

COMPLEMENTARY FEEDING AND CHILD-CARE FOOD CHOICES IN  
MEXICAN WOMEN EXPERIENCING DIFFERENTIAL ACCESS TO  
ALTERNATE-CARE AND WORKING CONDITIONS IN MEXICO

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COMPLEMENTARY FEEDING AND CHILD-CARE FOOD CHOICES IN  
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Maternal capacity to combine work and child-care and caregivers' food choices are important determinants for child wellbeing. A qualitative study was conducted in Central Mexico to determine work and day-care arrangements supporting and limiting maternal capacity to care for young children, and to identify classification systems, value attributes, and patterns of introduction of home and processed complementary foods driving food choices in Mexican working mothers and alternate caregivers. A random sample of 14 manufacturing businesses with at least 25% of working women was chosen from the census of the Cuernavaca City industrial zone, Mexico (n=157). A purposeful sample of 44 blue-collar working mothers, 20 day-caregivers, 22 grandmothers, and 14 business representatives was selected. In-depth interviews, free-listings, pile sort and food attributes exercises, and participant observation were conducted. Interviews' topics of inquiry included work and daycare policies, family-friendly arrangements, and nutrition education. Data were analyzed by using content analysis, multidimensional scaling, and

hierarchical clustering. Thirty-one key complementary foods were selected from a domain of 112 foods given to children less than one year of age in the region. From hierarchical clustering, mothers and alternate caregivers identified nine and ten classes of key foods, respectively. From multidimensional scaling, mothers and caregivers used food groups as a primary classification system. Relevant dimensions from multidimensional scaling for mothers were food introduction stages and food processing, and for alternate caregivers were healthiness, food processing, and meal relevance. Child health and nutrition, particularly vitamin content, were salient attributes. The notion of early introduction of complementary foods was shared by mothers and alternate caregivers; they reported providing fruits and vegetables to infants. Foods with positive attributes were apple, banana, carrots, squash, chayote, brown bean broth (no solids), pasta, and chicken flesh. Foods with negative attributes were pork, potato chips, and soda, among other processed products. Red meats were described as cold-type, heavy, and hard, not suitable for young children, but right for toddlers. This study will inform mission-based research oriented to promote opportune introduction of complementary foods in young children.

## BIOGRAPHICAL SKETCH

Maria Guadalupe Rodríguez–Oliveros was born in Cuernavaca, Morelos, Mexico. She holds a Master degree in Business Administration by the Autonomous University of San Luis Potosi, Mexico, and a B.S. degree in Nutrition by the School of Dietetics and Nutrition, Mexico. She was a doctoral fellow of the National Sciences and Technology Council- Mexico. As an undergraduate, she worked as clinical nutritionist in a Mexican regional hospital. As a graduate, she worked seven years as nutritionist and researcher of the Nutrition Education Department at the National Institute of Nutrition in Mexico City. She worked as a nutrition consultant for the Food and Nutrition Commission in San Luis Potosi State, Mexico, and for the local and national TV media. She was Director of the Nutrition Department of the National System for the Family Development in Morelos State, Mexico. Afterwards, she was appointed assistant researcher of the National Institute of Public Health (INSP) and graduate Professor in the National School of Public Health.

Her research program focuses on the development of health promotion interventions targeted to malnourished populations, social determinants of maternal and child health, food choices and cultural perceptions about foods and beverages, and nutrition policy and programs. She has published scientific papers in peer-reviewed journals and participated in national and international Conferences.

I especially dedicate this Dissertation to my daughter Mariana for always encouraging me and giving me her unconditional love.

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# CHAPTER 1

## INTRODUCTION

### 1.1 RESEARCH PURPOSE AND PREDISSENTATION WORK

The purpose of this research was to expand our previous knowledge of the determinants of child feeding and care behaviors associated with maternal work in low-income urban Hispanic populations. These issues were addressed bringing together the perspectives of four different stakeholders: manufacturing blue-collar Mexican working mothers with children less than two years of age, institutional and family alternate caregivers supporting working mothers, and businesses representatives.

The objectives of the dissertation were threefold:

A) To determine work and day-care arrangements supporting and limiting maternal capacity to combine work and child-care.

B) To identify classification systems, value attributes, and patterns of introduction of home and processed complementary foods in Mexican working mothers.

C) To identify classification systems, value attributes, and patterns of introduction of home and processed complementary foods in both family and institutional alternate caregivers.

This project builds on two previous studies coordinated by the author and conducted in Mexico in collaboration with the National Institute of Public Health-Mexico (INSP). The first study developed and tested a comprehensive

manual for improving dietary practices of young children, by using state-of-the-art inquiry methods (PAHO, 2004). The second study identified mothers' beliefs about and classification of complementary foods given to children in rural central Mexico (Rodriguez and Frongillo, 2001). This predissertation work provided preliminary data and methodological insights for developing this research. Specifically, it expanded current knowledge about the nature and pattern of use of complementary foods in the region, the factors that shape Mexican mothers' early childhood feeding practices, and the development of context-sensitive data collection methods.

## 1.2 THE CONCEPTUAL FRAMEWORK OF THE RELATIONSHIP BETWEEN MATERNAL EMPLOYMENT AND YOUNG CHILD FEEDING AND CARING PRACTICES

The conceptual framework developed for describing the relationship between maternal employment and young child feeding and caring practices is shown in Appendix A. This framework consists of four levels: the national and state, business, household and individual levels, representing different analytic strata and potential programmatic areas to improve complementary feeding and caring practices. This study focused on understanding gaps and strengths at the two intermediate levels represented by the mother's working conditions and alternate care services. This study also focused on the individual level by determining mother's food classification systems and value attributes driving

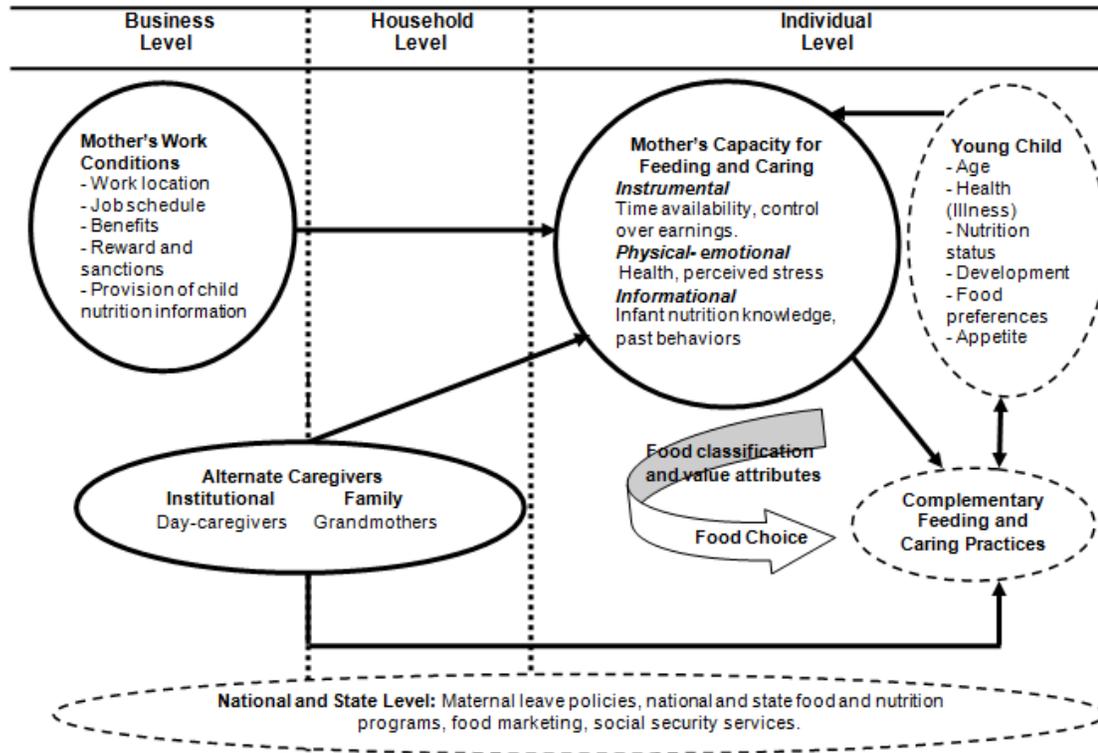


Figure 1. Conceptual framework of the relationship between maternal employment and young child-feeding and caring practices

infant feeding choices. The dashed framework components were out of the scope of this study, but are acknowledged as important components of the relationship between maternal employment and young child feeding and caring practices.

*At the national and state levels* are the political and macro-economic determinants of the supply and demand for complementary foods and alternate-care services, which have the potential of affecting factors at subsequent levels. Of particular interest at this level is the Mexican labor law that entitles working women to take a paid maternity leave of 42 days before and 42 days after birth (DOF, 2006). Similarly, social security benefits

targeted to working women provide free day care services children from 43 days to 4 years of age (Ley del Seguro Social, 2006; IMSS, 2006). At *the business level* are work conditions expected to be proximal determinants of maternal capacity for feeding and caring.

At *the individual level*, a set of three domains defines maternal capacity: the instrumental, physical-emotional and informational domains, that are expected to determine mothers' feeding and caring practices of young children. Alternate-care bridges between the business and household levels mediating the effects of work conditions on maternal capacity for feeding and caring. Both family structure and child's characteristics are expected to directly influence maternal capacity. Reciprocal relationships not shown in the model are expected.

### 1.3 THE RESEARCH SETTING

The study was conducted in Cuernavaca City from 2005 to 2006; a brief description of the national, regional, and local research setting is following provided.

#### 1.3.1 The National Setting

Mexico is a Spanish-speaking country located in Latin America, bordered by the United States to the north and Belize and Guatemala to the southeast. Mexico is about one-fifth the size of the United States. Mexico's terrain consists of coastal lowlands, central high plateaus, and mountains. Mexico consists of 31 states and one federal district; the capital is Mexico

City. In 2005, Mexico had 103, 263 388 inhabitants, 76.5% of them living in urban areas and 23.5% in rural areas; the literate rate was 91.8%, and the mean education level was 8.1 years (INEGIa, 2006). Mexico has a rapidly developing economy, ranked by the World Bank as the twelfth largest in the world (Crandall, 2004). In 2005, a total of 16.8% of the population older than 13 years of age worked in the manufacturing industry. The women's economic participation rate was 37.5% (INEGIb, 2006). Women headed 23.1% of the households; food purchase represented the main proportion (29.8%) of the household budget expenses (INEGIb, 2006). The 16.8% of older than 13 years of age population worked in the manufacturing industry.

Mexico is a democratic republic whose government is based on a congregational system, whereby the president of Mexico is both head of the state and head of the government. Vicente Fox was the president of Mexico during the research period. The current president of Mexico is Felipe Calderon. As part of his 2006 political campaign, president Calderon stressed the importance of increasing the number of public daycare centers to support working mothers. From 2006 to 2007 the number of these centers was increased in 3 500, providing services to 63 000 new children aged one month to four years of age.

### 1.3.2 The Regional Setting

The State of Morelos is one of Mexico's smallest, with an area of 1911.2 sq miles (4,950 sq kilometers), representing 0.25% of the extension of the entire Mexican Republic. Cuernavaca City is the capital of Morelos State. It

is located 45 minutes South of Mexico City. Cuernavaca City had 349,102 inhabitants in 2005 (INEGIa, 2006). This city stretches across a green valley at about 4,950 feet above sea level, and has an average year-round temperature of 70 to 80 degrees. Cuernavaca City is well communicated with the surrounded urban and rural counties of Morelos State and the enclosing states of Puebla and Guerrero. Migration is commonly observed from the surrounding rural areas making available blue-collar human resources for the manufacturing businesses in the area. Migration of young man to the United States is also frequent. Financial resources sent by U.S. male immigrant workers represents increased household income but also increased child-care and household responsibilities for women (Lartigue et al., 1998).

Two regional hospitals run by the National Institute of Social Security (IMSS) are located in Cuernavaca City. One of these hospitals is located at around 3.11 miles (five kilometers) from the Cuernavaca City industrial park. In Cuernavaca and the surrounding cites there are many private hospitals and health clinics run by the Ministry of Health.

The National Institute of Public Health (INSP) is one out of the twelve National Public Health Institutes run by the Mexican Ministry of Health. This is the largest federal public health agency in Mexico aimed to protect public health and safety by conducting research for evidence-based policy development, program´s design, and decision making. The INSP headquarters are located in Cuernavaca City, Mexico. The INSP promotes nutrition and health through research and academic partnerships with state health

departments, academic institutions, non-profit organizations, and other national and international agencies. Relevant research lines at the INSP are maternal and child malnutrition and health promotion, lead by the Centre for Nutrition and Health Research and the Centre for Health Systems Research, respectively.

### 1.3.3 The Local Setting

*The Cuernavaca City Industrial Park.* The study was conducted in the Cuernavaca City Industrial Park located in the Cuernavaca's north suburbs. PROCIVAC is the agency that manages this industrial park, by providing water, street building and maintenance services, and a community center for business representatives. This industrial park is composed of 157 private manufacturing businesses related to the chemical, garment, electronic, and auto-parts industry. Study businesses varied in size ranging from 115 to 920 employees; about half of these businesses belonged to multinational companies. Manufacturing work is structured in two to three shifts. Blue-collar workers generally alternate shifts in a monthly basis. The majority of businesses operate during both weekdays and weekends, while some of them only function on weekdays.

Public transportation from the industrial park to the Cuernavaca City and surrounding counties is available from 5:00 AM to 9:00 PM. Some of the study businesses provided transportation to their employees at the night and early morning shifts. Heavy traffic was observed early morning and at the evening on weekdays. The construction of a deck to improve the traffic

conditions in the area was in process at the time of the study.

The IMSS supervises businesses' compliance with maternity leave policies and working conditions. Mexico's maternity leave and lactation policies entitle working mothers to receive a paid maternity leave of 42 days before and after birth and to take one hour per day for lactation over a six-month period after delivery (DOF, 2006). None of the randomly selected study businesses had a lactation room. Over the course of the study the research team identified one multi-national business in the Cuernavaca City industrial park that had a lactation room and was conducting a lactation program. Consent to conduct research in this business was solicited but authorization was acquired several months after finishing the study.

*The Daycare Centers.* In 2006, there were 35 registered daycare centers in Morelos State. Higher density of daycare centers (91 to 144) is found in more industrialized areas of Mexico such as Mexico City, the State of Mexico, Jalisco State, and the states bordering the United States (IMSS, 2006). The IMSS provides health and daycare services as part of the worker's social security benefits.

Working mothers of children from 43 days up to four years of age are entitled to receive free daycare services provided by the IMSS or by private daycares affiliated and supervised by the IMSS (Ley del Seguro Social, 2006). Extended services for children older than four years of age are provided for free by one of the IMSS centers, while a few private daycare centers supported older children of single mothers with partial fellowships. Parents can

choose the location of the daycare according to their convenience and daycare availability.

Table 1 shows the proportion of preschool children relying on different types of alternate care in Mexico. The majority of preschool children (61.4%) are cared by family members, while the 8.5% are attending to a daycare. The nearest IMSS daycare was located about 3.11 miles (five kilometers) from the Cuernavaca City industrial park. Commuting from this center to the industrial zone by public transportation can take up to 30 minutes with heavy traffic. Day-care services are provided on weekdays. Schedules varied from 6:30 or 7:00 AM to 5:30 PM for private centers, and 6:30 to 7:00 PM for IMSS centers. Daycare centers attempt to tailor child's schedule to the mother's working shift and commuting time. This schedule, however, is not always compatible with the mother's evening and night shifts, making necessary to rely on alternate

Table 1

Children six years of age and under receiving alternate care in Mexico\*

Alternate Child-care	Number of Children $\leq 6$ y	% of Children $\leq 6$ y
Family	2 404 332	61.4
Public daycare	184 504	4.7
Private daycare	150 297	3.8
Paid person	327 032	8.4
Non paid person	82 082	2.1
Other	767 357	19.6

\* Instituto Nacional de Estadística, Geografía e Informática. (2000) *Encuesta Nacional de Seguridad Social 2000*. Secretaría del Trabajo y Previsión Social. Instituto Mexicano del Seguro Social. Mexico, DF.

caregivers for delivering or picking-up the child. The child's tolerance time may range from 15 to 60 minutes, depending on the day-care center. Tolerance time is estimated by the daycare manager from the mother's work-daycare commuting time. If a child is picked up late, some centers give parents written warnings until the child is suspended one or more days. Other centers charge a delay fee, authorizing a waiver if the mother provides written documentation of being at work. As part of the introductory or "adaptation" period, daycare centers require that the parents or a family member stay with the child for three to five consecutive days during two to six hours per day. Day-care schedules varied from 6:30 or 7:00 AM to 5:30 PM for non-government centers, and 6:30 to 7:00 PM for IMSS centers.

*Participating Agencies.* To conduct the present study partnerships were developed with several local institutions such as the IMSS, PROCIVAC, and the National Institute of Public Health (INSP). The IMSS provided technical counseling, reviewed and approved the research protocol, and provided introductory letters and contact information of the daycare centers. PROCIVAC, acted as a liaison between the project personnel and the businesses managers. The INSP provided technical advice, and helped to identify trained interviewers. This agency also brought the facilities for conducting the interviewers' training course and the research meetings.

#### 1.4 DATA COLLECTION GENERAL PROCEDURES

A two-week training course was conducted with the interviewers. Interviewers were two social workers and one nurse. The main researcher, who was experienced in the data collection techniques used in the study, also conducted interviews with the mothers and business representatives. Theoretical sessions about the interview technique and other qualitative data collection methods were conducted using the ProPan manual as a methodological guide (PAHO, 2004). These sessions were complemented with practices in a health clinic and a daycare followed by feedback sessions. Interview guides were also tested during this period and consequent adjustments to the wording, order of the questions, and the extensiveness of the inquiry topics were performed. During data collection, interviewers communicated by phone with the main researcher in a daily basis. Follow-up meetings were scheduled in the research setting as needed, so research challenges were addressed with opportunity. Informant's appointments were confirmed by the interviewers by phone. Main research challenges related with cancellation and reschedule of interview appointments, location of grandmothers' households, turnover of business representatives, and illness of some members of the research team. An interviewee (working mother) expressed concerns of losing her attendance bonus for participating in an extended interview at the beginning of her shift. The main researcher immediately contacted the interviewee's human resources chief to address this concern and assure that research participation would not hinder the

achievement of job benefits.

The interviewers and the main researcher conducted weekly meetings to review the accuracy of transcriptions and develop the coding catalogs. Two researchers from the IMSS joined these meetings periodically. Over the summer, the main researchers' advisor and a data analyst from Cornell University joined the research team and participated in the research meetings.

## 1.5 OVERVIEW OF THE DISSERTATION

This research applied qualitative methods for understanding the perspectives of the study participants. The specific methods for addressing the above objectives are described in each of the research papers. The dissertation is composed of an introduction and three research papers followed by the study conclusions and programmatic recommendations as described below.

*Chapter 1* This chapter presents the purpose and antecedents of the study as well as the conceptual framework that informed research inquiry, followed by an overview of the dissertation and the ethical considerations of the study.

*Chapters 2* address the first objective by presenting a research paper that focuses on the work and day-care arrangements supporting and limiting maternal capacity to combine work and child-care. The paper brings together the perspectives of different stakeholders involved in the provision of child-care and the work context such as working mothers, grandmothers, day-caregivers, doctors, and human resources executives.

*Chapters 3 and 4* address the second and third objectives by presenting two papers that focus on understanding food classification systems, food attributes and introduction of complementary foods. The former paper presents the perspectives of blue-collar working mothers relying either on institutional or family child-care. The later paper compares the perspectives of day-caregivers and grandmothers about similar topics (food classification systems, food attributes and the introduction of complementary foods).

