3.15	0.48	*
<i>Square Root</i>	749	1	1.76	0.13	0.02	0.74	0.0%	-	-	-	-	
<u>Child Care Type/Time</u>												
Prop. time in Relative Home	750	0	0.49	0.40	0.03	1.00	0.0%	614	0	0.23	0.30	
Prop. Time in CC Home	750	0	0.34	0.39	0.59	1.00	0.0%	614	0	0.07	0.17	
<i>Natural Log</i>	750	0	0.26	0.27	0.44	0.69	-	-	-	-	-	
Prop. time in Center	750	0	0.15	0.31	1.89	1.00	0.0%	614	0	0.04	0.13	
<i>Natural Log</i>	750	0	0.11	0.22	1.74	0.69	-	-	-	-	-	
<u>Child Care Quality</u>												
Caregiver	586	164	0.84	0.36	-	1.00	21.9%	**	-	-	-	-

Female					1.91							
Caregiver Minority	588	162	0.22	0.42	1.34	1.00	21.6%	**	-	-	-	-
Caregiver Education	583	167	2.68	1.12	0.57	5.00	22.3%	**	-	-	-	-
<i>Natural Log</i>	583	167	1.25	0.31	-	1.25	22.3%		-	-	-	-
Caregiver Years Experience	577	173	3.98	6.60	2.54	44.00	23.1%	***	-	-	-	-
<i>Natural Log</i>	577	173	0.98	1.06	0.63	3.81	23.1%		-	-	-	-
Caregiver Wage	486	264	\$605	\$586	1.75	\$5,000	35.2%		-	-	-	-
<i>Square Root</i>	486	264	20.53	13.57	-	70.71	35.2%		-	-	-	-
Caregiver Infant Experience	482	268	0.81	0.39	-	1.00	35.7%		-	-	-	-
Caregiver Traditional Beliefs	486	264	78.27	19.68	0.05	95.00	35.2%		-	-	-	-
ORCE average	595	155	14.90	7.68	0.25	29.75	20.7%	**	-	-	-	-
Caregiver Infant Interactions												