Finally, *Chapter 5* summarizes the results obtained from the information provided by the study participants. This chapter includes the conclusions based on the study findings formulated by the author and the programmatic implications of the study for further research.

## 1.6 ETHICAL CONSIDERATIONS

The study proposal was reviewed and approved by the Cornell University Committee on Human Subjects and the Ethics Committee of the National Institute of Social Security at Cuernavaca City to ensure that human subjects do not bear any inappropriate risk and will properly consented to their involvement.

Recruitment of participants was done in a non-power based manner using the procedures described in following chapters. Participants were informed about the study purpose, the procedures, the potential risks and benefits of their involvement, their alternatives to participation, and the opportunity to discuss any questions or concerns with a knowledgeable

research team member. Participants were asked open-ended and nondirective questions to ensure that they understand the extent of their role in the proposed research. Research team members gave participants the required time to think about their decision and to discuss it--if necessary--with family, friends, or local advisors. Written informed consent to conduct the study was obtained from the different groups of participants: the mothers, the alternate caregivers, and the businesses representatives. Participants' privacy was maintained by not disclosing their identity, using a numeric code for identifying research data and also by conducting the proposed surveys and interviews in private.

Inexpensive toys for children were given to the mothers in appreciation for their time devoted to the study. Similarly, the main researcher conducted lectures and developed educational material about adult nutrition in some of the businesses as required. Finally, a personalized than-you letter was sent to each of the study participants, as well as the businesses and daycare centers that participated in the study.

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## CHAPTER 2

# WORK AND DAYCARE ARRANGEMENTS ARE NOT SUPPORTING MEXICAN MOTHERS' FOLLOWING RECOMMENDED INFANT CHILDREN FEEDING PRACTICES

### 2.1 ABSTRACT

A qualitative study was conducted to determine the effectiveness of the work and alternate-care arrangements supporting Mexican working mothers to combine work and child-care. In depth interviews were conducted with 44 blue-collar working mothers, 20 caregivers, and 14 business representatives regarding work and daycare policies, family-friendly arrangements, and nutrition education. Work policies and supervisory practices are not supporting working mothers' job status after returning from maternity leave and when caring for their ill children. Barriers for breastfeeding relate with both the absence and perceived lack of need of a lactation room at the workplace, unsupportive supervisors and coworkers' attitudes, and insufficient counseling provided to women over the return to the job period. Nutrition education actions are not reaching parents with schedule-conflicts and family alternate caregivers. Organizational initiatives promoting appropriate infant feeding and addressing the work-family conflict must consider the values and perspectives of different stakeholders (i.e., mothers, family members, daycare providers, coworkers, supervisors, and policy-makers) involved in the provision of child-care.

## 2.2 INTRODUCTION

The pattern of women's work and the family structure in Latin American countries are dynamically changing as a consequence of urbanization, industrialization, and migration (Léautier, 2006; Brachet-Marquez and De Oliveira, 2002). Compared to past decades, more women are working away from home and are the primary economic providers and social support for their children. In Mexico, women represented 36.6% of the 2005' economically active population, and were head of 23.1% of households (INEGI, 2006).

Balancing working-family interface is an important concern from a public policy perspective (Burke, 2004; Westman, Etzion and Gortler, 2004). The work-family conflict, conceptualized as bidirectional, occurs when the individual experiences pressures from the performance of different roles (Netemeyer et al., 1996; Greenhaus and Beutell, 1985). In this regard, Spillover theory states that moods, stress, and thoughts generated in one role domain often influence or spillover into other domains (Williams and Alliger, 1994). A meta-analysis by Allen et al., (2000) showed that work-home spillover in women was associated with work-related outcomes such as diminished organizational commitment and intention to turnover, as well as with non-work-related outcomes such as life and marital dissatisfaction, family performance, burnout, general psychological strain, and depressive symptoms. Cross-cultural research indicates that the extent to which employee's functioning at home is hampered by demands from their work may differ among cultures

(Hofstede, 2001). Among collectivistic cultures such as most Latin American countries, job withdrawal intentions appear to be more evident in workers facing work-family conflict (Wang et al., 2004).

Feeding practices are significant determinants of young children's growth, health and development (Marquis, 1997; Eckhardt et al., 2001; Anderson, Johnstone, and Remley, 1999; Horwood and Ferguson, 1998). International child feeding recommendations highlight the importance of exclusive breastfeeding for the first six months of life followed by introduction of adequate complementary foods, while continuing breastfeeding for up to two years (WHO, 2001).

The effects of maternal employment on infant feeding practices have raised concerns over the past decades (Berger, Hill, and Waldfogel, 2005; Ruel, 2000; Zeitlin and Megawangi, 1995). Leslie's (1988) review and further studies conducted in developing countries (Leslie, 1988; Fein and Roe, 1998; Lakati, Binns, and Stevenson, 2002; Visness and Kenedy, 1997; Carlson, 1992) provide evidence of both an earlier shift from exclusive breastfeeding to mixed feeding and shorter overall length of breastfeeding among working women. Maternal employment factors associated with these practices include early resuming to work, working full time (i.e., more than 20 hours per week) outside home without taking the children, and lack of facilities to express and store milk at the work-place (Leslie, 1988; Ukwuani and Suchindran, 2003; Perez-Escamilla et al., 1993; Ukwuani, Suchindran, Cornwell, 2001; Hills-Bonczyk, 1993). Consistently, data from a national probabilistic survey

conducted in Mexico indicate that maternal employment reduced the probability of both exclusive breastfeeding and timely introduction of complementary foods at age 6 to 9 months, controlling for housing conditions (González-Cossío et al., 2006; González-Cossío et al., 2003).

Maternity leave policies have been related to breastfeeding practices (Leibowitz, 2003; Tanaka, 2005). In a U.S. national longitudinal survey, Berger, Hill and Waldfogel (2005) found associations between early returns to work (12 weeks of giving birth) and reduction in breastfeeding. These relationships were stronger for mothers who return to work full-time. Similarly, Chatterji and Frick (2005), using economic probability models, found that returning to work within three months was associated with a reduction in the probability that the mother initiate breastfeeding by 16%. Maternity leave policies substantially differ across countries (Tanaka, 2005; Bradshaw, 2002).

For example, in Mexico working mothers are entitled to receive a paid maternity leave of 42 days before and after birth and to take one hour per day for lactation over a six-month period after delivery (DOF, 2006). This figure contrast with policies of several industrialized countries which provide an average of 10 months of maternity leave, often followed by a period of child-rearing leave (Waldfogel, 1999; Waldfogel, 2001).

Women's work is thought to improve child well-being directly through increased income for food and health-related purchases, as well as indirectly through elevating women's status within the household (Tucker and Sanjur, 1988; Bennett, 1988; Piwoz and Viteri, 1985; Rathnayake and Weerahewa,

2005). Studies in the economics field indicate that the percentage of the family income earned by the mother and the mother's control over her own earnings positively influence household resource allocation to children (Leslie, 1988; Bennett 1988; Popkin 1981; Wheeler, 1991). Additionally, specific working conditions such as flexible shifts, availability of work-site care, and closeness of work to home also appear to positively influence child well-being outcomes (Leslie, 1988; Brooks-Gunn, Han and Waldfogel, 2002; Hayes and Kamerman, 1983; Hill, Waldfogel, Brooks-Gunn, and Han, 2005). There are also positive experiences on the use of the worksite for health promotion (Fielding, 1990; Sorensen et al, 2002). Regarding infant feeding, there are successful experiences with worksite breastfeeding promotion (Cohen and Mrtek, 1994) but limited experiences, however, concerning complementary feeding.

Determinants of working women's capacity for caring are the type and availability of family-friendly work, household and day-care arrangements (Levin et al, 1999; Drobnič, Blossfeld and Rohwer, 1999; Hallman K et al., 2003; Henly and Lyons, 2000). In Mexico, children from 42 days up to four years of age receive free institutional care as part of working mothers' social security benefits (Ley del Seguro Social, 2006). This service is provided by daycare centers run either by the Mexican Institute for Social Security (IMSS) or by private centers affiliated and supervised by the IMSS (IMSS, 2006). Flexible work arrangements such as flextime and part-time work can support working mothers by providing more control over their work schedule and work location (Thompson, Beauvais and Lyness, 1999). Dependent-care

arrangements such as subsidizing child care and temporary leave periods for taking care of dependent family members, enable mothers to combine work and caring responsibilities (Dijkers et al., 2004). In industrialized countries, there is evidence that unsupportive organizational culture may hinder employees from such arrangements (Starrels, 1992; Thompson et al, 1999; Anderson et al., 2002; Kossek and Ozeki, 1998). For example, in some organizations the amount of time visibly spent at work is considered an indication of employees' investments and career dedication (Lewis and Taylor, 1996). In developing countries, however, there is limited research about how work and alternate care arrangements shape maternal capacity for working and caring for their young children.

This study aims to expand our knowledge about the work and day-care factors that support and limit working mothers' compliance with recommended infant feeding practices and their capacity to combine work and child-care. Our research was guided by the following questions: 1. Are work and day care arrangements supporting maternal capacity to combine work and child-care? 2. Are maternity leave and work policies supporting breastfeeding? 3. Are nutrition education actions conducted at the work and day-care effectively reaching working mothers and alternate caregivers?

This study complements previous quantitative studies conducted in the region eliciting working mothers' issues as determinants of infant feeding practices (Navarro-Estrella, 2003; González-Cossío, 2003; González-Cossío 2006) by providing in-depth understanding of mothers' experiences. To the

best of our knowledge, this is the first qualitative study conducted in Mexico that bring together perspectives from working mothers, business representatives and alternate caregivers regarding maternal work, and infant care and nutrition.

## 2.3 METHODS

The study was conducted in Mexico from October, 2004 to May, 2005. This qualitative investigation used an interpretivist approach for data collection methods, building upon the participant's real-life experiences and understandings (Patton, 1990) regarding work-life, infant feeding and child-care.

### 2.3.1 Sampling

A random sample of 14 manufacturing businesses out of a total of 157 having at least 25% of working women was selected from the census of the Cuernavaca City industrial zone, Mexico. Businesses varied in size ranging from 115 to 920 employees. A screening survey was performed in all blue collar mothers (Appendix B), working at the businesses who had children less than-two years of age and used public transportation (n=150). Six mothers did not participate in the screening survey. Four of them had conflict schedules to conduct repeated interviews and two left their job at the time of the survey. Afterwards, ten day-care centers used by the working mothers were identified from the screening survey. Two centers were run directly by the IMSS and eight were private affiliated to the IMSS. Both provide free services to working

mothers. Finally, three purposeful samples of 44 working mothers (Group M), 14 business representatives (Group B), and 20 institutional caregivers (Group C) were chosen as follows:

Group M was composed of two subgroups of 22 blue-collar mothers relying on family care and institutional care, respectively. Mothers were chosen from the screening survey that looked for diversity in demographic and working characteristics. Maternal mean age was 28 years. Mothers had 1.8 children on average, 71% completed middle school, 24% high school, and 46% had no spouse present at the time of the survey. All mothers performed manufacturing jobs and earned the minimal wage. Mothers have been employed for five years on average, 15% worked extra-time in the past month and one third did not attend the job one or more days in the past 3 months. Average commuting from home to work was 38 minutes.

Group B was composed of all doctors working at the selected businesses (n=10) and four human resources executives. Group B age ranged from 27 to 51 years, 60% were male, and all had at least one year of working experience in the selected manufacturing business.

Group C was composed of 20 caregivers caring for children less than two years of age working at the selected day-care centers. A total of 14 and 6 caregivers worked at private and IMSS centers, respectively. Caregivers' age ranged from 22 to 57 years, all were female, had a technical or bachelor degree and at least 4 years of professional experience.

Sample extensiveness (Strauss and Corbin, 1990) was considered to be sufficient when new participants generated no additional insights and theoretical saturation was reached (Sobal, 2001; Sobal and Safman 2004). Participants took part voluntarily and provided written informed consent. The Cornell University Committee on Human Subjects and the Ethics Committee of the National Institute of Social Security at Cuernavaca City approved the research protocol.

### 2.3.2 Data Collection

A semi-structured interview was performed with the three study groups (Appendices C-E). Interviews with mothers and business representatives were conducted before starting the shift by two social workers and the main researcher at the work place. Interviews with Day-caregivers were conducted by a nurse at the day-care centers. Interviews lasted on average 42, 50, and 30 minutes, for groups M, B, and C respectively. Interviewers were trained and experienced. Interviews were conducted in Spanish, audio-recorded, and transcribed verbatim. Results were translated into English by the main researcher and a local bilingual assistant.

To address research question one, inquiry explored advantages and disadvantages of relying on institutional and family care perceived by the mother. To address research question two, inquiry focused on the type and availability of work and day care family-friendly arrangements. Inquiry focused on the type and availability of work and day care family-friendly arrangements, job and day-care sanctions, job supervisory and reward procedures, the

physical working conditions, the mothers' timing and motivators for returning to work and working mothers' issues, including social support for caring for young children, sources of stress, transportation, out-of-the-job activities, and experiences with child illness. To address research question three, inquiry focused on the health and breastfeeding policies at the work, and the health and food-service routines at the day-care. To address research question four, inquiry focused on the work and day-care health and nutrition communication. Interview guides were initially developed for each group and tested for accuracy. Interview guides contained inquiry items to contrast information of the different study groups.

Additionally, the research team conducted semi-structured observations of the physical working conditions and day-care food services, and registered field notes in a daily journal. Preliminary results of the interviews and field notes were discussed on a weekly base by the research team using the constant comparative method (Strauss and Corbin, 1990; Glaser and Strauss, 1967). This analysis guided both further adjustment of the interview guides and sample extensiveness. Accordingly, subsequent interviews were conducted with 17 participants of group M to explore in-depth emergent issues from the initial interview. Similarly, human resources executives were included in Group B to expand the information provided by the doctors in four businesses.

### 2.3.3 Data Analysis

A coding catalog was first developed for each of the three groups from a sample of the interview transcripts, and then expanded as new concepts emerged from the analysis. Coding was performed using Atlas.ti® software version 5 (Atlas.ti, 2006), and reviewed for accuracy by the interviewers. Information on mothers was analyzed by type of child-care used and civil status. Selected codes were analyzed by family size, extra time worked, absenteeism, and commuting time from home to work. Information on daycaregivers was analyzed by type of daycare (IMSS and non-governmental).

The quality of the data analysis was enhanced by triangulation of the results across groups, the participation of the interviewers on the coding development, and peer debriefing with other bi-lingual researchers (Guba and Lincoln, 1989).

## 2.4 RESULTS

Results regarding the four research questions are presented below:

### 2.4.1 Research Question 1. Reasons for Relying either on Family or Institutional Child-care.

Reasons elicited by Group M for relying either on family or institutional child-care are summarized in Table 2. The preferred child-care arrangement was family care. This was reported even by mothers relying on institutional care. Salient reasons for choosing family care relate with perceptions of

Table 2

Mothers' perceptions about advantages and disadvantages of relying on institutional and family child-care

Theme	Perceived Advantages	Perceived Disadvantages
Quality of Care and Organization	<p><b>Institutional services are...</b></p> <ul style="list-style-type: none"> <li>- Free, so valuable for low income working mothers (I)</li> <li>- Comprehensive (e.g. medical and psychological services available (I)</li> <li>- Facilities nice and clean (F, I)</li> <li>- Facilities well located, close to home (I)</li> <li>- An alternative for mothers lacking of social support (F)</li> </ul> <p><b>Institutional caregivers...</b></p> <ul style="list-style-type: none"> <li>- Treat children well, play with them and are patient (F)</li> <li>- Are responsible, nice and care about children (F, I)</li> <li>- Provide appropriate feeding (F)</li> <li>- Provide individualized attention to children with special needs (I)</li> <li>- Encourage children to do creative activities instead of watching TV (I)</li> <li>- Have training about child development</li> <li>- Keep in touch with parents and send individualized periodical reports (I)</li> <li>- IMSS supervision to daycare centers strengthen a sense of trust (I)</li> </ul> <p><b>Family caregivers...</b></p> <ul style="list-style-type: none"> <li>- Provide love and affection (F)</li> <li>- Provide individualized attention (e.g. non-walking infants) (F, I)</li> <li>- Provide integral care (e.g., bathing, feeding) (F)</li> <li>- Are more patient than any other caregiver (F)</li> </ul>	<p><b>Institutional services are...</b></p> <ul style="list-style-type: none"> <li>- <u>Crowded, excessive children/caregiver ratio, particularly in IMSS facilities (F)</u></li> <li>- <u>Unknown functioning and quality (F)</u></li> <li>- Expensive [private daycare] (I)</li> <li>- Services are better if you pay, so private daycare is best (I)</li> </ul> <p><b>Institutional caregivers...</b></p> <ul style="list-style-type: none"> <li>- <u>Do not pay proper attention to children (F, I)</u></li> <li>- Provide inadequate management and supervision of ill children (e.g., fever treated by taking-off the child)</li> </ul>

Continuation of Table 2

Theme	Perceived Advantages	Perceived Disadvantages
Quality of Care and Organization	<p><b>Family caregivers...</b></p> <ul style="list-style-type: none"> <li>- Are experienced caregivers (grandparents) (F)</li> <li>- Are plenty of time and available at the night shift (grandparents) (F, I)</li> <li>- Can also help with home chores (F)</li> </ul> <p><b>The adaptation period provides...</b></p> <ul style="list-style-type: none"> <li>- Comprehensive information about the service (F,I)</li> <li>- Tour to the facilities (F)</li> <li>- Enhance parents confidence (I)</li> </ul>	
Child Health and Development	<p><b>Children in institutional care...</b></p> <ul style="list-style-type: none"> <li>- <u>Acquire social integration and developmental skills (F, I)</u></li> <li>- Become independent and lose their fears (F)</li> <li>- Learn hygiene habits and good manners (F, I)</li> <li>- Learn diverse subjects (F)</li> <li>- Enjoy socializing in the daycare (I)</li> </ul> <p><b>Children in family care...</b></p> <ul style="list-style-type: none"> <li>- Are safest at home (F)</li> <li>- Can eat the food and the amount they want at flexible schedules (F)</li> <li>- Are attached to their grandparents (F)</li> <li>- Can interact with different family members and learn from them (F)</li> </ul>	<p><b>Children in institutional care...</b></p> <ul style="list-style-type: none"> <li>- <u>May feel abandoned or struggle adjusting to unknown caregivers and to a new environment (F, I)</u></li> <li>- <u>Develop depressive symptoms (no playing, eating problems) (I)</u></li> <li>- <u>Are too young and can easily suffocate (F)</u></li> <li>- <u>Can be infected by other children (F)</u></li> <li>- May catch a cold if leaving bed early morning (F)</li> <li>- Fight with other children and may get hurt (F)</li> <li>- May have an accident when commuting e.g., when picked-up by older caregivers (F)</li> <li>- Spend too much time in the facility, this is just not healthy (I)</li> </ul> <p><b>Children in family care...</b></p> <ul style="list-style-type: none"> <li>- Do not develop socializing skills (<i>se vuelven uraños</i>) (F)</li> <li>- Are isolated, in a secluded space (I)</li> <li>- May have trouble sharing their belongings (F)</li> </ul>

Continuation of Table 2

Theme	Perceived Advantages	Perceived Disadvantages
Parental Issues	<p><b>Parents relying on institutional care...</b></p> <ul style="list-style-type: none"> <li>- Had positive experiences when sending their older children or attending themselves to a daycare (I)</li> <li>- Received positive feed-back from family and coworkers (F, I)</li> <li>- Learned healthy cooking in the daycare (I)</li> </ul> <p><b>Parents relying on family care...</b></p> <ul style="list-style-type: none"> <li>- Feel no need for institutional care if family care is available (F)</li> <li>- Do not have to deal with transportation issues (F)</li> <li>- No application needed, family care is an expedite solution (F)</li> </ul>	<p><b>Parents relying on institutional care...</b></p> <ul style="list-style-type: none"> <li>- Feel they are abandoning their child (F, I)</li> <li>- Are afraid about leaving children with unknown people (I)</li> <li>- Are worry about leaving their children crying (F)</li> <li>- Lack of support for bringing or picking-up their child, particularly when working extra time (F)</li> </ul> <p>- Struggle finding caregivers to attend their ill child (F)</p> <p>- Have problems for going to the daycare on working hours i.e. adaptation period (F, I)</p> <p>- Have to wake-up earlier to prepare their children (F, I)</p> <p>- Face transportation problems when commuting to the daycare (e.g., financial, time, and fatigue issues) (I)</p> <p>- Are penalized for picking-up their children late (I)</p> <p>- Struggle with medical care when children are infected by their classmates (F)</p> <p><b>Regarding institutional care...</b></p> <ul style="list-style-type: none"> <li>- Grandparents did not want children attend to a daycare (F)- Family felt the child is too young (F)</li> <li>- Family distrusted, had fears or negative opinions (F)</li> <li>- Family felt anxious about what is going on there (I)</li> <li>- Doctors did not recommend institutional care (F)</li> <li>- Coworkers or neighbors described negative incidents such as child abuse or the dead of a child (F)</li> <li>- The media disseminated negative comments (F)</li> </ul>

I = Mothers relying on institutional care  
 F= Mothers relying on family care  
 Underlined statements were frequently mentioned

convenience, trust, shared child rearing practices, schedule flexibility, appreciation, and individualized attention provided to the child by family members. Family caregivers integrated a social network composed by the maternal-side grandmother as the primary alternate caregiver, and several secondary alternate-caregivers such as the paternal-side grandmother, the partner (in married or free-union families), older siblings, relatives, and neighbors. Family child-care is mostly provided for free. This service is compensated by providing instrumental support such as shelter, clothing, and other non-economic goods to family caregivers.

The most salient reasons expressed by mothers for choosing institutional care were lack of family support and positive experiences with older children attending to a day-care. Favorable opinions about the day-care expressed by the three study groups related with the availability of medical services, the opportunity for children to socialize and acquire developmental skills, and the quality of the diet that “compensate” for the junk food provided on weekends by family members.

Negative opinions about day-care centers expressed by some members of Group B relate with the rigid schedules, lack of space, and provision of low quality care. Moreover, Group B stated that mothers are not using institutional child care because they ignore that they are entitled to this service for free, they trust more on their relatives, they would have to expend extra-money for transportation to the day-care, they distrust government services, or they believe that their child will get infectious diseases at the day-

care. Accordingly, a doctor affirmed that “a child attending to a day-care will be continuously ill”. Group M described that these negative expectations were often shared by family members. Consistently, some mothers did not send their children to a day-care because their child’s grandparents strongly disagreed, as following illustrate:

*Mother 1- “I wanted to send my child to the daycare but my mother did not allow me, she said: In which place your child would be better than at home!”*

*Mother 2- “My father told me: Do not send your daughter to the daycare, they might even kill her!”*

Caregivers working on non-government facilities expressed concerns about IMSS day-care centers such as the location, low caregiver/child ratio, and quality of care. They also complained about the characteristics of the IMSS caregivers such as the low education, and high mean age associated with low energy and patience. For example, a common complaint was that IMSS caregivers delegate work to trainees, spend the day “chatting” and are careless with child hygiene. In contrast, members of Group C working on IMSS facilities claimed to be “highly experienced”, given that the IMSS day-care centers have been operating for more than 25 years.

Some mothers of very young infants did not consider institutional care as a choice because their child is still “too young” to attend to a day-care center. Therefore, a common practice is to leave infants with relatives or neighbors for several months before sending them to a day-care. A few caregivers agreed with this practice recommending mothers to “wait until the

child can walk” because they lacked of trained personnel to care for young infants or specialized pediatric medical services were not available in the area.

#### 2.4.2 Research Question 2. Work and Daycare Arrangements

Supporting Maternal Capacity.

*Work Arrangements.* Work was structured in one to three rotation shifts and extra-time periods. Child recovery was described as a particular challenging period for both single mothers and mothers working at the night shift. For example, single mothers reported about having extra-expenses for home care for their ill children when family caregivers were not available. Mothers working at the night shift reported compromising morning sleep to bring their children to the doctor and afterwards going to work without proper rest. Businesses offered extra-time mostly on weekends, sometimes without previous notification. Businesses exempted pregnant and lactating mothers from working extra-time or on the night shift. Single mothers generally disagreed with this policy that was viewed as limiting their options to earn extra income.

Group B reported having flexible policies that allow mothers taking time off-work as needed. Nevertheless, attendance and productivity bonuses are infrequently achieved by mothers who ask for time off work to attend to the day-care (i.e., child introductory period) or care for their ill children. Similarly, benefits conditioned to punctuality, such as food stamps, are not awarded to mothers with high commuting times or lacking reliable public transportation. Some business penalized lack of punctuality with a non-paid day off work. A

common arrangement to “pay” for this time was exchanging it for vacations or working extra hours.

Absenteeism is sanctioned by assigning employees into low-status positions not entitled to productivity benefits. Day-care centers’ reports justifying mother’s absence from work are generally not considered by supervisors. According to group B, higher absenteeism is observed in mothers relying on institutional day-care and lacking family support. Child illness was the main cause of maternal absenteeism reported by both Groups M and B. Other relevant absenteeism causes were mothers’ attendance to child medical and school appointments, and illness. Regarding the latter, mothers explained that often they compromise their own recovery to “save” days needed to care for their children as the following describes:

*“I do not want to take days-off work even when I feel sick. I ask for a day-off only when the doctor says I must, but I have to feel I am dying to take a day-off work... I might need days-off later for attending my ill children and I need the money [attendance bonus] also...”*

The majority of Group M agreed with their business’ supervisory routines. Supervisors’ functions included: evaluating working mothers’ productivity, assigning job positions and tasks, and giving time-off permissions. Women supervisors were usually viewed as sympathetic with working mothers, and even described as “good counselors”. Groups M and C claimed that often supervisors do not inform mothers about child emergencies reported by the daycare, however, and they discounted the day to mothers who leave the job. Some mothers also claimed being pressured by their supervisors

when productivity demands increase. Similarly, a few mothers lacking alternate child-care observed non-supportive attitudes in their supervisors when they could not work extra-time.

Job benefits included attendance and productivity bonuses, food stamps, financial loans, and financial support for child delivery. A few businesses provided as an incentive either economic support for transportation or transportation services, generally at the night shift.

Personal incentives described by Group M for returning to work were self-realization, empowerment, socialization, and economics, including achievement of job benefits. Additionally, mothers referred to their work as a mean to “run away of their home routine” and to “expand their intellectual background for interacting better with their partners”. In contrast, a recurrent complaint of mothers was work-load increase of combining work and home, as they viewed the latter as their primarily responsibility. Routines to cope with work overload included compromising leisure time and recreational activities, as well as diminishing the quality of home activities such as child-care.

Accordingly, a mother working in the evening-shift described:

*“After resuming my job I am always in a hurry, my time is not my time anymore... So I quit exercising. I do not feel as rested as I used to be... I quickly wash the baby, I feed him while I am doing the dishes and my other home chores... I cannot review the homework of my oldest daughter anymore, I barely see her at nights because she is sleeping. However, I try to keep a balance of everything, I try to make time for my kids, my home and my work [not for her] but it is just hard!”*

Mothers complained about noise, warm temperature, and lack of basic equipment such as ergonomic chairs. These conditions were also observed by the researchers in specific areas of certain businesses. In contrast, Group B perceived working conditions as appropriate claiming that businesses fit the standards regulated by the Mexican government.

*Day-Care Arrangements.* Day-care schedules varied from 6:30 or 7:00 AM to 5:30 PM for non-government centers, and 6:30 to 7:00 PM for IMSS centers. The child's schedule is tailored to the mother's working shift and commuting time. A few mothers informed that their child's schedule was not totally compatible with their shift, however, so they relied on alternate caregivers for delivering or picking-up their child. Mothers relying on non-government centers demanded extended schedules, but some members of Group C expressed concerns that extended schedules would compromise quality time between parents and children. Further changes in schedule require paper-work that is not always expedited. For example, a few mothers reported having trouble bringing their supervisor's statement, required to change their child's schedule, when they planned to work extra-hours or swift shifts.

Parents can choose the location of the daycare according to their convenience. Day-care services are provided on weekdays to children from two months to four years of age. In this regard, the three studied groups acknowledged the need for extending free child-care services to children older than four years of age. Accordingly, one IMSS center is providing free

preschool services, and a few day-care centers are offering fellowships to older children of single mothers. All day-care reported to have availability for less than two years of age children but some pointed out that availability for older children is not always assured.

When the child starts attending the day-care, it is required that one of the parents or a family member stay with the child for three to five consecutive days during two to six hours. Caregivers expect that the mother attend this introductory period, but they acknowledged that mothers are not always able to leave their job on consecutive days. Group C reported that most of the child drop-outs happen during this adaptation period induced by family caregivers or the child's father. Reasons for dropping-out the daycare evoked by Group C includes: the "*machismo*", parental fears about the child's capacity for adapting to a new environment, lack of knowledge about the objectives and organization of the daycare, and grandmothers' excessive attachment to the child.

The main reason for suspending child-care services was child illness and injuries. Other salient reasons were child age, incomplete vaccination scheme or paper-work, maternal layoff, and holydays. A consistent complaint in Groups M and C was that businesses did not allow caregivers contact with mothers at work and did not deliver messages left by caregivers. Moreover, one mother described that her supervisor did not allow her to leave her work immediately after experiencing a child emergency. Entrance to mildly ill children is allowed in some day-care centers. If the child gets worse at the

day-care, caregivers have to contact the child custodians. A few members of Group M complained that caregivers overreacted when reporting “mild incidents” by asking them and alternate custodians to come to the daycare center simultaneously. When the child recovers, day-care centers require a medical discharge. In some cases, mothers invest considerable time commuting and bringing their children to medical services, so experiencing undesirable outcomes at work. For example, several mothers complained about losing productivity bonus for taking excessive time off work when bringing their child to non-expedited medical services.

The day care center child’s tolerance time ranged from 15 to 60 minutes. It is estimated from the mother’s work-daycare commuting time. If a child is picked up late, some centers give parents written warnings until the child is suspended one or more days. Other centers charge a delay fee, authorizing a waiver if the mother provides written documentation of being at work. A salient concern of mothers was that their children would be reported as “abandoned” and sent to a social services facility if picked up late. Caregivers explained that this is the “official” policy told to parents, but in practice they would bring the child to the child’s home if neither the parents nor the caregivers are available.

Recommendations for improving daycare services expressed by working mothers, day-caregivers, and business representatives are presented in Table 3. Overall participants propose to improve quality of services by extending schedules, improving day-caregiver’s attitudes, increasing health

Table 3

Recommendations for improving daycare services expressed by Mexican working mothers, day-caregivers, and business representatives

Recommendations	Mothers	Day-caregivers	Business Representatives
<b>Quality of services</b>			
<u>Improve overall child-care (i.e., pay more attention to children, do not let them cry, do not make distinctions among children)</u>	●		
Provide more affection to children	●		
Improve caregivers' attitudes when receiving or delivering children or the child is picked-up late	●		
Provide nutrition counseling to parents and family	●		●
Improve acceptability of some IMSS menus	●		
Consider parental schedules when programming informational and recreational activities	●	●	
Provide counseling to parents	●		
Provide child-care to ill children		●	
Allow caregivers to provide medical treatment to children (e.g. homeopathic medicines)	●	●	
<b>Organization</b>			
<u>Increase the child/personnel ratio</u>	●		●
<u>Extend service schedules (i.e., covering the three shifts and weekends)</u>	●	●	●
<u>Improve the caregiver's selection process (e.g. evaluate vocational aptitudes, hire professionals)</u>	●	●	●
<u>Reduce paperwork and extend application deadlines</u>	●	●	
<u>Extend free services to children older than four years of age</u>	●	●	
<u>Increase tolerance time</u>	●		
Periodical evaluation of organizational processes	●		
Provide continuous training to caregivers and nutrition personnel	●		●
Hire part-time physicians	●		
Reduce tuition rates in non-government facilities	●		
<b>Facilities' Design and Promotion</b>			
<u>Install day-care facilities closer to the industrial zone</u>	●		●
Update the facility design	●		
Supervise hygiene conditions	●		
Promote daycare services among working women		●	●
Change daycare centers image from a place for keeping children to a learning space			●

\* Highlighted statements were frequently mentioned

promotion, providing services to older preschool children, increasing the child/personnel ratio, and installing day-care facilities closer to the industrial zone, among other actions.

#### 2.4.3 Research Question 3. Work and Daycare Child Feeding Policies. Maternity Leave and Breastfeeding Policies at Work.

The majority of Group M returned to work 42 days after delivery but expressed their wish for expanding their maternity leave period. A few businesses allowed mothers to take two to three additional non-paid months off-work. After prolonged absence of the job, however, mothers were placed into lower prestige positions or lost their productivity bonus when asked to perform tasks with which they were not experienced. Similarly, some mothers recovering from a Caesarean section were “temporarily” placed in low-effort jobs and were not later reinstated in their initial positions.

Mothers are entitled to take one hour per day out off the job for lactation during a 6 months period after delivery. The majority of mothers reported “taking advantage” of this time for doing different activities such as home chores, grocery shopping, and attending to medical or school appointments. The majority of mothers with very young children conveyed reservations about breastfeeding and described unpleasant experiences for expressing their milk at work. For example, a mother working in a production line perceived disproving attitudes from her supervisor and coworkers when taking time-off work for expressing her milk. Similarly, lactating mothers who choose not to express their milk at work reported struggling with personal discomfort

associated with breastfeeding and eventually abandoned it. In other cases, mothers were either not familiarized with techniques for expressing their milk or they did not consider this procedure to be culturally appropriate.

Additionally, two mothers complained that their business' doctor used disrespectful terminology when referring to breastfeeding, a condition that was also observed by the research team.

None of the study mothers brought out the need of a lactation room at work. They stated that a lactation room has not been a priority for their business representatives, so "it is not even worthy to think on it". Similarly, Group B claimed that the proportion of mothers willing to breastfeed or to express their milk at work was not enough to justify the existence of a lactation room. Group B also brought up child-safety, health insurance, and lack of space issues for making available this facility at the workplace. Consistently, all businesses lacked a room specific for lactation and breastfeeding mothers used no hygiene facilities for expressing and storage their milk such as the bathroom and the dining fridge. One business designated a multi-purpose room for lactation. At the time of the study, this room was used by one woman, while other women with infants were not breastfeeding. Early abandoning of breastfeeding was consistently evoked as a strategy to facilitate alternate caregivers to take care for infants when the mother returns to work. Some mothers initiated this process gradually at two months of age, while a few described interrupting breastfeeding abruptly, right after resuming to work. Consequently, they introduced formula and complementary foods to children.

*Day-care Food Service Policies.* Standardized meals designed by the IMSS are provided to children, so they are not allowed to bring any food to the facility. Day-care food services were run by nutrition technicians at IMSS centers, and by managers with no formal training in nutrition in non-government centers. Caregivers considered the IMSS menus as “good, balanced, healthy, and overall well accepted”. Caregivers reported food consumption to parents qualitatively on a daily basis. If a child dislikes an item or requires special meals for medical reasons, the food service provides alternative food only during regular meal-times. Therefore, a common practice is to keep the sample trays for contingencies, i.e., children that are picked-up late. Nevertheless, trays are often maintained without refrigeration, as observed by the research team. The mechanisms to report food acceptability issues to the IMSS were not clearly understood by some caregivers.

#### 2.4.4 Research Question 4. Nutrition Education at Work and the Daycare

*Work Nutrition Education.* Working mothers and their families are entitled to social security and medical services at work. Social security agencies provide child feeding counseling on pediatric medical appointments but mothers often declared not having time to bring their children to a social security facility. In some cases, they rely on relatives who eventually bring nutrition messages into the household. Medical services available in the study businesses organized health workshops once or twice a year as part of health fairs. Child nutrition was not considered on this agenda. Moreover, doctors in

Group B explained that mothers barely look for nutritional advice during medical sessions, except for guidance about milk formula management.

*Day-care Nutrition Education.* Health information is delivered to parents through blackboards, bimonthly workshops and individual counseling provided by a nurse. Caregivers also distributed printed IMSS menus to parents and alternate caregivers to encourage the preparation of similar meals at home. Both caregivers and mothers expressed their concern about children's rejection of vegetables. Caregivers attributed this behavior to the fact that parents are not offering vegetables at home, while offering fast food and canned baby products. For one caregiver, giving vegetables daily to young children was considered "just too much". A communication campaign promoting vegetable was carried out in the day-care centers at the time of the study, while workshops targeted to parents conducted in the last year focused on child development, parenting and vaccination. Centers complained about low attendance of parents to the workshops and about the complexity of choosing schedules according to parents' agenda.

Training of nurses and caregivers about preventive medicine is conducted occasionally by the IMSS Epidemiology Department. Training to food service managers is provided at least once a year by both the IMSS and the Ministry of Education. Some caregivers stated the importance of nutrition training, but some considered that food service managers do not need additional training "because the menus are pre-established".

## 2.5 DISCUSSION

This study highlights the important role played by organizations to support work-family integration in the context of a Latin-American semi-industrialized population. Specifically, this study gives answers to the research questions posed about the effectiveness of the work and alternate-care arrangements to support Mexican blue-collar working mothers to combine work and child-care and compliance with recommended infant feeding practices.

Regarding question one, it was identified a wide range of disadvantages elicited by the participants about daycare services. Concerns about the quality and accessibility of institutional care, as well as about the well-being of children attending to daycare services partly explain why some parents are not taking advantage of free daycare services provided by the Mexican government. Family care, usually provided by grandmothers, was viewed as reliable, practical, and mindful (Van Esterik, 1995; Lowe et al., 2003). These values are consistent with cultural characteristics prevailing in collectivistic cultures such as kinship, solidarity, and social networks (MacPhee, Fritz, and Miller-Heyl, 1996; Wang et al, 2004; Göksen F, 2002). We may expect, though, that the availability of family care will be limited in future generations, given the influx of women into the paid labor force. Consequently, it is necessary to anticipate an increase in demand for daycare services by improving both their quality (Engle, Menon, and Haddad, 1999) and institutional image among parents and business representatives.

Regarding our second question, this study documented work policies and supervisory practices that might affect mothers' career development and job status after returning from extended leave periods and during episodes of child illness. Additionally, there were identified policies that might be detrimental for single-earner families requiring supplemental income such as the policy restricting lactating mothers to work overtime. A thorough review of such policies and supervisory practices is necessary to prevent that work benefits negatively impact mother's career and performance appraisal (Eaton, 2003; Allen, 2001; Anderson, Coffey, and Byerly, 2002; Burke, 2004; Lobel, 1999).

Impaired communication between businesses and day-care centers was evident. In this regard, Katz and Kahn (1967) state that a major misconception in organizations is the "failure to recognize fully that they are continually dependent upon inputs from the environment". Inter-dependency between business and day care centers must be acknowledged by improving business' internal and external communication, and in doing so reducing maternal stress and inter-organizational conflicts.