*** p<.001

** p<.01

* p<.01

Table 6.5 Bivariate Analysis NICHD Child Care Quality Sample

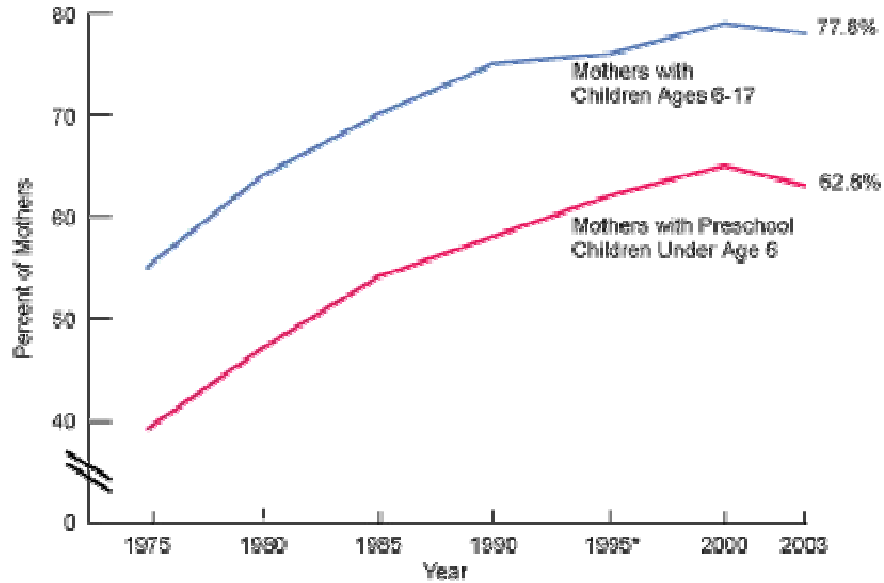
	Breastfeeding	Live with father/partner	Mom Age	Mom Education	Family Income	Minority	Maternal Traditional Beliefs	Prop. Time in Relative Home	Prop. Time in CC Home	Prop. Time in Center	Caregiver Female	Caregiver Minority	Caregiver Education	Caregiver Experience	Caregiver Wage	Caregiver Infant Experience	Caregiver Traditional Beliefs
Live with father/partner	.189 ***																
N	731																
Maternal Age	.330 ***	.303 ***															
N	731	750															
Maternal Education	.446 ***	.250 ***	.537 ***														
N	731	750	750														
Family Income	.248 ***	.491 ***	.436 ***	.412 ***													
N	678	696	696	696													
Minority	-.263 ***	-.316 ***	-.221 ***	-.186 ***	-.222 ***												
N	731	750	750	750	696												
Maternal Traditional Beliefs	-.350 ***	-.196 ***	-.379 ***	-.499 ***	-.319 ***	.324 ***											
N	730	749	749	749	695	749											
Prop. time in Relative Home	.042	.107 **	-.025	.018	.067	.044	-.040										
N	731	750	750	750	696	750	749										
Prop. Time in CC Home	-.037	-.081	.035	.023	-.061	-.023	.006	-.364 ***									
N	731	750	750	750	696	750	749	750									
Prop. time in Center	.027	.082	.103 **	.082 *	.058	-.095 **	-.074 *	-.333 ***	-.322 ***								
N	731	750	750	750	696	750	749	750	750								
Caregiver Female	-.031	.082	.102 *	.057	.126 **	.024	-.031	-.345 ***	.178 ***	.166 ***							
N	573	586	586	586	550	586	585	586	586	586							
Caregiver Minority	-.151 ***	-.155	-.059	-.070	-.059	.533 ***	.241 ***	.043	-.090 *	.000	.093 *						
N	575	588	588	588	552	588	587	588	588	588	583						
Caregiver Education	.211 ***	.089 *	.146 ***	.298 ***	.053	-.152 ***	-.273 ***	.003	-.009	.104 *	-.205 ***	-.211 ***					
N	570	583	583	583	549	583	582	583	583	583	578	583					
Caregiver Experience	.081	.068	.165 ***	.114 **	.131 **	-.115 **	-.141 **	-.337 ***	.142 **	.268 ***	.356 ***	-.019	-.032				
N	564	577	577	577	543	577	576	577	577	577	576	575	570				
Caregiver Wage	.169 ***	.167 ***	.281 ***	.281 ***	.196 ***	-.243 ***	-.291 ***	-.395 ***	.151 **	.373 ***	.161 ***	-.124 **	.283 ***	.478 ***			
N	476	486	486	486	454	486	485	486	486	486	485	485	483	477			
Caregiver Infant Experience	.031	-.082	.024	-.023	-.065	-.022	.009	-.056	.155 **	-.070	.061	.017	.009	.296 ***	.099 *		
N	471	482	482	482	450	482	481	482	482	482	481	479	477	472	465		
Caregiver Traditional Beliefs	-.225 ***	-.103 **	-.133 **	-.263 ***	-.096 *	.172 ***	.397 ***	.165 ***	-.148 **	-.081	-.020	.385 ***	-.498 ***	-.070	-.265 ***	.025	
N	475	486	486	486	454	486	485	486	486	486	481	479	476	475	444	439	
ORCE Caregiver Infant Interactions	.097 *	.029	-.021	.033	.047	.001	.004	.333 ***	.045	-.455 ***	-.229 ***	-.084 *	.000	-.222 ***	-.284 ***	-.036	-.032
N	582	595	595	595	557	595	594	595	595	595	580	582	577	572	481	476	486

*** p<.001
 ** p<.01
 * p<.05

Figure 2a

Percent of Mothers in the Work Force: 1975-2003

Source (1.6): U.S. Department of Labor



*Data for 1995 and later are not strictly comparable with data for earlier years due to changes in the survey and estimation process.