This study documented mothers' behaviors and thoughts suggesting spillover between work and family. This spillover was more apparent when referring to child illness and time management issues. Moreover, the data suggest that mothers still expect to take primary responsibility for their household in addition to work. This behavior conceptualized by Allen and Hawkins (1999) as "gatekeeping" derive from the social construction of

gender. Gatekeeping dimensions such as external validation of a mothering identity, setting rigid standards, and differentiated conceptions of family roles also emerged in this study, indicating the need to promote collaborative family efforts in daily household work.

Regarding the third question, this study documented compelling barriers to compliance with breastfeeding recommendations. First, lactation rooms were absent at the workplace. Second, mothers and business representatives perceived a lack of need of a lactation room at work. Third, supervisors and coworkers' attitudes were unsupportive towards the time taken by working mothers for expressing milk. Fourth, insufficient counseling about prevention of early introduction of complementary foods was provided to women over the return to the job period. These issues are consistent with previous reports regarding breastfeeding (Heinig et al., 2006; Van Esterik and Greiner, 1981; Huffman, 1984; McIntyre et al., 2002).

Regarding our final question, we found that businesses are not conducting nutrition programs focused on the childhood, while they focus mostly in prevention of chronic diseases. Business could take advantage of available health services at the workplace to provide infant feeding counseling to working mothers and their families. Similarly, daycare centers must develop alternative nutrition communication strategies to reach parents with conflicting schedules and expand their actions to alternative custodians. In addition, private day-care centers should assure continuous nutrition training of caregivers and food-service personnel.

When evaluating the findings of this study, methodological limitations should be considered. This study focused on employed mothers, so we did not attain the perspectives of women who did not return to work after their maternal leave and of those who worked in the informal sector. Perspectives of these groups would be considered in further studies about maternal capacity for achieving work-family integration. Similarly, we did not conduct a comprehensive study of the household system. Expanding research into this system would provide insight of the fathers and grandparents' perspectives, and social networks involved in child-care.

The methods used in this study allowed us to document policies, practices and concerns of different stakeholders. They did not reveal, however, the mothers' moment-by-moment emotional challenges that other methods such as participant observation could produce, if extended time and other resources would be available. This investigation was driven by previous research in the fields of nutrition and organizations. A different focus of inquiry might have come out if using a different conceptual approach.

The subjectivity of qualitative research must be acknowledged. The degree to which these findings are a function of the informants and their context would be influenced by the researcher's professional background, values, and motivations when interpreting data (Krefting, 1991). To increase dependability and potential biases, peer examination, triangulation, and code and recode procedures were conducted.

Confidentiality was assured, although participants may have withheld sensitive information about family and work issues. In addition, the specific findings of this study cannot be generalized to the larger population and settings with different work and child-care arrangements. These findings, though, provide insight to understand similar ethnocultural groups and may guide inquiry for further quantitative studies in the region.

Our findings evidenced the need to develop work and day-care arrangements supporting maternal capacity to follow recommended infant feeding practices. These initiatives must consider the perspectives of different stakeholders (parents, employers, coworkers, alternate caregivers, and health personnel) involved in the child-care process.

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## CHAPTER 3

### KNOWLEDGE ABOUT FOOD CLASSIFICATION SYSTEMS AND VALUE ATTRIBUTES PROVIDES INSIGHT FOR UNDERSTANDING COMPLEMENTARY FOOD CHOICES IN MEXICAN WORKING MOTHERS

#### 3.1 ABSTRACT

Knowledge about mothers' perceptions of food classification and values about young child feeding is necessary for designing educational and food supply interventions targeted to young children. To determine classification, attributes, and consumption routines of key complementary foods, 44 mothers of children < 2 y of age in 14 manufacturing businesses were studied. Using 31 key foods, we conducted free-listings, pile-sort and food attributes exercises. Hierarchical clustering showed that mothers identified nine classes of key foods, including milk derivatives, complements, junk food, infant products, chicken parts, and other meats. From multidimensional scaling, mothers used three primary classification systems: food groups, food introduction stages, and food processing. Secondary classification systems were healthy-junk, heavy-light, hot-cold, good-bad fat, and main dish-complement. Child health and nutrition, particularly vitamin content, were salient attributes. Fruits and vegetables were preferred for initiating complementary feeding on the second month of age. Consumption of guava and mango, and legumes, however, was associated with digestive problems

(*empacho*). Red meats were viewed as cold-type, heavy, and hard, not suitable for young children, but right for toddlers. Chicken liver was considered nutritious but dirty and bitter. Egg and fish had vitamin content, but were viewed as potentially allergenic. Concerns about chemical and excessive sugar content of processed foods were revealed. Mothers valued processed foods vitamin content, flavor, and convenience, but some were suspicious about expiration date and overall safety of these foods. Results indicate that mothers' perceptions and values may differ from that of nutritionists and program designers, and should be addressed when promoting opportune introduction of complementary foods in social programs.

### 3.2 INTRODUCTION

*The role of food classification and value attributes in complementary food choices.* Complementary food choices are important determinants of infant feeding practices and future eating habits relevant to child health, development, and growth (Brown et al., 1989; Lozoff et al., 1998; Schürch, 1995; Marquis et al., 1999). The life-course conceptual models (Clausen, 1986; Elder, 1987; Devine, 2005) provide a means to explain how food choices develop in changing temporal, social, and historical contexts. Furst et al., (2006) proposed a conceptual model of the food-choice process that illustrates how people's life-course experiences affect major influences on food choice that include ideals, personal factors, resources, social context, and the food context. According to this model, the recurring experience of making food

choices over the life course led to the development of personal food systems. A central component of these systems is the weighing and accommodation of values salient to a person in a particular situation (Furst et al., 2006). Gutman (1982) pointed out that values play a role in attaching valences to the potential physiological, psychological, and sociological consequences when making food choices. This author proposed a model of the consumer categorization process by stating that people choose actions (i.e., food choices) that produce desired consequences with positive valence (i.e., pleasure) and minimize undesired consequences with negative valence (i.e., health threats). Furthermore, Belk (1975) stressed that these valences are modified by specific situations that eventually influence consumer behavior. Previous studies show that people cope with the diversity of foods that are potential satisfiers of relevant values by grouping them into sets or categories so as to reduce the complexity of their choice (Gutman 1982, Furst et al., 2000, Winter-Falk et al., 2001). Examples of food-related values reported in the literature are health/nutrition, convenience, quality, sensory perceptions, and monetary considerations, among others (Furst et al., 2006; Dutta and Frongillo, 2006).

The capacity of performing complex categorization processes such as relational matching is developed since early childhood, generally after 5 years of age (Smith, 1983; Siegler, 1991). People classify objects in term of their attributes, be these physical features, linguistic labels, or functions (Anderson, 1991). Examples of complementary foods classifications are the developmental stages of food introduction utilized by the food industry

(Gerber, 2006), food groups based in the nutrient content of foods (USDA, 2006), and classifications based in food color, shape, and texture (Michel and Contento, 1984), effects on the child, availability, and accessibility (Dutta and Frongillo, 2006), among others.

Taxonomic categorization, based on a hierarchy of kinds, play an important role in human thinking (Wierzbicka, 1984). Food classifications can have different levels depending of the meaning ascribed to foods, including superordinate categories based on physical and evaluative attributes, as well as lower category levels based on needs satisfaction (Bovet, Vauclair, and Blaye 2002). Accordingly, Furst et al., (2000) in a study to examine how people construct and use food classifications, found multiple levels of food categories including those culturally recognized, socially significant, and personally operational. The latter were found to be the most significant and routinely used in everyday food choices.

Kempton (1981) and Wierzbicka (1984) pointed out the importance of understanding folk categorizations which may differ from scientific categorizations. Consistently, the social-sciences literature stresses the importance of understanding emic perspectives by studying and analyzing a setting or a behavior from the author's perspective (Morse and Field, 1995). Therefore, understanding caregivers' perceptions and values about foods is of the importance of health providers' and child food programs to assure proper communication and sustainability.

*Maternal work and infant feeding in Mexico.* Developing countries are facing both child overweight and micronutrient deficiencies as part of the epidemiological transition (De Onis and Blossner, 2000; Kain, Vio, and Albala, 1998). In Mexico, the prevalence of iron and zinc deficiencies in infants <2 years of age is 67% and 34%, respectively (Villalpando et al., 2003), while one out of five school children are either overweight or obese (Barquera, 2003). This highlights the importance of focusing on events occurring at the preschool age to further understand well-known, school-age, nutritional-status outcomes. The mechanisms through which children's eating patterns and level of physical activity may be affected by maternal employment are multifaceted. Micronutrient deficiencies may develop over time as a consequence of the abandoning of breastfeeding associated with mother's resuming to work and early introduction of low-nutrient complementary foods (González-Cossío et al., 2006; Chatterji and Frick, 2005). Time limitation may constrain parental food choices by offering energy-dense fast food, or allowing the child to consume snacks prepared by their own or by misinformed care providers (Crepinsek and Burstein, 2004). Additionally, children may spend a great deal of time engaged in less active patterns, due to safety concerns of working parents about outdoors activities supervised by young or elderly siblings (Anderson, Butcher, and Levine, 2003; Anderson, 2003).

Among the strategies to improve micronutrient consumption, food-based programs have been successful in increasing children's consumption of key nutrients such as iron and zinc. Successful examples are found in

programs supporting animal-source foods (ASF) conducted in Peru, Mexico, and Ecuador (Lopez de Romaña, 2000; Rivera et al., 2000; De Caballero et al., 2004). To assure sustainability, food-based programs, whether they emphasize home foods, processed foods, or both, must follow a culturally sensitive approach by recognizing caregiver's food belief systems shaping food choices.

Over the past decade, studies about maternal work and infant feeding mostly focused on breastfeeding behaviors (Lakati, Binns, and Stevenson, 2002; Launer, 1993; Kurinij et al., 1989; Rivera, 2003). Few studies have been conducted in developing countries to understand working mothers' barriers and facilitators for promoting desirable complementary feeding choices (Johnson, 1992; Lindberg, Artola, and Estrada, 1990; Bran, Skinner, and Carruth, 2001; Dewey and Lutter, 2001).

This study aimed to expand our knowledge about the classification systems, value attributes, and patterns of introduction of home and processed complementary foods in urban working mothers in Central Mexico. It aimed to determine classification, attributes, and consumption routines of key complementary foods among mothers of children less than two years of age working in manufacturing businesses. This study is part of a comprehensive study about multi-level determinants of maternal work and child care conducted in Central Mexico.

### 3.3 METHODS

The study was conducted in Mexico from 2005 to 2006. This qualitative investigation used an interpretativist approach for data collection methods, building upon the participant's real-life experiences and understandings (Patton, 1990) regarding infant feeding.

#### 3.3.1 Study Sample

A random sample of 14 manufacturing businesses with at least 25% of working women was selected from the census of the Cuernavaca City industrial zone, Mexico (n=157). Businesses varied in size ranging from 115 to 920 employees. All mothers having children less than two-years of age who were blue-collar workers and used public transportation to get to and from work were selected for a screening survey (Appendix A). From the 150 mothers participating in the screening survey (6 did not participate), a stratified purposeful sample of 44 working mothers relying on either on institutional care (Group I), or family care (Group F) was selected, looking for diversity in demographic and working characteristics. All mothers selected agreed to participate.

#### 3.3.2 Data-Collection

Initially, a free-listing survey was conducted with key informants (Weller and Rommney, 1988) at an IMSS regional hospital and a daycare in Cuernavaca City. Afterwards, a single pile-sort exercise, and a food-attributes exercise were conducted with the mothers at the morning, evening, and night shift, either before or after finishing the shift. These exercises took place at the

mothers' work site, in the health service room. Additionally, semi-structured observations about working physical conditions and availability of a lactation room were carried on by the research team. Trained interviewers who were familiar with the study population participated in data collection. A one week training workshop was conducted with the interviewers. Consistency among interviewers was assured by periodic supervision of interview content and triangulated review of transcriptions by the interviewers and the main researcher. Working mothers' information was acquired in Spanish, audio-recorded, and transcribed verbatim.

**Free-listing Survey.** To identify the cultural domain of foods given to children less than one year of age, a free-listing survey was conducted with key informants (Weller and Rommney, 1988) at an IMSS regional hospital in Cuernavaca City. Key informants were 15 working mothers, five day-caregivers, and five pediatric nurses. They were asked to list all foods that are usually given to children less than one year of age in the region. Key complementary foods were selected by including the most frequently mentioned foods, child processed foods that were less mentioned but relevant in infant feeding, foods sources of iron, zinc, fat, and simple carbohydrates. The study was conducted in the winter season when certain seasonal fruits such as mango, tangerine, and guava were available. Color cards with the image and name of each of the key foods were developed and tested for reliability of recognition in a group of working mothers.

**Food-Attributes Exercise.** To identify factors involved in the key-food choice process, a food-attributes exercise was conducted with the mothers (Appendix C5). Duration of the food-attributes exercise ranged from 20 to 32 minutes. Informants were encouraged to openly speak about the role of the key foods in complementary feeding, while showing them one food card at a time. When the mother asked for clues, interviewers suggested predefined discussion topics such as perceptions of positive and negative food attributes, age of introduction of the key foods, food preparation, and sources of information about the role of the key foods in complementary feeding. Interviewers clarified the connotation (positive or negative) of an attribute when necessary.

**Pile-Sort Exercise.** To identify culturally defined food classes, a single pile-sort exercise was conducted with the mothers after finishing the food attributes exercise. Informants were asked to sort the cards representing the key foods into piles according to how similar they were (Miles and Huberman, 1994). Duration of the pile-sort exercise ranged from 12 to 28 minutes. Cards were designed with the image and name of each of the key foods. In addition, the interviewer mentioned the name of the food during the pile-sort exercise. Informants were allowed to form as many piles as they wanted with at least two cards but one item can be placed in only one pile (Bogartti, 1996). A description of the mothers' food classification criteria and the name of the created food classes were tape-recorded verbatim and back-up notes were taken by the interviewer.

### 3.3.3 Data Analysis

Data from the screening and free-listing surveys were summarized by descriptive statistical methods such as frequencies, means, and standard deviations. For the pile-sort survey, food classes were generated by using two basic approaches for analyzing proximities: Johnson's hierarchical clustering (Bogartti, 1996) and non-metric multidimensional scaling --MDS-- (Cox and Cox, 2000; Green and Rao, 1972; Punj and Stewart, 1983). Hierarchical clustering attempts to find groups that are nested within each other. The "agglomerative" algorithm developed by Johnson (1967) used in the hierarchical clustering allows the identification of food groups while it starts with joining many small clusters (i.e., pair of similar foods) and gradually merges into fewer, bigger clusters (i.e., food groups). The purpose of MDS is to provide a visual representation of the pattern of similarities among a set of items such as foods (Cox and Cox, 2000). MDS plots items perceived to be very similar to each other; in doing so it finds a set of vectors in p-dimensional space by ordering the items in the map along a continuum. Qualitative information provided insight to interpret the dimensions of the MDS maps.

A coding catalog was developed from a sample of the transcripts to analyze the reasons for classifying foods, and then expanded as new concepts emerged from the analysis. Coding was peer-reviewed for accuracy and dimensions were defined until consensus was obtained by project co-investigators and assistants. The pile-sort survey analysis was run using the Anthropac® software version 4. One participant was left out from these

analyses because a food card was placed twice into two different groups.

For the food-attributes exercise, mothers' perceptions from groups F (relying on family care) and I (relying on institutional care) on the key foods were compiled per food and coded using a thematic conceptual matrix. The rows of this matrix were the key foods' positive and negative attributes that were grouped in six clusters as follows: physical well-being, child nutrition, food preparation and consumption routines, food quality, and age of food introduction. The columns represented the frequency of mention of the attributes by each of the key foods.

Mothers participated voluntarily and provided written informed consent. The Cornell University Committee on Human Subjects and the Ethics Committee of the National Institute of Social Security at Cuernavaca City, Mexico approved the research protocol.

### 3.4 RESULTS

#### 3.4.1 Characteristics of Study Participants

Table 4 presents the socio-demographic characteristics of mothers with children less than two-years of age, stratified by the type of child-care used. The average age of mothers was 27.9 years. Most of the participants were born in the study City (64.1%) and completed middle school (71.4%). Families had from one to four children. Almost one of every two participants (46.1%) did not have a spouse or partner at the time of the study. Women earned the minimal wage; reported being employed by the current business for 5.2 years

Table 4

## Socio-Demographic Characteristics of Mexican Working Mothers

Working Mothers Socio-Demographic Characteristics	Total (n=44) Mean (SD)
Age (y)	27.9 (5.3)
Born place	
Cuernavaca City (%)	64.1
Outside Morelos State (%)	23.1
Schooling	
Middle school (%)	71.4
High school (%)	23.8
Number of children	1.8 (1.3)
Spouse no present (%)	46.1
Monthly wage (USD)	152.00 (30.00)
Years employed	5.2 (0.7)
Extra time worked past mo (%)	14.6
Absenteeism $\geq$ 1 d on last 3 mo (%)	33.3
Commuting home to work (min)	37.7 (6.1)

on average, and 14.6% worked extra time in the past month. Mothers' extra time was carried out generally on weekends, and was either paid or considered a replacement for the time they took off to care for their ill children or attend their children's school. Almost one of every three mothers missed at least one day at their job in the three months previous to the study. The mean

transportation time from home to work was 37.7 minutes, ranging from 10 to 75 minutes.

### 3.4.2 Key Foods

Informants mentioned a total of 112 foods given to children less than one year of age in the region at least one time. From this domain the key foods list was composed by the most frequently mentioned foods (n=21) that were: carrot, squash, chayote, brown bean broth, chicken, apple, banana, pasta, fish, lentils, tortilla, egg, bread, guava, yogurt, broccoli, mango, tangerine, oatmeal, rice, and cheese. Other processed foods included in the key foods list that were less mentioned but relevant in infant feeding (n=5) were: Danonino® (petit Suisse cheese), Gerber® (meat flavor), cream, infant cereal, and boxed cereal. Finally, foods potentially rich sources of iron, zinc, fat, and simple carbohydrates (n=5) such as beef, chicken liver, pork, soda, and potato chips were added to complement the above list to finally select 31 key foods.

### 3.4.3 Food Classification

Hierarchical clustering revealed that mothers classified key foods into nine classes (Table 5). About half of the mothers agreed, on average, on the foods selected to compose the following five food classes: vegetable, fruit, junk food (*chatarra*), milk derivatives, and complements. Lower degree of agreement (similarity 0.38 to 0.49) on the foods included in a specific class was observed, however, when composing the soups, chicken parts, other meats and the infant products class.

Table 5

Classification by hierarchical clustering of complementary foods by Mexican working mothers

Food classes	Complementary foods	Similarity*
Vegetable	Squash, chayote, carrot, broccoli	0.86
Fruit	Apple, banana, guava, mango, tangerine	0.78
Junk foods	Soda, potato chips	0.67
Milk derivatives	Cheese, cream, Danonino®, yogurt	0.44
Complements	Bread, tortilla	0.53
Soups	Brown beans broth, lentils, pasta, oatmeal, rice	0.43
Chicken parts	Chicken, chicken liver	0.38
Other meats	Beef, fish, pork, egg	0.38
Infant products	Boxed cereal, infant cereal, Gerber® (meat)	0.30

\* The purpose of a measure of similarity is to compare two lists of numbers (i.e. vectors, foods) and compute a single number which evaluates to what extent two variable co-vary (Bogartti,1996). Higher values represent a higher degree of agreement within each group of caregivers about the foods included in each class.

When plotting mothers' food-grouping similarities in multidimensional scaling (Figure 2), the corresponding plot using two dimensions showed satisfactory stress (0.15), reflecting a reasonable fit. A reduction of the stress was observed by using a three-dimensional model (0.09), reflecting a better fit.

This indicates that mothers used at least three different dimensions or criteria when classifying the key foods. The identified dimensions shown in the MDS map were: food groups, food introduction stages, and food processing.

Figure 2 shows the first dimension regarding food groups as indicated by the food clusters. Overall, this classification was consistent with the one obtained by hierarchical clustering. The second dimension described below, refers to the stages of introduction of complementary foods as represented by the dotted lines. The third dimension refers to food processing represented by southeast-northwest axis. The key foods were classified as natural and processed foods. As expected, fruits and vegetables were described as natural foods, while Danonino®, yogurt, and Gerber®, among others foods were classified as “packaged” or processed products.

#### 3.4.4 Food Attributes

Working mothers recognized at least 82 positive and 94 negative attributes of key complementary foods (Tables 6 and 7). Overall, foods with high proportion of positive attributes and few negative attributes were apple, banana, carrots, squash, chayote, oatmeal, pasta, and chicken (meat). In contrast, pork, potato chips, and soda, among other processed products were described mainly by negative attributes. The most frequently mentioned attributes were related to child health and nutrition. These attributes were linked together when reported.

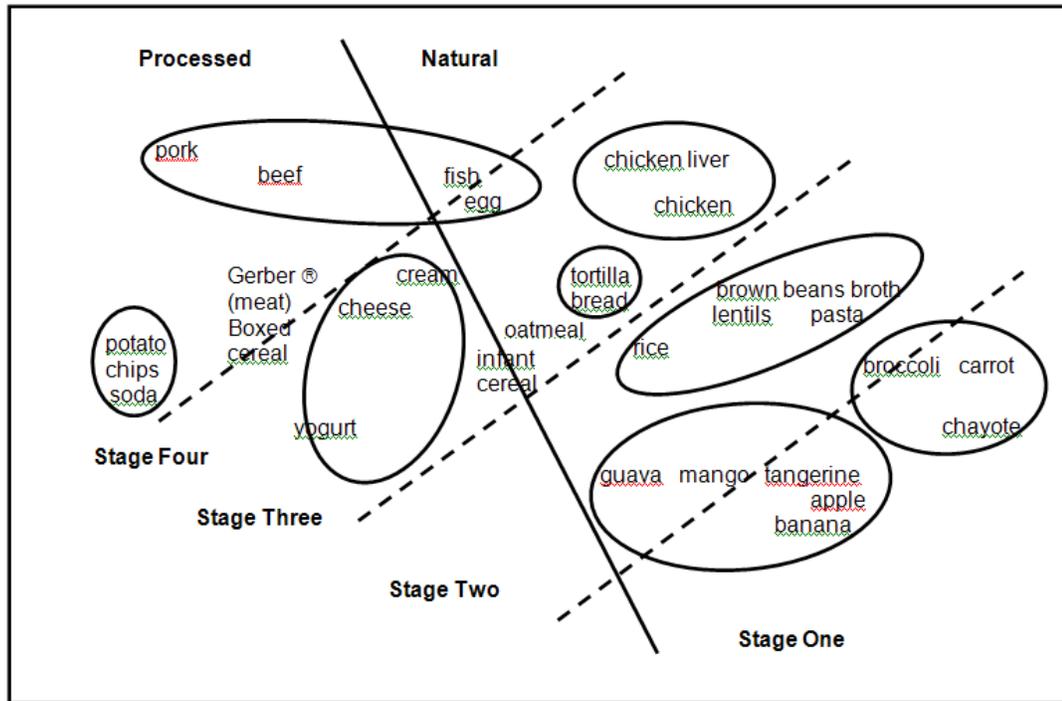


Figure 2. Multidimensional scaling map of complementary food classification by Mexican working mothers (n=44)

**Physical Well-being.** Positive attributes related to child well-being focused on three main topics: child health, child illnesses, and growth/development. Both groups considered vegetables and a few animal foods such as chicken as important for preventing illnesses and maintaining health of less than one-year-old children. Some mothers, however, were worried about chicken liver, egg, and beef causing digestive problems in young infants. Mothers brought up a condition called *empacho*, characterized by stomachache, abdominal distention, and finally diarrhea or constipation. This condition was often associated with consumption of certain fruits such as guava and mango, as well as with consumption of legumes described below:

*“I was told that my child can eat brown beans at six months, but just the broth, otherwise my baby will get sick (se empacha) because beans’ peel sticks on my baby’s stomach...”*

Another salient concept relates with the “heavy foods” such as pork and fish. Mothers explained that the stomach of a very young child does not tolerate foods that are too strong or heavy and consequently develops diarrhea. Mothers associated allergic events with consumption of AFS such as whole egg, red meat, and fish. Moreover, a few mothers pointed out red meat as carcinogenic.

**Child Nutrition.** Mothers’ perceptions about the nutritional value of the key foods mainly focused on their vitamin content. Most of the studied fruit and vegetables, as well as chicken and its derivatives, were recognized as vitamin-rich foods. A general belief was that bean and chicken broth contain a lot of vitamins and are highly nutritious because solids left most of “their substance” in the broth. Another common belief was that black beans are more nutritious and suitable for the child than brown beans. Mothers expressed contrasting concepts about the nutritious value of processed products. For example, some of them considered Danonino® as a vitamin source, while others thought it has a low nutritious value, or might make the children overly fat. A few informants declared not knowing the nutrient value of processed infant products and consequently questioned their role in child feeding.

Table 6

Positive attributes of key complementary foods recognized by Mexican working mothers

Positive Attributes	Key Complementary Foods <sup>a</sup>		
	Mothers F and I (n=44)	Mothers F Family child-care (n=22)	Mothers I Daycare (n=22)
<b>Child Well-being</b>			
It doesn't, harm the baby, promotes child well-being, healthy foods	<b>Fruits <sup>b</sup>, vegetables <sup>c</sup>, brown bean and chicken broth, chicken liver, pasta, mango, lentils, oatmeal, fish and tangerine</b>	<b>Tortilla, infant cereal, pasta, cream, and rice</b>	Chicken
Good for stomachache and a good digestion	Oatmeal		Rice, tortilla
Good for teeth itching		Oatmeal	Tortilla
Good on winter time for colds	<b>Tangerine</b>		Oatmeal
Good for preventing cancer		Green vegetables	
Helps to grow-up well, it is good for child development	Chicken, yogurt, oatmeal, apple, and banana	Danonino®, beef, infant cereal and pasta	Carrot, and mango
Helps to strength bones	Tortilla		Beans broth
<b>Child Nutrition</b>			
Nutritious	Chicken broth and <b>meat <sup>b</sup></b> , infant cereal, oatmeal, black beans, fish, cheese, rice, beef, and vegetables	Apple, banana, yogurt, bread, and pasta	<b>Chicken liver</b> , eggs, tortilla and fruits.
Contains vitamins a) General	<b>Fruits, vegetables, chicken (liver, meat, eggs, broth), black bean broth, Danonino®, infant cereal, lentils, fish, tortilla, boxed cereal, rice, cream, oatmeal, beef</b>		Pasta, yogurt, bread and cheese.

Continuation of Table 6

Positive Attributes	Key Complementary Foods <sup>a</sup>		
	Mothers F and I (n=44)	Mothers F Family child-care (n=22)	Mothers I Daycare (n=22)
...Contains vitamins b) Vitamin C	<b>Tangerine, guava,</b> apple and banana		Mango
Contains minerals a) Iron (prevents anemia)	<b>Brown bean broth,</b> lentils, Danonino®	<b>Chicken liver</b> and vegetables	<b>Infant cereal,</b> green vegetables and cream
b) Calcium	<b>Tortilla,</b> cream, eggs and Danonino®	Infant cereal, oatmeal, brown beans broth, banana, yogurt, and vegetables	Boxed cereal, fish, carrot, guava, and cheese
Contains proteins	Chicken (liver and broth), beef, and fish	<b>Chicken</b> <b>(meat and</b> <b>eggs),</b> rice and mango	Pasta and lentils
Contains good fat, productive for the body		Fish, beef, and Danonino®	Cheese
It is good flour [carbohydrates]	Rice and bread		
Contains fiber for good digestion	Tortilla, infant cereal, rice, and boxed cereal	Brown beans, bread, oatmeal, cheese, and meat	Mango, vegetables and lentils
<b>Food Preparation and Consumption</b> I use it often at home		<b>Rice</b>	<b>Chicken</b> <b>broth,</b> banana, cheese, yogurt, beef, and tangerine
I prepare soups with these foods	<b>Chicken and legume</b> <b>broths with tortilla, rice,</b> <b>pasta, vegetables, and</b> <b>chicken (meat or liver)</b>		

Continuation of Table 6

Positive Attributes	Key Complementary Foods <sup>a</sup>		
	Mothers F and I (n=44)	Mothers F Family child-care (n=22)	Mothers I Daycare (n=22)
I use it as a reward			Soda, potato chips
Practical, ready to eat or easy to prepare	Vegetables, apple and banana	Infant cereal, Gerber®, carrot, and eggs	Boxed cereal
Dinner food	Tortilla	Pasta, oatmeal and boxed cereal	Bread and banana with oatmeal
Breakfast food	Apple and banana	Yogurt	Bread
Snacks		Guava	Gerber®
Good dessert	Apple and banana		Yogurt
It is a complement	Bread and tortilla	Oatmeal and cream	Soda
<b>Food Quality</b>			
Children like its flavor	<b>Soda, potato chips, tortilla, Danonino®, fruits, chicken broth, fish, boxed cereal, pasta, rice, and brown bean broth</b>	Lentils	Chicken liver, and cream
It is creamy, soft, tender or easy to chew	Infant cereal	Egg, tuna fish, pasta	Chicken
It has an attractive color	Danonino®		
It is clean meat and less aggressive than red meat	Chicken	Fish	
It is a refreshing beverage			Soda
It is natural so it is good		Fruits	Guava, mango, rice, and bread
Seasonal food (cheep)	Tangerine	Apple	Guava

<sup>a</sup> Foods in bold were frequently mentioned

<sup>b</sup> Fruits: apple, banana, guava and tangerine

<sup>c</sup> Vegetables: squash, chayote, carrot, and broccoli

Table 7

Negative attributes of key complementary foods recognized by Mexican working mothers

Negative Attributes	Key Complementary Foods <sup>a</sup>		
	Mothers F and I (n=44)	Mothers F Family child-care (n=22)	Mothers I Daycare (n=22)
<b>Child Well-being</b>			
Heavy foods	<b>Pork, fish,</b> beef, boxed cereal, soda, and potato chips	<b>Pasta</b> (solids), Danonino®, mango, and guava	Egg
It causes digestive problems such as stomachache ( <i>empacho</i> ), flatulence, distention ( <i>se esponjan</i> ), and/or cramps	<b>Brown beans, lentils, Danonino®, guava strawberry, and mango</b>	Chicken liver, egg, rice, beef, and tortilla	
It causes constipation	Guava	Tortilla	
It causes diarrhea and/or vomit	<b>Mango, cream</b> and tangerine		
It might cause allergies	<b>Egg and fish</b>	Gerber® (meat), and other animal products	
It contains cancer	Red meat		
It causes choke because of its texture	<b>Boxed cereal, potato chips, tangerine,</b> rice, mango and oatmeal	Brown beans and lentils grain, pork, and tortilla	<b>Guava</b>
<b>Child Nutrition</b>			
It has low nutritious value, not beneficial for children	Boxed cereal, Danonino®, soda and potato chips	Guava	<b>Pork sausage,</b> cream, and Gerber® (meat)
It is junk food ( <i>chatarra, gusqueria, chucheria, fritanga</i> )	Soda and potato chips		<b>Beef</b>
It is just a treat ( <i>golosina</i> )		No comments	Danonino®
Contains a lot of cholesterol and/or fat	<b>Egg,</b> chicken skin, cream, and red meat	Fish, and chicken liver	Pork
Makes the child overly fat	<b>Rice</b>	Soda and potato chips	Infant cereal and Danonino®
Contains bad carbohydrates / bad flour	Bread and rice	Soda and potato chips	<b>Pasta,</b> oatmeal

Continuation of Table 7

Negative Attributes	Key Complementary Foods <sup>a</sup>		
	Mothers F and I (n=44)	Mothers F Family child-care (n=22)	Mothers I Daycare (n=22)
It contains a lot of sugar	Soda	Boxed cereal, bread	No comments
I do not know if it is good or bad for infants	<b>Egg, lentils, Gerber®, and boxed cereal</b>	Chicken liver, Danonino®, fish, mango and guava	Chicken broth, cream, pasta, and infant cereal
<b>Food Preparation and Consumption</b>			
I barely used it at home / the day-care center	Pork, fish, and lentils, soda and potato chips	Chicken liver and oatmeal	Gerber®, and lentils
I have not offered it to my baby yet	<b>Chicken liver, boxed cereal, Gerber® (meat), lentils, mango, tangerine, cream, and fish</b>	<b>Oatmeal, Danonino®, guava, and yogurt</b>	<b>Infant cereal, pork, and potato chips</b>
It must be given infrequently / low quantity	<b>Pork, egg, Danonino®, cheese, soda, beef, and potato chips</b>	<b>Cream, mango, tortilla, and pasta combined with other “flours”</b>	
Children might get used to no natural food		Infant cereal	
<b>Food Quality</b>			
It is hard, tick, dry or rough	Boxed cereal, beef	Oatmeal	<b>Pork, guava</b>
I dislike its flavor so I do not give it to my child	Pork and Gerber® (meat)		
My child dislike its flavor	<b>Guava, chicken liver, infant cereal, fish, lentils, oatmeal, and</b>	Boxed cereal, Danonino®, cream, brown beans, cheese, and yogurt	<b>Gerber®, brown beans, and lentils</b>
It just calm down child’s appetite for a while		Potato chips	
It is a cold-type of food	Tangerine, beef	Cream	Pork
It is a hot-type of food			Mango
It contains chemicals not good for babies	<b>Gerber®, tuna fish, soda, potato chips, and infant cereal</b>		Pork sausage, Danonino®, yogurt, and boxed cereal
It is a canned, packaged, synthetic, artificial, or processed food	<b>Gerber®</b>	<b>Pork sausage</b>	Potato chips, yogurt, and cheese

Continuation of Table 7

Negative Attributes	Key Complementary Foods <sup>a</sup>		
	Mothers F and I (n=44)	Mothers F Family child-care (n=22)	Mothers I Daycare (n=22)
It has been on storage for a long time and might be expired, so I do not trust it.	Gerber®	Danonino®	
It is dirty food	<b>Pork and chicken liver</b>		
It can be contaminated or spoiled	Fish	Chicken	

<sup>a</sup> Foods in bold were frequently mentioned

Regarding mineral sources, respondents in both groups characterized legumes, Danonino®, and vegetables as sources of iron. Both chicken liver and infant cereals were also recognized as iron-rich foods. Mothers acknowledged the importance of iron in preventing anemia, but paradoxically, bean broth, unlike meat, was considered an iron food source. Moreover, three mothers described meat as low nutritious. Some mothers extrapolated the mineral content of certain foods such as milk to its derivatives. For example, they stated that cream contains the same nutrients than milk, as in the following example:

*“Cream contains milk, so it is calcium; this is one of the foods that children must eat frequently”*

Concerning the main nutrients, mothers made a distinction between “good and bad” sources of flour (starchy carbohydrates), protein, and fat. For

example, some mothers considered rice as “bad flour” because it makes the child overly fat. Consistent with the above results, some mothers described red meats as “bad proteins” for young children because of their content of fat, cholesterol, and hard texture. Similarly, a few mothers did not consider egg yolk appropriate for young children because of its content of cholesterol. Nevertheless, some mothers preferred egg yolk to white because the latter is considered allergenic for young infants.

Fiber content was associated with a good digestion and “the strength of child’s intestine”. Mothers often pointed out cereals and their derivatives as fiber sources. A few mothers included cheese and meats in this category. Furthermore, a few mothers indicated that meat fiber is similar to vegetable fiber so both fibers are equally beneficial for children.

**Food Preparation and Consumption Routines.** Mothers provided a comprehensive description of the ways caregivers prepared the key foods for infants. Boiling was the preferred preparation technique during the first year of age. Some easy-to-crush fruits such as apple and banana were also offered raw. Seasonal foods and *atoles* (i.e., starchy food beverages prepared with cereals), were highly valued, as well as chicken, legume, and pasta broths. Mothers pointed out that they usually combine broths with rice, tortilla, vegetables, or chicken liver, indicating that broths might be a “vehicle” for nutritious foods.

Lack of a lactation room was observed in all the study businesses. Mothers who continued breastfeeding after maternal leave reported

expressing in low-hygiene facilities such as the business bathroom, and then keeping their milk at the dining room fridge. In other cases, they either discard their milk or wait until coming home to breast-feed their child, experiencing a number of personal inconveniences at work.

Mothers pointed out that grandmothers usually prepare main meals for children given that they are the primary alternate caregivers. A few mothers explained that grandmothers occasionally offer foods and preparations they had not planned to give to their children at a certain age or time of the day, as this mother explains:

*“At the beginning I did not want to give tortilla to my child because I was afraid of choking. However, one day after coming from work I saw my mom giving it to Juanito... and I kept my mouth shut.”*

Similarly, a few mothers using institutional child-care mentioned their children were offered some of the key foods that they do not prepare at home. This was generally perceived as an opportunity for their children to try new foods and preparations. A few mothers indicated that they do not know how to prepare some key foods such as lentils and fish, so they do not offer these at home. They acknowledge, however, that their children might consume these foods either in their mother-in-law's home or in the day-care center.

Mothers stated attributes describing the role of foods either in different mealtimes such as breakfast and dinner or in a main meal, such as complements and snacks. Dinner foods defined as “very filling” were particularly appreciated when causing the child to sleep for a longer period of time. These foods included cereals and banana. Brown beans were not

considered as dinner foods because they “cause abdominal blow-up and flatulence at night”. Guava and processed foods were considered snacks, described as convenience foods to eat outside home or when home cooked meals are not ready.

**Food Quality.** Foods appreciated for their sensory characteristics were creamy, low viscosity, soft, and easy to chew foods, which are considered particularly suitable for children lacking teeth. In contrast, hard, thick, dry, and rough foods were disapproved because of mothers’ concern of choking. Participants also had strong concerns about foods containing strings, seeds, or bones such as mango, guava, and fish, not only because of the choking hazard but also because they might “stick to the baby stomach”.

Food taste was pointed out as a relevant factor in mothers’ child feeding choices. On one hand, some mothers recognized not buying foods they personally dislike by assuming their child would dislike these foods as well. On the other hand, they stopped offering nutritious foods when their child rejects its flavor. For example, some mothers described that their children refuse to eat chicken liver because of its bitter flavor, so they are not offering it regardless that they viewed it as nutritious and overall good food for children. A number of mothers reported that they stopped offering chicken liver to their grow-up child, because over time the child rejected this food.

The notion of “cold hot foods” came out in both groups of mothers. Participants stated that especially cold-type foods such as tangerine might be strong for young children, and there is a risk that milk gets spoiled if

consuming together. A mother mentioned that she soaks cold-type fruits in water before consumption to reduce that risk.