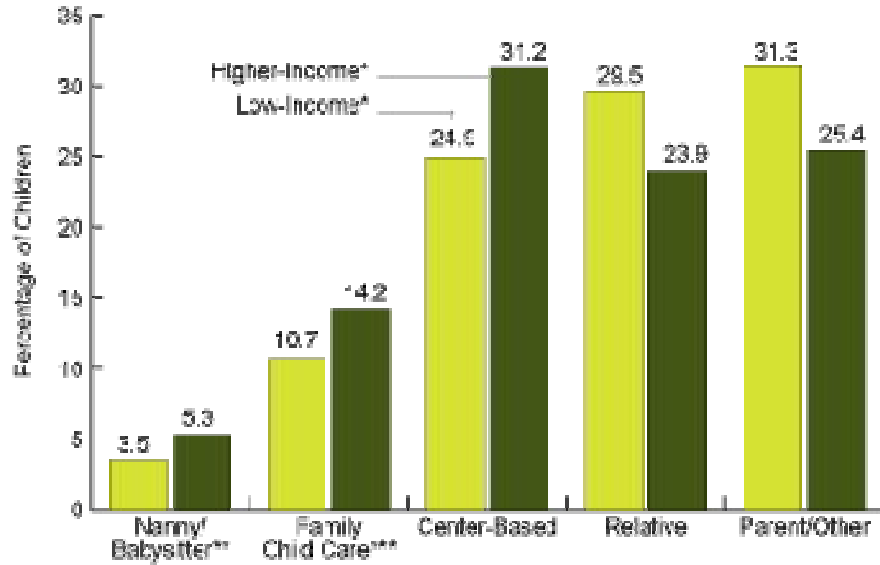
Source: U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health

Bureau. *Child Health USA 2004*. Rockville, Maryland: U.S. Department of Health and Human Services, 2004.

Figure 2b

Child Care Arrangements for Children Under Age 5 with Employed Mothers, by Family Income: 2002

Source (1.7): Urban Institute, National Survey of America's Families



* Low income is defined as below 200 percent of the federal poverty level, higher-income is 200 percent and above.

** Care by a non-relative in the child's home.

*** Care by a non-relative in the provider's home.

Source: U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health

Bureau. *Child Health USA 2004*. Rockville, Maryland: U.S. Department of Health and Human Services, 2004.

Figure 3a

Ecological Health Promotion Theory: Childcare provider effects on maternal breastfeeding

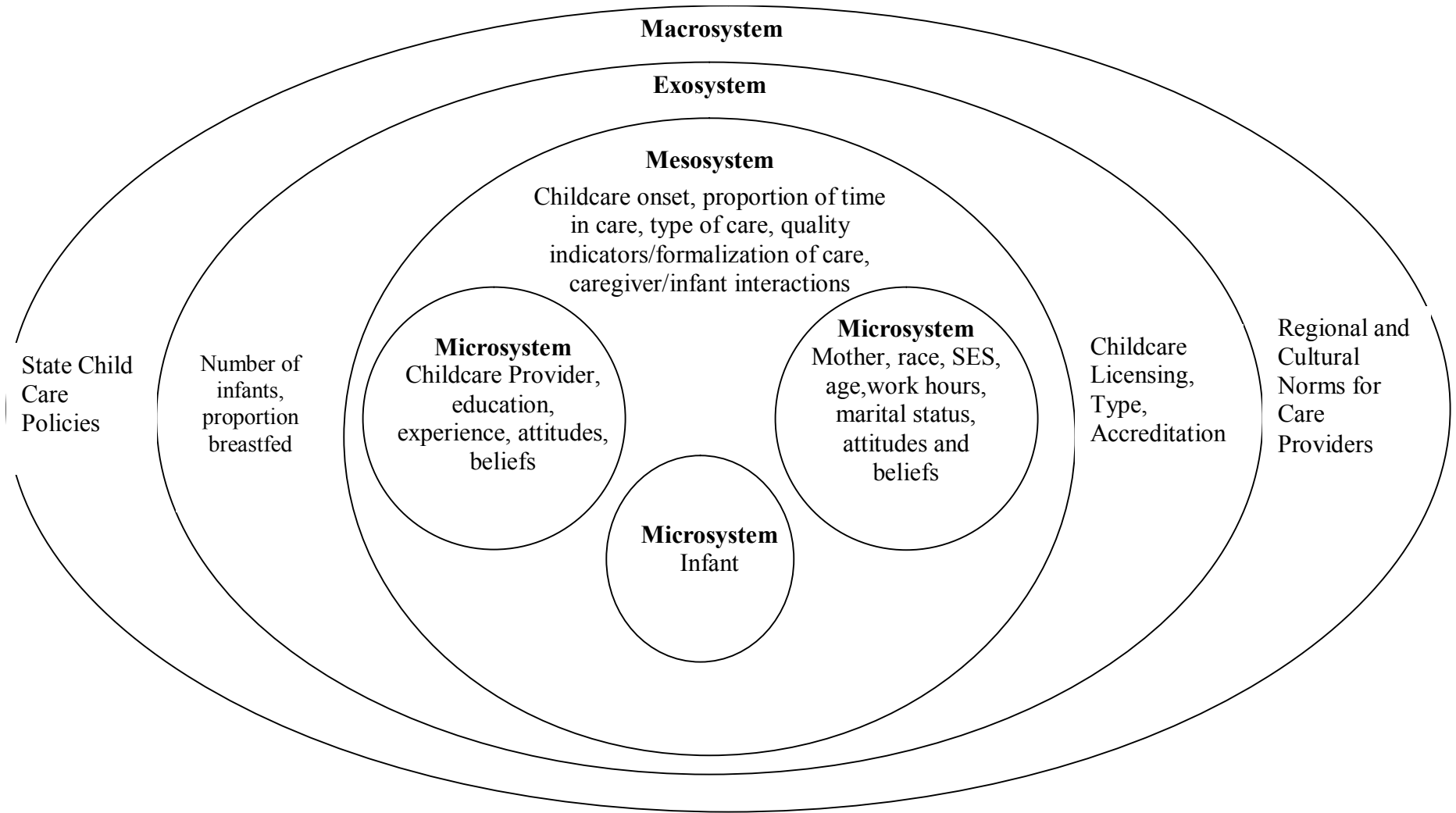
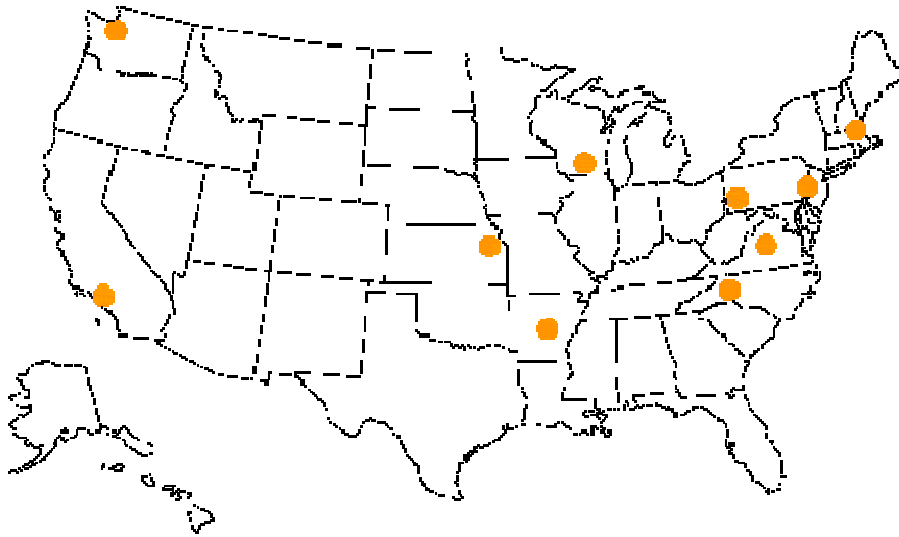


Figure 6a

Data Collection Sites



Source: NICHD SECC Retrieved March 24, 2009 from <https://secc.rti.org/sitesmap.cfm>