Processed foods were less suitable for very young babies than “natural foods”, despite that the former were viewed as easy to prepare and practical for busy caregivers. Furthermore, a few mothers affirmed that only natural foods are suitable for the first year of age, so they did not buy any packaged food for their infants. Reasons for rejecting processed foods relate mainly with their “chemicals” content but also with their sugar content and freshness. Mothers believe that chemicals, particularly preservatives and artificial colors, are harmful for young babies, as a participant stated:

*“I would rather feed my child with natural foods; packaged foods are for lazy mothers. These foods [processed food] contain a lot of preservatives and just look at me! I am overweight because of the preservatives... Preservatives might also harm my baby’s stomach”*

A few mothers described yogurt and cheese as foods with significant content of preservatives. Mothers also complained about the excessive sugar content of certain processed foods such as boxed cereal and soda. Additionally, some mothers were suspicious about the freshness and overall quality of processed products, as in the following testimony:

*“Because it [a processed food] has been on storage for many days, it might be spoiled. I just do not trust it, no matter what the expiration date says”*

Safety concerns were also expressed about ASF. Some mothers believed that pork is fed with excrement, fish might be sold spoiled, and chicken liver

contains “the bad emotions of the animal”, so these foods are not suitable for infants.

**Stages of Introduction of Foods.** As previously observed in the MDS maps, the notion of introducing complementary foods by stages emerged from the food attributes exercise. Mothers in both groups (relying on either institutional care or family care) recognized at least four different stages of food introduction over the first year of age.

The first stage, from 2 to 4 months of age, refers to the initiation of complementary feeding by trying some fruit and vegetable with a soft consistency and lack of strings and seeds. Both groups of mothers, but mainly mothers relying on institutional child-care, brought up the issue of “preparing their children” during the second month of age by introducing formula as well as some solid foods, so the children will be “ready” when they come back to work. The duration of paid maternity leave in Mexico is 42 days before and 42 after birth. Even mothers that considered it appropriate to initiate complementary feeding at later stages recognized that they had introduced complementary foods earlier to facilitate child-care for alternate caregivers when the mothers were at work, as in the following statement:

*“My baby didn’t really have to get used to my milk because I had planned to go back to work. So before she was born I had already bought formula to have it on hand at home, that way she got used to her bottle...we also began to feed her porridges so I had no problems and she didn’t suffer on my absence”*

The second stage, from 5 to 6 months, according to the mothers, is a period when the baby is training “the stomach” to receive solids, but still is at

high risk of allergies, stomachache, and choke. Foods introduced in this stage are legumes broth and some cereals.

The third stage, from 7 to 10 months, is a period that coincides with teeth eruption. This time is associated not only with child's capacity to chew foods with hard, dry, or sticky texture, but also with a developmental stage of the stomach and intestines that allows the child to tolerate "heavy foods" better. This is a landmark period in complementary feeding, because of the increase of mothers' confidence about tolerability of foods such as cereals, legume (solids), and certain meats such as chicken.

The fourth stage, from 11 months and over, is a period when children are offered a diverse diet and are included in family meals. Red meat, fish, and whole egg are offered at this age. Finger foods such as rolled tortilla (*taco*), banana, and other fruits are considered practical in this period because children can eat these foods by themselves while the "busy" caregiver is doing home chores or taking care of other children. Mothers generally pointed out they would not recommend soda and potato chips for children at any age, although some of them acknowledged giving it to their preschool child once he/she was demanding them.

### 3.5 DISCUSSION

This study documented belief systems framing food choices about the characteristics and perceived effects of complementary foods in Mexican urban working mothers with young children. Primary food classifications were

food groups, stages of food introduction, and food processing. Secondary food classification systems that mothers invoked when describing how they select, prepare, and offer foods to their infants included healthy-junk, heavy-light, hot-cold, good-bad fat, main dish-complement classes.

A confirmatory but still disturbing finding refers to mothers' belief system supporting of early introduction of complementary foods with displacement of breastfeeding in preparation for resuming work. Evidence of this belief system expressed as a feeding practice has been consistently documented in dietary studies conducted in Latin America, including urban Mexico (Leslie, 1988; Navarro-Estrella, Duque-López, and Trejo y Pérez, 2003; González-Cossío et al., 2003, Hight-Laukaran et al., 1996). We identified two relevant factors associated with mother`s belief system related with early introduction of foods. First, mothers declared they experienced pressure to facilitate the adaptation to the transition period after maternal leave for both the child and the alternate caregiver. Second, they stated that businesses lacked appropriate work-site facilities for expressing breast-milk. It is evident that interventions at the work-site level promoting exclusive breast-feeding must be expanded to enhance an opportune timing of introduction of complementary foods in mothers working outside home.

Concerns about opportune introduction of ASF and vegetables such as legumes, vitamin A and C-rich fruits were less evident in mothers relying on institutional care. Day-caregivers might be positively influencing perceptions because of nutrition education (e.g., a communication campaign promoting

vegetable consumption was taking place at the day-care centers at the time of the study), but mothers also might develop confidence when their children experienced no negative effects by consuming these foods in the day-care center. The study results are consistent with dietary studies in Mexican urban populations (Huerta and Martínez, 2004; Allen, 2003) that show that introduction of legume-solids is delayed in infants related to beliefs linking legume consumption and fear causing digestive problems previously reported (Dutta et al., 2006).

The first primary classification system referred to food groups. This system was overall consistent with international and domestic classifications that include classes of vegetable, fruit, milk derivatives, and meats (Painter, Rah, and Lee, 2002; Kaufer-Horwitz et al., 2005; Dixon, Cronin, and Krebs-Smith, 2001). In contrast, a fat and sugar class present in several international classifications was not elicited in this study. Mothers possibly ignored this class influenced by the Mexican Food Guideline (Secretaría de Salud, 2006). s that lack of a fat and sugar class or by considering this class unsuitable for infants, but also the number of fat and sugar items we evaluated might have been insufficient for them to create a class.

The second primary classification system based on stages of food introduction emerged as promising for designing and marketing infant products in nutrition programs. This food classification system may help caregivers and nutrition educators to easily conceptualize special needs for specific “stages” or developmental periods of young children.

The third primary food classification system identified in this study was food processing. While mothers preferred “natural” or home foods for their very young children, distrust issues about expiration date, nutrient value and safety of processed products were evident. Addressing these concerns is clearly of importance for marketing of processed products used in social programs (Griffits, 2000). Dairy products were overall well accepted. Mothers generally grouped together all processed foods except dairy products perhaps by assuming that they share the nutrition value of milk, as some mothers stated. Among them, Danonino® was the preferred product for its vitamin content, flavor, convenience, and creamy texture, as previously reported (Martínez et al., 1999). Positive perceptions of milk-based products can be advantageous for marketing fortified processed foods used in child nutrition programs, such as those distributed in Mexico and Chile (Rosado et al., 1999, Mardones-Santander et al., 1988).

Secondary but relevant food classification systems were healthy-junk, heavy-light, hot-cold, good-bad fat, main dish-complement, among others. Similar findings have been reported in studies conducted in Latin American countries (Gittelsohn and Vastine, 2003; Kuhnlein and Pelto, 1997; Behrens, 1986), indicating their relevance for understanding mothers’ food choices in local social contexts. Moreover, our study supports previous evidence indicating that culturally sensitive complementary food approaches have to build up on both primary and secondary classification systems to assure sustainability.

Food-price attributes of ASF were barely invoked in this study. Economic factors appear to be weaker barriers for the opportune introduction of beef, fish, and whole egg than negative perceptions and misconceptions about these foods. This view is consistent with dietary studies conducted in central Mexico documenting low consumption of ASF in preschool children (Huerta and Martínez, 2004; Rivera and Sepulveda, 2003). Chicken was the preferred meat for children because of its nutrient value, flavor, and texture. Some mothers, however, were worried about the use of hormones in chicken production. Related safety concerns were reported in two studies conducted in Mexico and other Latin American Countries (Creed-Kanashiro, 2003). Food preparation data suggest that rejection of this food might be conditioned by its preparation technique. Acceptance of sensory characteristics of ASF, particularly chicken liver, must be tested in food-based programs oriented to increase the consumption of iron and zinc. Successful examples are reported in community-based studies conducting recipe trials (Dutta et al., 2006; Creed-Kanashiro, 2003; PAHO, 2004; Villanueva, 2001; Creed-Kanashiro, 1991).

When evaluating the findings of this study, methodological limitations should be considered. This study provides limited information about dark-green leafy foods that have been used to increase vitamin A consumption in food-based programs (Creed-Kanashiro, 2003; Jones, 2005). These foods were not selected given that were barely mentioned on the free-listing survey.

A different outcome might be obtained if the study would be conducted on the rainy season, when dark-green leafy would be more on top of the participants mind.

We assumed that the single pile-sort exercise captured the most salient food arrangement. Consecutive pile-sorts, however, might provide insight about alternative food arrangements as those that emerged in the food attributes exercise. We acknowledge discretion inherent to the method when selecting the MDS dimensions. Following an interpretative approach, the researchers supported MDS' findings by incorporating qualitative information about food grouping provided by the mothers.

This study informs about perceptions held by mothers about complementary feeding on the first year of age, a particularly dynamic period when several foods are introduced. This study, however, does not inform food perceptions related with later developmental stages. Further qualitative studies are necessary to have a better understanding of permanent and temporary proscriptions of complementary foods documented here.

The specific findings of this study cannot be generalized to the larger population, or working women having different demographic characteristics. These findings, though, provide insight to understand similar urban ethnocultural groups and may guide inquiry for further quantitative studies in the region. The findings reported here cannot be extrapolated to ill children, while different food classifications and contrasting food attributes might be obtained regarding this group.

Age groups used in this study for describing introduction of complementary foods were based in those elicited by a majority of mothers. These age groups are consistent with other classifications based on food introduction patterns (Huerta and Martínez, 2004) but are somewhat different than those groups used by Brown based on age-specific energy requirements (Ruel, Brown, and Caulfield, 2003; Brown, Dewey, and Allen, 1998). Our definition of key foods was broader than used previously (PAHO, 2004) by adding low-nutrient and energy-dense foods such as soda and potato chips possibly related with child overweight.

This study demonstrates that low-cost and feasible data-collection methods provide valuable qualitative information that can be used as formative research for developing behavior-change and other types of programs targeted to working mothers aimed at improving complementary feeding. Among the number of attributes identified here, nutrition content linked to health outcomes should continue being stressed by nutrition educators when promoting complementary foods. Similarly, emic terms might be used for designing culturally insightful nutrition messages targeted to working mothers. We expect that the information reported here will help to have a better understanding of previous quantitative studies on complementary feeding, and to promote mission-based research oriented to sustain and encourage exclusive breastfeeding and opportune introduction of nutritious complementary foods to improve health and adequate development of young children of working mothers.

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## CHAPTER 4

# KNOWLEDGE ABOUT FOOD CLASSIFICATION SYSTEMS AND VALUE ATTRIBUTES PROVIDES INSIGHT FOR UNDERSTANDING COMPLEMENTARY FOOD CHOICES IN MEXICAN ALTERNATE CAREGIVERS

### 4.1 ABSTRACT

Caregivers' complementary food choices are important determinants of infant feeding practices. Food choices may be influenced by belief systems, including caregivers' food classification and value attributes. This study aimed to determine classification systems, value attributes, and perceptions about the time of introduction of home and processed complementary foods in both family and institutional alternate caregivers in Central Mexico. A convenience sample was integrated with 42 alternate caregivers supporting mothers having children less than two-years of age working in manufacturing businesses of the Cuernavaca City industrial zone, Mexico. Free-listings, pile-sort and food attributes exercises were conducted. Thirty-one key complementary foods were selected from a domain of 112 foods given to children less than one year of age in the region. Hierarchical clustering revealed that caregivers classified key foods into ten classes. Day-caregivers highly agreed (similarity between 0.83 to 0.95) on average, in their selection of vegetables, fruit, milk derivatives, and healthy meats. Grandmothers demonstrated medium level of agreement

(similarity between 0.60 to 0.69) in their selection of vegetable and fruit classes. Salient MDS' dimensions for day-caregivers were food groups and healthiness; for grandmothers were food groups, food processing (referred as packaged and non packaged foods), and meal relevance (snack-breakfast-main meal). Foods with high proportion of positive attributes and few negative attributes were apple, banana, carrots, squash, chayote, brown bean broth (no solids), pasta, and chicken flesh. Foods described mainly by negative attributes were pork, potato chips, and soda, among other processed products. Results indicate that nutrition content linked to health outcomes should continue being stressed by nutrition educators when promoting nutritious complementary foods in alternate caregivers. Information reported here will help to have a better understanding of previous quantitative studies on alternate care in Hispanic populations, and to conduct mission-based research oriented to promote opportune introduction of complementary foods in young children.

#### 4.2 INTRODUCTION

The pattern of women's work and of the family structure has substantially changed during the past decades in Latin American countries, including Mexico. More women are working away from home and are the primary economic providers and social support for their family (Léautier, 2006; Brachet-Marquez and De Oliveira, 2002). Consequently, working mothers face constraints on their time and on other available resources for making food

choices and caring for their young children (Anderson-Kulman and Palud, 1986).

Alternate care, provided either by the family or institutions, is a basic need for working mothers. The characteristics of alternate care services and caregivers have been shown to be important for satisfactory child growth and development (Waldfogel, 2002, Engle et al., 1999). Day-caregivers have a potential role as family change agents by introducing into the family system substantial changes in beliefs, values, and food choices relevant for child survival (Engle et al., 1999). Young children are particularly vulnerable to nutritional impairment resulting from high rates of infectious diseases coupled with caregivers' inappropriate complementary food choices and child-rearing practices leading to undernutrition, overweight, and obesity (Brown et al., 1989; Nicklas et al., 2001).

Knowledge about food classification systems and value attributes provides insight for understanding alternate caregivers' young child food choices. This is of particular importance during the first two years of age, when numerous transitions and turning points associated with child development and growth take place. Understanding alternate caregivers' food classification is relevant in urban settings with a wide array of natural and processed foods available as shown in studies in the marketing and nutrition fields (Gutman 1982, Furst et al., 2000, Winter-Falk et al., 2001). Food classification involves a cognitive process with high levels of abstraction of relations between objects and concepts (Bovet, Vauclair, and Blaye 2002). The meaning ascribed to

foods is a relevant factor for developing food classifications. Bovet et al. (2002), proposed multi-level models involving physical and evaluative attributes of foods (i.e., time saving) as the bases for composing superordinate categories, while ways of satisfying people's particular needs such as product variants and brands are the bases for integrating lower category levels (2002). Relevant food classification conceptual models are the taxonomic categorization model (Wierzbicka, 1984); the multi-level model composed by culturally recognized, socially significant, and personally operational food categories (Furst et al., 2000); and folk categorizations (Kempton, 1981), among others. Complementary food classifications refer to food groups based in the nutrient content of foods (USDA, 2006), the developmental stages of food introduction (Gerber, 2006), and classifications based in food color, shape, and texture (Michel and Contento, 1984).

The choice of attributes or properties to be focused on for classifying foods is influenced by people's values and contextual situations, so what is meaningful is a personal decision to make (Gutman, 1982). In a study conducted in Mexico and other Latin-American countries, it was found that mothers associate key complementary foods with perceived effects on the child health, availability, and accessibility, among other value attributes (Dutta et al., 2006). However, little is known about Mexican alternate caregivers' perceptions of food classification and value attributes of complementary foods and how these perceptions differ from institutional and family child-care providers, influencing their capacity for offering adequate child-care. This

study aimed to expand our knowledge about the belief systems and patterns of introduction of home and processed complementary foods in two groups (grandmothers and day-caregivers) of urban alternate caregivers in Central Mexico. This study is part of a comprehensive study about multi-level determinants of maternal work and child-care conducted in Central Mexico.

#### 4.3 METHODS

The study was conducted in Central Mexico from 2005 to 2006. This qualitative investigation used an interpretivist approach for data collection methods, building upon the participant's real-life experiences and understandings regarding complementary feeding (Patton, 1990). This approach has been used to examine factors involved in food choice such as life course events, and value negotiations (Blake and Bisogni, 2003; Sobal et al, 2006) that are relevant for the selection and timing of introduction of complementary foods.

##### 4.3.1 Study Sample

A random sample of 14 manufacturing businesses from a total of 157 having at least 25% of working women was selected from the census of the Cuernavaca City industrial zone, Mexico. Businesses varied in size ranging from 115 to 920 employees. A screening survey was conducted in the businesses with 150 blue-collar working women having children less than two-years of age and using public transportation to get to and from work. A purposeful sample of 42 alternate caregivers was chosen as follows:

**Grandmothers.** A total of 22 grandmothers providing support to working mothers were chosen from a previous screening survey as reported in Chapter 3. All grandmothers agreed to participate but one did not complete the pile-sort exercise because of vision problems.

**Day-caregivers.** A total of 20 day-caregivers were chosen from 10 day-care centers providing services to the working women selected for the screening survey. Two day-care centers were public run by the IMSS and eight centers were private but supervised by the IMSS. Day-care centers varied in size from 120 to 435 preschool children; IMSS centers were the two largest. All caregivers selected agreed to participate.

Sample extensiveness was initially based on the ProPan guidelines (PAHO, 2004). Qualitative information gathered was considered to be sufficient when new participants generated no substantial additional insights and theoretical saturation was reached (Sobal, 2001; Glaser, 1967; Higginbottom, 2004). Researchers and interviewers scheduled weekly meetings to discuss data gathering and review repetitiveness in the data and considered that the category developed was dense.

#### 4.3.2 Data-Collection

Single pile-sort and food-attributes exercises were conducted with the two groups of alternate caregivers. A team of experienced interviewers composed by two social workers and one nurse participated in data collection. A one-week training course was conducted with the interviewers who were already familiar with the study population. Information was acquired in

Spanish, recorded verbatim, and transcribed. Selected alternate caregivers' quotations were translated by the main researcher into English, and then reviewed by a local bilingual assistant. Research progress and potential incidents were monitored periodically by the main researcher. Sessions with day-caregivers were conducted in the daycare centers either before the shift or during the mid-day recess. Sessions with grandmothers were performed at the grandmothers' home at a schedule of their convenience. Participants took part voluntarily and provided written informed consent. The Cornell University Committee on Human Subjects and the Ethics Committee of the National Institute of Social Security at Cuernavaca City approved the research protocol.

**Free-listing Survey.** To identify the cultural domain of foods given to children less than one year of age, a free-listing survey was conducted with key informants (Weller and Rommney, 1988) at an IMSS regional hospital in Cuernavaca City. Key informants were 15 working mothers, five day-caregivers, and five pediatric nurses. They were asked to list all foods that are usually given to children less than one year of age in the region. Key complementary foods were selected by including the most frequently mentioned foods, child processed foods that were less mentioned but relevant in infant feeding, and foods sources of iron, zinc, fat, and simple carbohydrates. The study was conducted in the winter season when certain seasonal fruits such as mango, tangerine, and guava were available. Color cards with the image and name of each of the key foods were developed and tested for reliability of recognition in a group of alternate caregivers.

**Food-Attributes Exercise.** To identify factors involved in the key-food choice process, a food-attributes exercise was conducted with the two groups of alternate caregivers. Duration of the food attributes exercise ranged from 18 to 35 minutes in day-caregivers, and from 25 to 42 minutes in grandmothers. Informants were encouraged to openly speak about the role of the key foods in complementary feeding, while showing them one food card at a time. When the alternate caregiver asked for clues, interviewers suggested predefined discussion topics such as perceptions of positive and negative food attributes, age of introduction of the key foods, food preparation, and sources of information about the role of the key foods in complementary feeding. When necessary, interviewers clarified the value attribute connotation. For example, the term “strong” could imply both a negative and positive connotation depending of the caregivers’ discourse context.