Figure 6b

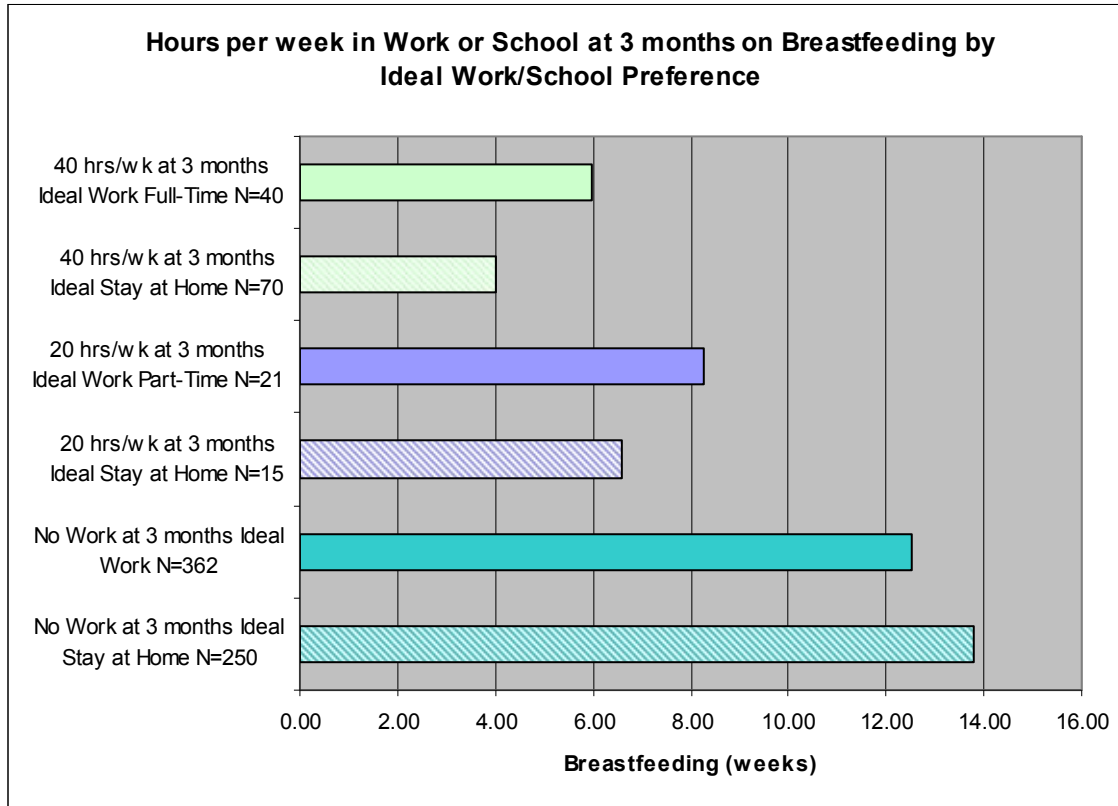
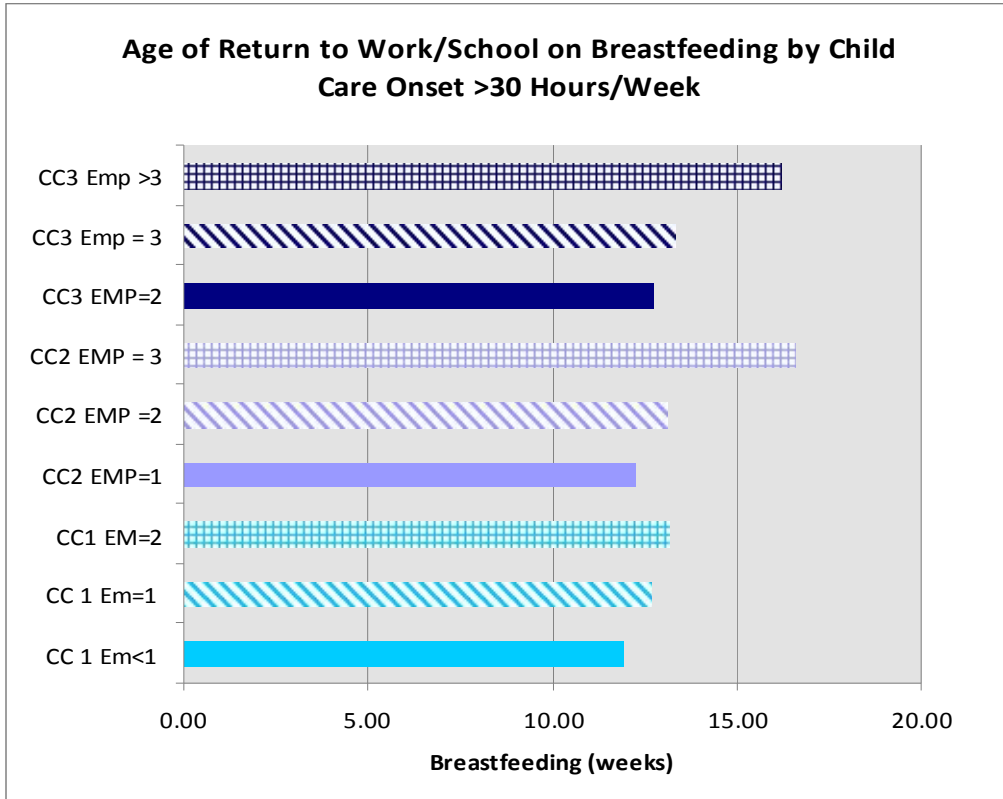