**Pile-Sort Exercise.** To identify culturally defined food classes, a single pile-sort exercise was conducted with the day-caregivers and grandmothers at the daycare and home, respectively (Appendix F). Duration of the pile-sort exercise ranged from 12 to 22 minutes in day-caregivers, and from 18 to 25 minutes in grandmothers. Informants were asked to sort the cards representing the key foods into piles according to how similar they were (Miles and Huberman, 1994). Cards were designed with a colored drawing and the name of each of the key foods. In addition, the interviewer mentioned the name of the food during the pile-sort exercise to facilitate food recognition. Informants were allowed to form as many groups as they wanted with at least

two cards but one item can be placed in only one pile (Bogartti, 1996). A description of the alternate caregivers' food classification criteria and the name of the created food classes were tape-recorded verbatim and also the interviewer took back-up notes.

#### 4.3.3 Data Analysis

Data from the screening and free-listing surveys were summarized by using conventional descriptive statistical methods, including frequencies, means, and standard deviations. For the pile sorting, two basic approaches to analyzing proximities (Bogartti, 1996) were used to identify complementary food classes: Johnson's hierarchical clustering and non-metric multidimensional scaling [MDS], (Cox and Cox, 2000; Green and Rao, 1972; Punj and Stewart, 1983). Hierarchical clustering attempts to find groups that are nested within each other. The agglomerative algorithm developed by Johnson (1967) used in the hierarchical clustering allows the identification of food groups while it starts with joining many small clusters (i.e., pair of similar foods) and gradually merges into fewer, bigger clusters (i.e., food groups). The purpose of MDS is to provide a visual representation of the pattern of similarities among a set of items such as foods (Cox and Cox, 2000). MDS plots items perceived to be very similar to each other, in doing so it finds a set of vectors in p-dimensional space ordering the items in the map along a continuum according to the informant's perceived similarity. Qualitative information provided insight to interpret the dimensions of the MDS maps. The pile-sort survey analysis was run using the Anthropac® software version 4.

Regarding food attributes, alternate caregivers' perceptions on the key foods were compiled per food from the food-attributes exercise and coded using thematic conceptual matrices (Miles and Huberman, 1994; PAHO, 2004). A coding catalog was first developed from a sample of the transcripts, and then expanded as new concepts emerged from the analysis. Interviewers and project researchers participated in the coding development and verification of the transcripts. During the course of the study, data were examined to a constant comparative process (Glaser and Strauss, 1967; Miles and Huberman, 1994).

To compare and contrast the information of the two groups of alternate caregivers, a clustered conceptual matrix was further developed (Miles and Huberman, 1994). The rows of this matrix were the key foods' positive and negative attributes that were grouped in six domains as follows: physical well-being, child nutrition, food preparation and consumption routines, food quality, food purchase, and age of food introduction. The columns represented the frequency of mention of the attributes by each of the key foods, reported by each of the two groups of alternate caregivers.

## 4.4 RESULTS

### 4.4.1 Characteristics of Study Participants

The socio-demographic characteristics of grandmothers of children less than two-years of age and the day-caregivers are following described. Grandmothers age ranged from 42 to 63 years, 68% have elementary school

and 14% did not have formal education, 54% did not have individual earnings and depended from their family income, 73% were maternal side-grandmothers, and 82% lived with their siblings either in their own house or their siblings' house. Day-caregivers age ranged from 22 to 57 years, all were female and had a technical or bachelor degree and at least 4 years of professional experience, their monthly income ranged from \$3,750.00 to \$6,000 Mexican pesos, 60% worked at private centers and 40% worked at IMSS centers.

#### 4.4.2 Key Foods

Informants mentioned a total of 112 foods given to children less than one year of age in the region at least one time. From this domain the 31 key foods list was composed by the most frequently mentioned foods (n=21) that were: carrot, squash, chayote, brown bean broth, chicken, apple, banana, pasta, fish, lentils, tortilla, egg, bread, guava, yogurt, broccoli, mango, tangerine, oatmeal, rice, and cheese. Other processed foods included in the key foods list that were less mentioned but relevant in infant feeding (n=5) were: Danonino® (petit Suisse cheese), Gerber® (meat flavor), cream, infant cereal, and boxed cereal. Finally, foods potentially rich sources of iron, zinc, fat, and simple carbohydrates (n=5) such as beef, chicken liver, pork, soda, and potato chips were added to complement the above list.

#### 4.4.3 Food Classification

Hierarchical clustering revealed that caregivers classified key foods into ten classes (Table 8). Day-caregivers highly agreed (similarity between

0.83 to 0.95) on average, in their selection of vegetables, fruit, milk derivatives, and healthy meats. At least half of them agreed, on average, on the foods selected to compose the complements, soups/grain/seeds, junk/no basic, high

Table 8

Classification by hierarchical clustering of complementary foods by two groups of Mexican alternate caregivers

Food Classes	Complementary Foods	Day-caregivers (n=20)		Grandmothers (n=21)	
		Similarity*	Food Classes	Complementary Foods	Similarity*
Vegetable	Broccoli, carrot, chayote, and squash	0.95	Vegetable for chicken broth	Broccoli, carrot, chayote, and squash	0.69
Fruit	Apple, banana, guava, mango, and tangerine	0.87	Fruit	Apple, banana, guava, mango, and tangerine	0.60
Milk derivatives	Cheese, cream	0.85	Milk derivatives	Cheese, cream	0.32
Complements	Bread and tortilla	0.70	Combine together	Brown beans broth, lentils, tortilla	0.32
Junk, no basic	Soda, potato chips and Gerber® (meat)	0.60	Eat a small portion	Soda, potato chips and yogurt	0.26
Soups, grains, seeds	Brown beans broth, lentils, pasta, and rice	0.69	Caloric, farinas	Pasta, rice, and bread	0.29
Breakfast products	Boxed cereal, Danonino®, yogurt®	0.43	Good to go	Danonino®, Gerber® (meat)	0.36
Pap cereals	Oatmeal, infant cereal	0.55	To eat with milk	Oatmeal, infant cereal, boxed cereal	0.30
High cholesterol	Beef, pork, egg, and chicken liver	0.59	Expensive red meats	Beef, pork	0.36
Healthy meats	Fish, chicken	0.83	White meats	Fish, chicken, egg, chicken liver	0.38

\* The purpose of a measure of similarity is to compare two lists of numbers (i.e. vectors) and compute a single number which evaluates to what extent two variable co-vary (Bogartti, 1996). Higher values represent a higher degree of agreement within each group of caregivers about the foods included in each class.

cholesterol, and pap cereals. Grandmothers demonstrated medium level of agreement (similarity between 0.60 to 0.69) in their selection of vegetable and fruit. Low level of agreement (similarity between 0.26 to 0.36) was observed in this group, however, in their selection of the classes described as “eat a small portion, caloric farinas, foods to eat with milk, foods that combine together, milk derivatives, foods good to go, and read meats”.

When plotting caregivers’ food-grouping similarities in multidimensional scaling (Figures 3 and 4), the corresponding plot using two dimensions showed satisfactory stress (0.06) for day-caregivers reflecting a reasonable fit. Stress for grandmothers in a bidimensional model was 0.21, while a reduction of the stress to 0.09 was observed by using a three-dimensional model, reflecting a better fit. This indicates that grandmothers used at least three different dimensions or criteria when classifying the key foods, while day-caregivers used at least two dimensions. Food classes were a dimension that emerged in both groups. This dimension is represented by the food clusters in the MDS maps. Overall, this classification was consistent with the one obtained by hierarchical clustering. The second dimension in day-caregivers represents a continuum of unhealthy and healthy foods indicated by the southwest- northeast axis in Figure 3. The second dimension in grandmothers referred to packaged and non-packaged foods, following a northeast to southwest axis in Figure 4, and the third dimension referred to classification of foods according to their importance in a meal as snacks, breakfast foods, and main meal courses (southwest- northeast dotted axis in Figure 4).

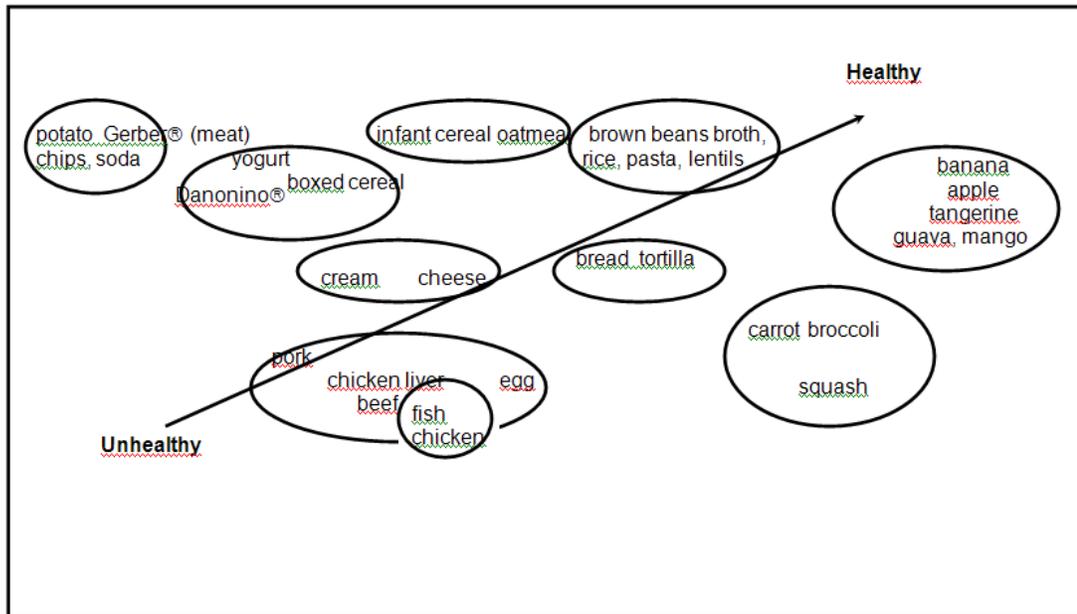


Figure 3. Multidimensional scaling map of complementary food classification by Mexican day-caregivers (n=20).

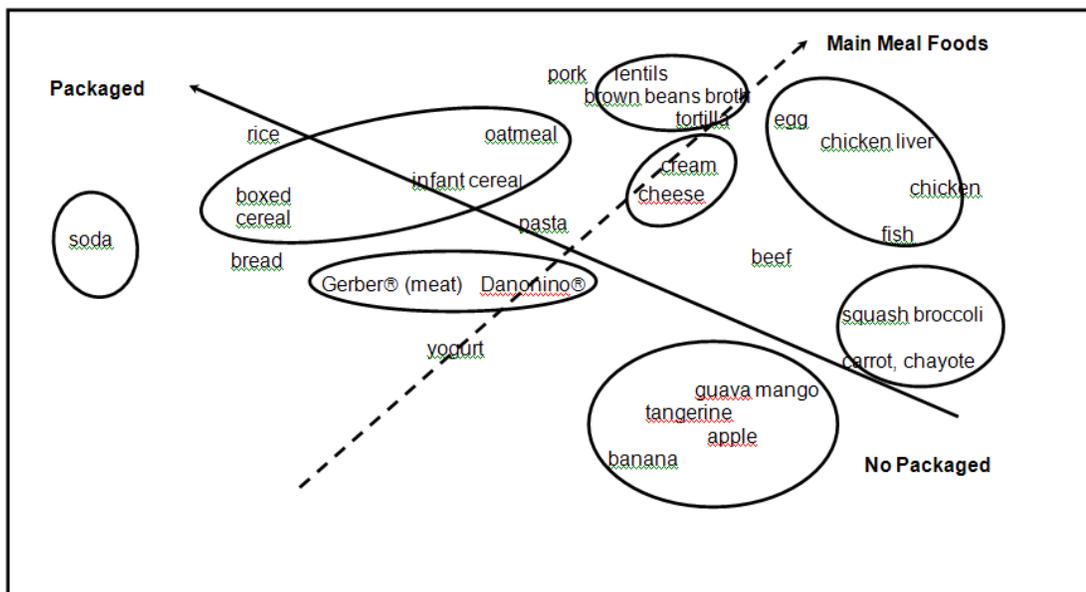


Figure 4. Multidimensional scaling map of complementary food classification by Mexican grandmothers (n=21).

#### 4.4.4 Food Attributes

Both groups of caregivers recognized at least 83 positive and 68 negative attributes of key complementary foods (Tables 9 and 10). Overall, foods with high proportion of positive attributes and few negative attributes were apple, banana, carrots, squash, chayote, brown bean broth (no solids), pasta, and chicken flesh. In contrast, pork, potato chips, and soda, among other processed products were described by negative attributes.

**Physical Well-being.** Attributes related to child well-being focused on three main topics: growth/development, child digestion, and child health/illness. Both groups described chicken, chicken liver and brown bean broth as promoters of proper growth. Some participants viewed the latter as basic in the young children's diet but others viewed legume solids as harmful for babies while their skin might "stick in the baby's stomach". Both groups pointed out vegetables, fruits, cereals, and fish, as healthy foods. Chicken parts were considered easy to digest and helpful to "strengthen bones". Fish was also considered by both groups a hard to digest "heavy food" but nutritious. Other heavy foods mentioned only by day-caregivers were cream, lentils, Gerber®, and yogurt. Both groups associated children allergic events with consumption of Danonino® and citric. Day-caregivers also described fish and chicken liver as allergenic, and egg as having *Salmonellas*. In contrast, pasta was viewed as beneficial and good for sick or low weight children,

Table 9

Positive attributes of key complementary foods recognized by two groups of Mexican alternate caregivers

Positive Attributes	Key Complementary Foods*		
	Day-caregivers and grandmothers (n=42)	Day-caregivers (n=20)	Grandmothers (n=22)
<b>Child Well-being</b> To grow-up/ develop well	<b>Danonino<sup>b</sup></b> , chicken, chicken liver, brown beans broth	Vegetables, infant cereal oatmeal, rice pasta, cream, egg, Gerber®, cheese	Fish, mango
Healthy, good, basic, must be given often	<b>Fruits, vegetables, fish, Danonino®, oatmeal, lentils, tortilla, brown beans broth, pasta<sup>b</sup> and bread</b>	Yogurt	Cheese
Harmfulness	<b>Fruits, vegetables, Gerber<sup>b</sup>, infant cereal<sup>c</sup></b> , fish, chicken liver	Cream, pasta	Chicken, Danonino®
Strong food for kids [positive connotation]			Bread, rice, yogurt
Good for low weight children, makes their skin [skin fold] tight	Oatmeal	Lentils, infant cereal, rice, chicken liver	Pasta
Strength bones			Brown beans broth
Prevents constipation, strength the stomach	<b>Oatmeal<sup>b</sup></b> , boxed cereal Guava	Infant cereal, bread	Yogurt
Easy to digest	Chicken	Chicken liver, Gerber®	Danonino®
Wash-out the intestines because of it slippery consistency			Mango
For the brain, neurological system			Chicken liver, Gerber®, infant cereal
Good for the immunologic system Good for the teeth/ teeth itching	Tortilla	Brown beans broth	

Continuation of Table 9

Positive Attributes	Key Complementary Foods*		
	Day-caregivers and grandmothers (n=42)	Day-caregivers (n=20)	Grandmothers (n=22)
Protects from colds in winter time	<b>Tangerine</b>		
Good for sick children		Pasta	Danonino®
<b>Child Nutrition</b>			
Nutritious, complete, substantial, with [nutritional] properties ( <i>comida de mucho sustento</i> )	<b>Fish, egg, vegetables, lentils, Danonino®<sup>c</sup>, chicken<sup>b</sup> oatmeal<sup>b</sup>, tortilla<sup>b</sup>, cream<sup>b</sup>, chicken liver<sup>b</sup>, infant cereal, cheese, rice, black beans broth, tangerine</b>	Boxed cereal, pasta, yogurt	Bread
Contains vitamins			
a) General	<b>Vegetables, fish, chicken liver, infant cereal<sup>b</sup>, boxed cereal, oatmeal, egg, rice, pasta</b> Danonino®, chicken	<b>Gerber, brown beans broth</b> , bread, tortilla, cream, pork	Yogurt, cheese
b) Vitamin C	<b>Fruits</b>		
Contains minerals			
a) General		Vegetables	Tangerine
b) Iron	<b>Lentils<sup>b</sup>, brown beans broth<sup>b</sup></b>	<b>Chicken liver<sup>b</sup>, oatmeal</b>	Tortilla
c) Calcium	<b>Tortilla, cream<sup>b</sup>, Danonino®, lentils, yogurt, cheese</b>	Egg, chicken liver, brown beans broth, infant cereal	
d) Potassium			Fish
Carbohydrates/energetic properties		Vegetables, pasta, chicken liver, pork	Bread
Contains proteins	Fish	Oatmeal, infant cereal, pork, chicken, egg white, chicken liver, lentils, rice, guava	
Meat substitute		Black beans broth	
Good fat		Chicken	
Contains cholesterol but it is not harmful for babies		Egg	

Continuation of Table 9

Positive Attributes	Key Complementary Foods*		
	Day-caregivers and grandmothers (n=42)	Day-caregivers (n=20)	Grandmothers (n=22)
Dietetic, you do not get fat		Chicken, tortilla	
Fiber for better feces	Tortilla, mango	Some boxed cereal, lentils	Infant cereal
Milk derivative, good because milk contains calcium	<b>Danonino®, yogurt, cheese, cream<sup>b</sup></b>		
TV says that "it is as good as beef"	<b>Danonino®</b>		
TV recommended it	Vegetables		
Cereal, flour, grain, so it is good, beneficial	Oatmeal, bread, rice	Boxed cereal	Pasta
Similar nutrition content than other cereals/pasta/ tortilla	Bread	Rice	
More nutritious than bread		Tortilla	
More nutritious than junk food			Bread, yogurt, rice
Better than other yogurt		Danonino®	
<b>Food Consumption and Preparation</b>			
It is given often at the daycare center and/or home	<b>Fruit, chicken, egg, bread, tortilla, rice, pasta, brown beans broth, chicken liver<sup>e</sup>, lentils<sup>b</sup>, oatmeal</b>	<b>Infant cereal, vegetables</b>	Boxed cereal Danonino®, carrot, squash
Recommended by pediatricians		Vegetables, brown beans	Egg, fish
The substance is in the broth, give only the broth			Chicken liver, lentils
Good for children who dislike milk		Cream	
Complete meal combined with vegetables		Chicken liver, Gerber®, pasta	
Balanced vitamin-rich meal combined with chicken, beef or fish			Vegetables (soup)
Combined with fruits is nutritious			Yogurt (better homemade)

Continuation of Table 9

Positive Attributes	Key Complementary Foods*		
	Day-caregivers and grandmothers (n=42)	Day-caregivers (n=20)	Grandmothers (n=22)
Combines with lentils, brown beans, fried egg, chicken broth, vegetables and main courses	Rice		
Combine with milk ( <i>atole</i> )			Oatmeal
To accompany main courses/ meats			Soda, potato chips
Combines with rice, brown beans, and tortilla with cream	Cheese		
Combines with egg	Brown beans		
To supplement or combine with milk		Vegetables	Bread, rice
To supplement tortilla		Bread	
Brown beans substitute		<b>Lentils</b>	
Without sugar are better		Boxed cereal	
Good to try new flavors/ salty flavors/ new textures/diverse food	Tortilla	<b>Boxed cereal</b> , vegetables, cheese, pork brown beans	Lentils, potato chips, soda
Practical for busy working mothers [ <i>saca de apuros</i> ]	<b>Gerber®</b>	<b>Danonino®</b> , boxed cereal, infant cereal, brown beans broth	
Easy to get or prepare	Potato chips, soda	Oatmeal, yogurt	Pasta
Preparation versatility	<b>Rice</b>	Chicken	
Good for soups	<b>Vegetable, rice</b>		Chicken liver
The child feels empty [positive connotation]	<b>Oatmeal</b> , tortilla, pasta		Infant cereal
Breakfast food	Infant cereal	Boxed cereal, Danonino®	Fruits
Consumed in a main meal			Vegetables Bread, rice
Snack better than chips/dessert		Danonino®	Yogurt
Complement	<b>Bread</b> , tortilla, cheese	Infant cereal	Danonino®
You do not get bored if consuming it often			Bread