Figure 6c



Appendix A Qualitative Interview Form

PRELIMINARY QUESTIONS FOR ALL INTERVIEWS BEFORE USING THE GUIDE

Child Care Providers Attitudes and Experiences with Infant Feeding

Date: _____ Location: _____

Interviewer: _____

Participant Number: _____ (Put on the tape too)

Q: Consent:	Yes (proceed)	No (stop)		
Q: Over 18?:	Yes (proceed)	No (stop)		

(keep the signed one, give the unsigned)

I'd like to ask you a few questions first about you and your personal experiences feeding and caring for children.

[circle appropriate answers]

Questions	Responses		
Q: Qual1			
Record Interviewee's Gender	Male		
	Female		
Q: Qual2	Caucasian		
Record Interviewee's Race	African American		
	Asian/Pacific Islander		
	Native American		
	Other		
Q: Qual3			
How old were you on your last birthday?	19-100	DK	REF
Q: Qual4			
What was the highest year of schooling you completed?	0-22 And/or degree	DK	REF
Q: Qual3			
Do you have any children?	Yes	DK	REF
	No		
Q: Qual3a			
If YES, How many	1 - 12	DK	REF
Q: Qual3b			
Do any of them currently live with you now?	Yes	DK	REF
	No		

Now I'm going to ask you some general information about your child care program.

Questions	Responses			
Q: Qual4 For how long have you been a licensed child care provider?	Months (1-12) or Years (1-100)		DK	REF
Q: Qual5 How many children do you currently serve?	1-100		DK	REF
Q: Qual6 How many of those children are currently under the age of 12 months?	1-100		DK	REF
Q: Qual7 Approximately how many child care providers and staff are licensed to care for children at your facility?	1-100		DK	REF
Q: Qual8 What is your licensing type?	Family Home I Family Home II Child Care Center		DK	REF
Q: Qual8a If Child Care Center , Is your center part of a larger organization or corporation?	Yes No		DK	REF
Q: Qual8b If Yes , Is that organization for-profit, or not-for-profit?	For Profit Not for Profit		DK	REF
Q: Qual9 Are you accredited with any other outside agency?	Yes No		DK	REF

1. First, we want to talk about your experiences caring for infants under 12 months of age. Over your lifetime please describe your experiences caring for infants and young children.

PROBES:

- *How many years of your life have you cared for infants and young children?*

2. Please tell me about your personal/non-professional experiences caring for infants.

3. Where did you first learn about caring for and particularly feeding infants?

PROBES:

- *Did you learn from your mom?*
- *How old were you?*
- *Did you learn about breastfeeding, infant formula or both?*

4. As a child care provider describe your experiences with infant feeding?

PROBES:

- *Were your professional experiences different than your personal experiences?*

5. **If Child Care Center:** Do your knowledge or beliefs about infant feeding differ from the policies in your center?

PROBES:

- *Do you agree or disagree with the policies?*
- *Has there been any discussion about personal conflicts with policies or procedures?*

6. Have you had any formal training or courses on caring for infants? Do you have any formal training that has addressed infant feeding in particular? **If so**, could you please describe it?

PROBES:

- *Did they discuss breastfeeding infants?*
- *Did they discuss appropriate foods?*
- *Did they discuss food allergies?*

- A. **If not**, do you think this would be an important area to train child care providers in? Why or why not?

7. Is feeding infants under 12 months easier than feeding older kids, is it more difficult than feeding older kids, or is it about the same?

PROBES:

- *What makes it more difficult?*
- *What is easy about it?*

8. Please describe how you discuss infant feeding with mothers of infants in your program. Is it something they discuss with you?

PROBES:

- *Who usually initiates the discussion?*
- *When does the discussion occur?*
- *Who usually asks the most questions?*
- *What kind of information do parents provide?*
- *Do you find it difficult following parents instructions? Why?*
- *Is it difficult or awkward to discuss infant feeding?*

9. Do you have any policies of procedures regarding when to start infants on solid foods?

PROBES:

- *Do parents make the decision only?*
- *Is there anytime where the parent wouldn't get to decide when to start solid foods?*

10. Do you prefer that mothers of children under 12 months use formula, breast milk, or both?

PROBES:

- *Is providing infant formula easy for you?*
- *Do you perceive it to be difficult for the mother?*
- *What makes one more difficult?*
- *Which option is the easiest?*

11. How important do you think it is that mothers provide breast milk to their infants after they go back to work?

PROBES:

- *Why?*

12. How many mothers do you currently have in your facility that provide breast milk to infants in your program?

13. How many infants have you fed at least some breast milk to in the last year?

14. What have your experiences been in the past and present with mothers who continue to breastfeed? Would you describe their attempts as successful, unsuccessful, or both?

PROBES:

- *What types of things make providing breast milk to infants in child care successful?*
- *What kinds of things do you think make their attempts unsuccessful?*

15. Why have mothers of infants in your care stopped nursing?

A. Is this something they usually discuss with you? If not, why do you think that is?

16. When do you think is the best time to stop nursing?

PROBES:

- *Is there a certain age?*

- *Is there a certain time in development?*

17. Do you or your staff handle human milk differently than formula? What are some of the precautions you take? If you've never provided human milk to an infant in your care, do you perceive there to be any differences in providing human milk as opposed to formula?

PROBES:

- *What are some of the precautions you take?*
- *Are they stored differently?*
- *Are the children fed differently or on a different schedule?*

A. If never provided human milk, do you know of any differences in handling human milk compared to infant formula?

18. Is there anything we haven't talked about infant feeding that you think would be important to include?

Wrap up reminders:

- *ask about cognitive interview study contact
- *provide brochures and general information if she seems upset or curious
- * pay (Lori may have already done this).
- * Evaluate the interview on tape – quality, thoughts, insights, wishes.

Appendix B Chapter 5 Quantitative Mail Survey of 113 Child Care Providers

Thank you for choosing to participate in our study. Below you'll find a series of questions about your personal and professional experiences feeding infant. Your beliefs, attitudes and experiences with infant feeding are valuable to us. Please answer as accurately as possible. Your responses will be kept strictly confidential. There are no right or wrong answers, we just would like to know what you think. Please note that when we refer to infants, we are referring to children 12 months of age or younger. (Please use a blue or black pen. Completely darken each circle.)

1. Please fill in the circle for the one category that best describes your overall experience with feeding your own infant(s):

- Never had an infant
- Exclusively formula fed
- Mostly formula fed
- A little more formula than breast milk
- About half formula/about half breast milk
- A little more breast milk than formula
- Mostly breast milk
- Exclusively breast milk (never used infant formula)

2. We would like to know about your overall experience feeding infants as a child care provider. How often have you experienced feeding infants as a child care provider?

- Never
- Some experience (have occasionally fed infants)
- Experienced (have regularly fed infants for about a year)
- Very Experienced (have regularly fed infants for over a year)

3. People often have strong opinions about infant care. We are interested in your opinions and experiences with others regarding infant care.

a. How often do you find that you disagree with the parents of children about child care practices?

- Rarely
- Sometimes
- Frequently
- Very often

b. If you disagree with a parent about a child care practice, how do you generally handle the situation? (fill in the oval of the response that represents what you usually do)

- I haven't had a disagreement with parents about child care practices
- I carry out the parent's wishes
- I attempt to educate the parent about my practice
- I continue my practice without discussing it with the parent
- I consider asking the parent to leave my program
- other (please specify)

4. We're interested in how many infants in your care recently received formula, breast milk or both. Please count the number of infants in the last 12 months that belong in each category below. Recall that infants are under 12 months of age. Each infant should be counted only once for the last year:

How many infants have you cared for (if none, please put 0).

Of those infants, how many received only formula?

Of those infants, how many received both breast milk and formula?

Of those infants, how many received only breast milk?

5. Do you prefer caring for infants who receive mostly breastmilk or mostly infant formula? (Fill in the circle that best describes your preference)

- Mostly breast milk
- Mostly formula
- No preference

For the following questions, please fill in the one oval that best represents your answer.

	Very Comfortable	Comfortable	Neither Comfortable or Uncomfortable	Uncomfortable	Very Uncomfortable
6. How comfortable do you feel giving parents advice on infant feeding?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. How comfortable do you feel giving parents advice on raising children?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8. How long do you think infants should be fed breast milk? (in months)

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9. Sometimes parents and providers disagree about what a child should eat. When you and a parent disagree, who has the final say?

- The parent
- If consulted, a doctor's opinion would determine
- Me (The child care provider)
- Other (please specify)

10. Please indicate if you strongly agree, agree, disagree, or strongly disagree with the following statements:

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree
a. I feel confident in my ability to <u>prepare</u> formula for infants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. Child care providers should receive training in infant feeding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. I can tell when infants are ready to start solid foods.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. I feel confident in my ability to <u>feed</u> formula to infants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. Parents always know what is best for their own children	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. I feel confident in my ability to <u>feed</u> breast milk to infants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. Parents should receive training in infant feeding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. I feel confident in my ability to <u>prepare</u> breast milk for infants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. Doctors provide good advice on what to feed infants.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

11. Think for a moment about mothers who breastfeed their infants in your program. What is the most common reason that mothers stop breastfeeding? (fill in only one circle)

- No infants in my program have been breastfed
- Too busy
- The infant did not want to continue nursing
- Insufficient milk supply
- Too hard to combine work and nursing
- Uncomfortable nursing in public
- Infant formula seemed more convenient
- Doctor suggested stopping
- Husband/partner suggested stopping
- The mother just wanted to stop
- The mother was not supported/encouraged to continue
- The infant was old enough to stop
- other most common reason (please specify)

12. Please state if you think the following is not important, somewhat important, neither important or unimportant, important, or very important:

	Not important	Somewhat important	Neither Important or unimportant	Important	Very important
a. That mothers have a place to nurse in a child care facility	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
b. That infant feeding options are discussed with new parents at your program.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
c. That I neither encourage nor discourage breast milk or formula.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
d. That I hold infants when feeding them.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
e. That parents follow doctors' suggestions on infant feeding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
f. That infants receive at least some breast milk.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
g. That infants get tummy time.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
h. That parents consult me about introducing solid food.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
i. That doctors encourage breastfeeding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
j. That child care providers receive training in infant feeding.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
k. That doctors neither encourage or discourage infant formula or breast milk.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
l. That all parents wait until at least 4 months to start solid food.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
m. That child care providers encourage the use of breast milk.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

13. Our last question is about practices at your child care facility. (Please fill in the box for all that apply)

- My program provides information sheets on formula
- My program provides information sheets on breast milk
- My program provides information sheets on feeding infants solids
- My program provides a place for mothers to nurse
- When prospective parents call to enroll, we discuss infant feeding
- My program does not promote formula or breast milk
- My program promotes formula
- My program promotes breast milk
- My program has an 'open door' policy (parents are always welcome)
- I have opportunities for training/education in infant feed

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ⁱ *Milkworks* is a local no-profit breastfeeding facility with lactation consultants, a pediatrician, support groups, pumps to rent, and clothing for breastfeeding.