Continuation of Table 9

Positive Attributes	Key Complementary Foods*		
	Day-caregivers and grandmothers (n=42)	Day-caregivers (n=20)	Grandmothers (n=22)
Children like it soaked	<b>Tortilla</b>	Bread	
Recently prepared is delicious	Tortilla		
You would not enjoy a meal without it		Tortilla	
<b>Food Quality</b>			
Children like it, is tasty	<b>Danonino®, fruits (mango), fish, eggs, Gerber®, cream, pasta, tortilla, lentils<sup>b</sup>, oatmeal, chicken liver, potato chips, boxed cereal, soda, brown beans broth</b>	Pork, vegetables	Bread, rice
Soft and easy to chew	<b>Chicken, chicken liver<sup>b</sup>, Danonino®<sup>b</sup></b>	Soaked boxed cereal, fish, pasta	Gerber®
Attractive color		Boxed cereal	
Finger food, children can easily open it	<b>Tortilla</b>	Chicken, Danonino®	Potato chips, tangerine
Food of the Mexicans, present in all homes in spite of their category [socioeconomic status]		Tortilla, brown beans	
The best meat	<b>Chicken</b>		Fish
Red are fresh		Egg	
The yolk/ white is better	<b>Egg</b>		
Healthier than meat			Vegetables
It is prepared with hygiene / good quality because it is manufactured specially for babies	<b>Gerber®</b>		
It is natural so it is good / it is made with natural food	<b>Vegetables, fruits</b>	Non canned fish, Gerber®	Oatmeal, pasta
Chicken demand it	<b>Potato chips, soda</b>		Danonino®, boxed cereal
I like it so I give it to children		Chicken liver	
Good because of the yeast			Bread

Continuation of Table 9

Positive Attributes	Key Complementary Foods*		
	Day-caregivers and grandmothers (n=42)	Day-caregivers (n=20)	Grandmothers (n=22)
<b>Food Purchase</b>			
Affordable price	Chicken, fish, bread, tortilla, pasta	Chicken liver, Gerber®, cheese tangerine	Vegetables
<b>Timing of food introduction</b>			
Good for babies, for starting CF, the first food to offer	<b>Vegetables, soaked tortilla, brown beans broth, chicken liver<sup>b</sup></b>	<b>Pasta</b> , infant cereal	Oatmeal
Good for older children, when their stomach is hard enough or have teeth			Egg, cream, yogurt

\* Foods in bold were highly mentioned

Table 10

Negative attributes of key complementary foods recognized by two groups of Mexican alternate caregivers

Negative Attributes	Key Complementary Foods*		
	Day-caregivers and grandmothers (n=42)	Day-caregivers (n=20)	Grandmothers (n=22)
<b>Child Well-being</b>			
Dangerous, harmful for babies	Pork, potato chips, soda, brown beans	Gerber®	Guava
Not healthy, not recommendable for young infants	<b>Danonino®<sup>b</sup>, Boxed cereal<sup>b</sup></b> , infant cereal, yogurt, soda, potato chips, tortilla, brown beans	Bread, pasta, tangerine	Mango, guava
Heavy food	<b>Fish<sup>b</sup></b> , tortilla	Cream, lentils, Gerber®, yogurt	
Hard to digest, distention (empacho, <i>se esponja, le cae mal, lo vaya a acedar</i> )	<b>Egg<sup>b</sup></b> , fish, chicken liver, pork, guava	Tangerine (all citric)	<b>Brown beans (solids)</b> , tortilla
Causes nausea or vomit		Gerber®	Cream, Danonino®
Constipation		Infant cereal	
Sticks in the stomach/mouth	<b>Lentils, brown beans<sup>b</sup> (skin)</b> , tortilla		
It might cause allergies	<b>Tangerine</b> (citric), Danonino® (strawberry content)	Fish, chicken liver, guava	
Causes choke (texture, bones or seeds)	Fish <sup>c</sup> , tortilla, guava	Boxed cereal, lentils, bread, tangerine, pasta	Potato chips
Cysticercoids or salmonellas	Pork	Egg	
Do not eat it if having a cough			Mango
Causes kidney failure			Pork
<b>Nutrition</b>			
No substations, low nutritious	<b>Potato chips Soda</b>	<b>Boxed cereal</b> , bread, pasta	Pork, tortilla, brown beans
It is no basic, no good in excess	Bread Tortilla	Yogurt	
I do not know what nutrients contain or if it is good for infants	Danonino®, chicken liver, Gerber®, pasta	Infant cereal, tortilla	<b>Oatmeal</b> , boxed cereal, brown beans broth, mango

Continuation of Table 10

Negative Attributes	Key Complementary Foods*		
	Day-caregivers and grandmothers (n=42)	Day-caregivers (n=20)	Grandmothers (n=22)
Contains a lot of cholesterol	Chicken skin <sup>b</sup> , pork <sup>b</sup>	<b>Egg</b> , cream, fish, chicken liver	
Contains too much fiber, so it might be harmful			Lentils
Causes anemia and malnutrition		Soda, potato chips	
It is junk food ( <i>chatarra</i> ), no necessary	<b>Potato chips, soda, pork</b>	Danonino®	
Reduce child's appetite for nutritious meals		Potato chips, soda	
Does not replace a breakfast		Boxed cereal	
<b>Food Preparation and Consumption</b>			
I barely use it at the daycare or home	<b>Egg, pork, Gerber®, Danonino®, infant cereal</b> , fish, oatmeal, chicken liver <sup>b</sup> , lentils <sup>c</sup> , potato chips, soda	<b>Cream</b> , Danonino®, boxed cereal, brown beans broth	Yogurt
I have not tried it yet / uncommon	<b>Gerber®, infant cereal<sup>c</sup></b> , brown beans (solids), fish		<b>Oatmeal</b> , cream, boxed cereal, pasta, Danonino®
It must be given infrequently/ low quantity	Cream, egg, tortilla Danonino®, potato chips, soda	Infant cereal	<b>Pork</b> , fish, yogurt, pasta, boxed cereal, brown beans broth, lentils, tangerine
Only the broth is good	Lentils, pasta, brown beans broth		<b>Fish</b>
Are just for craving ( <i>aperitivo, antojito</i> ), it is no nutritious but you just want it	Potato chips, soda		
It is for lazy people		Danonino®, Gerber®	
Children might get used to sweets and soft food		Infant cereal, Danonino®	
Hard for cleaning and preparing		Fish, vegetables	
Children get bored ( <i>se enfadan</i> ) if giving these often			Vegetables

Continuation of Table 10

Negative Attributes	Key Complementary Foods*		
	Day-caregivers and grandmothers (n=42)	Day-caregivers (n=20)	Grandmothers (n=22)
Junk food but it is not harmful if combined with vegetables	Soda, potato chips		
My child asked for it when saw me eating it [negative connotation]	Soda, potato chips		
It has not to be combined with potato (too much carbohydrates)		Pasta	
<b>Food Quality</b>			
It is rough, hurt children's gums	Boxed cereal		
It cannot be used in the child's bottle because it is sticky ( <i>babosa</i> )			Otameal
I dislike it ( <i>me da asco</i> ), so I do not give it to the child	Lentils	Oatmeal, Gerber®, pasta	Pork
I dislike its odor		Fish	
Children dislike its flavor / acid flavor	<b>Oatmeal<sup>c</sup></b> , lentils, broccoli, chicken liver	Gerber®, Danonino®, fish, tangerine, guava	Egg, infant cereal
Cold-type food (acid)	Lentils	Tangerine	
Hot-type food			Mango
Contains chemicals not good for babies	Gerber® <sup>b</sup> , infant cereal, soda (colorants)	<b>Danonino®</b> , boxed cereal, yogurt	
Packaged, processed, no natural, natural is better (all packaged products have something bad)	Gerber®	<b>Danonino®</b> , <b>cream</b> , oatmeal, fish, yogurt, potato chips, soda	
Long caducity, too refrigerated	Gerber®		
Storage the emotions of the chicken		Chicken liver	
Chicken are fed with hormones		Chicken, chicken liver	

Continuation of Table 10

Negative Attributes	Key Complementary Foods*		
	Day-caregivers and grandmothers (n=42)	Day-caregivers (n=20)	Grandmothers (n=22)
White are not fresh, it is used as glue, so it is no good, yolk is not right for babies		Egg	
I do not recommend it / I do not trust on it/ I am against it	<b>Fish</b>	<b>Gerber®</b> Chicken liver	Guava
Pediatricians do not recommend it	Cream	Fish	Infant cereal
<b>Food Purchase</b> It is expensive	Gerber®, boxed cereal, potato chips, soda	Danonino®, infant cereal	Mango
It is hard to find good quality		Fish, pork	
Available only in the winter		Tangerine	
It is just marketing. You want it because TV advertised it		Boxed cereal, yogurt, potato chips, soda	
It does not fit mother's expectations		Gerber®	

\* Foods in bold were highly mentioned

affordable, and easy to prepare. Most fruits were described as basic and as the main source of vitamin C. Some processed foods such as Danonino® and Gerber®, were considered by the two groups as “harmless”, while Gerber® was also viewed by the grandmothers as easy to digest. Both groups, especially grandmothers, brought up a digestive condition called *empacho*. This condition was associated with consumption of guava, legumes, and ASF such as egg, fish, chicken liver, and pork. Grandmothers brought-up the notion of “strong” foods (bread, rice and yogurt), supporting child well-being, not addressed by the day-caregivers.

**Child Nutrition.** Alternate caregivers’ perceptions about the nutritional value of the key foods mainly focused on their vitamin, iron, and calcium content. Day-caregivers but just a few grandmothers highlighted the protein content of foods. Vegetables and most ASF were defined as nutritious or “complete”. Cream was included in this category by both groups, while considered a milk derivative. Moreover, some day-caregivers affirmed that cream is as a source of calcium that can be given to children who dislike milk.

Vegetables, chicken, chicken derivatives, packaged cereals, and other cereal products were recognized as vitamin-rich foods. A general belief in both groups was that “the vitamin or the substance” of legumes is in the broth. Moreover, a couple of day-caregivers described black bean broth as a “meat substitute”. Chicken liver and a few cereals such as oatmeal and tortilla were described as iron sources. Day-caregivers expressed concerns about the cholesterol content of several ASF such as egg, chicken parts, and fish.

Similarly, they were concerned about the sugar content of foods that described as “making children overly fat” such as cereal products, soda and potato chips. When referring to Danonino® and vegetables, both groups of caregivers mentioned positive TV messages they heard about these foods, and consistently they described these as “complete and meaty”. Some day-caregivers considered yogurt as “heavy for the stomach” because of its fat content, so they stated that this food would not be offered in excess.

Fiber content was considered helpful for improving child feces’ consistency. Alternate caregivers often pointed out tortilla, mango, and processed cereals as fiber sources. A few participants in both groups declared not knowing the nutrient value of processed infant products and cereals.

**Food Preparation and Consumption Routines.** Grandmothers usually prepare main meals for children not attending to a daycare. They often addressed the concept of “food combination” as a mean to make a “complete” or “vitamin reach” meal. A salient preparation and consumption routine elicited by this group was “food variety” used as a mean to increase the overall nutrition content of meals and prevent that children get bored by eating the same foods often.

Both groups of caregivers pointed out that they did not offer to infants processed baby products such as Gerber®, Danonino®, infant cereal and boxed cereal. Moreover, day-caregivers declared that these products are used by “lazy people” and are “just marketing”. This group was also concerned about children getting used to sweets or to eat only soft foods if using

processed products. In addition, this group considered soda and potato chips as “easy to get” but “harmful” appetizers. Caregivers explained that children demand these foods when they observe adults eating such products.

Foods described by grandmothers as “uncommon” or “barely offered” to infants were fish, egg, lentils, chicken liver, and oatmeal. Accordingly, this group stated that the three former foods must be given occasionally and in low quantity to infants. Regarding vegetables, grandmothers declared that “children get bored” if using these foods often, while day-caregivers thought that child custodians do not want to invest the effort necessary to clean and prepare vegetables, so they are not offering these foods often enough.

Consistent with the MDS results, grandmothers referred to foods according to their relevance in a meal (i.e., snacks, breakfast food, and main courses).

Preparation of “soups” was described as a technique to provide a combination of foods and “disguise or dilute” the strong flavor of “substantial” foods such as chicken liver that, otherwise, the child might reject. Foods that children can eat by themselves [finger foods] such as rolled tortilla (*taco*), chicken, Danonino®, and tangerine were viewed as practical by both groups of alternate caregivers.

**Food Quality.** Taste and soft consistency were two sensory characteristics frequently evoked by caregivers. They recognized not offering foods to children that they personally dislike either because of their taste or odor (i.e., fish). Safety concerns were expressed about egg, chicken parts, fish, and pork. For example, some day-caregivers believed that chicken are

fed with hormones and that chicken liver “storage the bad emotions of the animal”, so they do not “trust” these products.

Identities emerged when describing the attributes of tortilla and brown beans. Caregivers referred to these items as “the food of the Mexicans”. Natural foods (i.e., fresh fruits and vegetables) as opposed to processed foods were viewed as highly suitable for the first year of age. Reasons for rejecting processed foods relate with their chemical content, lack of freshness, or “long expiration date”.

**Price.** An issue raised by both groups of alternate caregivers, but mostly by grandmothers was food price. Chicken, fish, bread, tortilla and pasta were recognized as affordable, while several processed infant products were considered expensive foods. Mango was viewed as expensive only by grandmothers.

**Age of Introduction of Foods.** Overall, grandmothers reported offering complementary foods earlier than day-caregivers since two to three months of age. A description of the process of introducing food described by the majority of caregivers is presented below. There were some caregivers, however, that recommended introducing foods either before or after the following periods.

The notion of introducing complementary foods by stages was raised by some grandmothers, while day-caregivers were more specific about the month of age each food should be introduced. In the first stage, between 2 to 4 months, grandmothers recommended giving apple, banana, guava and vegetables. In the second stage, between 5 to 6 months, when “the baby’s

stomach is ready to receive solids”, grandmothers introduced infant cereal, soaked tortilla, and Danonino®. In the third stage, from 7 to 10 months, when children have enough teeth to chew, grandmothers recommended legumes (solids), Gerber® and oatmeal, as well as tangerine (whole) and pasta. Finally, at a year of age several new foods, including egg and fish are introduced while the child integrates to family meals. They explained that boxed cereal, pork, soda and potato chips could be given after the year of age but they do not recommend the latter three foods during early childhood.

Day- caregivers reported starting complementary feeding between 3 to 4 months by offering the same fruit mentioned by the grandmothers. In addition, they recommended introducing oatmeal and pasta at this age. Between 5 to 6 months, they offered infant cereal, tangerine juice, and started trying chicken parts. Between 7 to 8 months they fully offered chicken and tried mango. Between 9 to 10 months they introduced egg, pasta, tortilla, and tangerine (whole). Day-caregivers explained that Gerber® (meat), and Danonino® could be introduced between 8 to 10 months but they do not recommend the use of processed products for infants. Finally, at 11 to 12 months most of day-caregivers stated that children are “ready to tolerate” fish, legumes (solids), and eventually boxed cereal.

#### 4.5 DISCUSSION

This study informs about classification systems, value attributes, and perceptions of key complementary foods in both family and institutional

alternate caregivers in Central Mexico. Salient primary food classification systems were food groups, healthy/unhealthy foods, packaged and natural foods, and snack-main meal-breakfast foods. Caregivers classified key foods into ten classes including vegetables, fruit, milk derivatives, and healthy meats. Foods with high proportion of positive attributes and few negative attributes were some fruits and vegetables, brown bean broth (no solids), pasta, and chicken flesh. Foods described by negative attributes were pork, potato chips, and soda. Grandmothers reported starting complementary feeding since 2 to 3 months of age and day-caregivers between 3 to 4 months of age by offering fruit to infants.

The domain of foods given to children less than one year of age in the region composed by 112 foods was consistent with previous research in urban Central Mexico, a region with wide variety foods available. Green leafy vegetables, however, were barely mentioned in the free listing. This may be related with perceptions that green leafy vegetables are not adequate for infants because of their fiber content (as expressed by some alternate caregivers in the food attributes survey) or may be related with the season in which the study was conducted (winter) when price of leafy vegetables increase and there is less variety of these foods, so informants would overlook the relevance of mentioned as foods consumed by young children.

Food classes emerged as a salient food classification system in both groups of alternate caregivers. Some classes elicited by informants were consistent with those used in the Mexican Food Guidelines based on the

nutrient content of foods (Secretaría de Salud, 2006). As expected, day-caregivers used biomedical knowledge for classifying foods as shown when identifying “the high cholesterol” food class. Grandmothers focused mostly on food combinations and price issues for some natural foods such as red meat class meat but this issue was barely raised when classifying processed foods. The predominant criteria used for classifying processed foods was convenience (i.e., foods good to go, foods easy to prepare for breakfast), an issue raised mostly by grandmothers. This is consistent with previous studies (Glanz et al., 1998; French et al., 1999).

Bread and tortilla were grouped together as “complements” by alternate caregivers. Perceptions that these foods play a secondary role in the child’s diet, may lead to lack of awareness of their energy contribution to the child’s diet and of the importance of controlling food portions to prevent overconsumption. In this regard, the National health and nutrition survey conducted in Mexico (Barquera et al., 2003) indicates that children in the lowest socio-economic stratum had the higher carbohydrate intake in the country, were tortilla make a significant contribution as a Mexican staple food.

Cream and cheese were grouped together by alternate caregivers. Attributes regarding these foods show alternate caregivers’ misperceptions about their nutrient content. Overall, both groups agreed that cream has similar nutrition value than cheese given that “both foods are milk derivatives”. This is of the importance for childhood obesity prevention interventions and for nutrition educators aiming to discourage consumption of high saturated-fat and

high cholesterol foods in early childhood.

Beef and pork were described as unhealthy, expensive, and hard to chew for infants. In contrast, chicken flesh was classified as a “healthy meat” and described as clean, soft, and easy to chew. This finding stresses the importance in food-based nutrition programs of selecting culturally-accepted foods from those with similar nutrition value but perceived as inadequate for young children.

A shared perception among alternate caregivers was that soda and potato chips are not suitable for very young children, as they classified these foods into the “junk food” or “eat a small portion” classes. Interestingly, dietary studies show that these foods are consumed by Mexican preschool children (Warner, 2006). Reasons to offer these foods while considering them not beneficial for children relate with pleasing or rewarding children. This is consistent with the Health Belief Model (Baranowski et al., 2003) indicating that a behavior that might be considered inadequate may be performed if the perceived benefits (to please children) outweighed perceived susceptibility (undesirable health outcomes at early childhood).

Day-caregivers’ higher level of agreement on food classification is consistent with their homogeneous education level and nutrition training. In contrast, heterogeneity in demographic characteristics of grandmothers such as age and education level would explain their lower level of similarity found in this study when classifying complementary foods. This is relevant for both nutrition education and social marketing in nutrition programs were actions

must be tailored to different market niches by considering the characteristics and needs of different population subgroups.

Both groups of alternate caregivers shared the notion of introducing food at early stages. This notion was more evident in grandmothers who reported introducing solid foods to infants as early as months of age when mothers return to their work after maternity leave. This practice has been reported in previous research both in developing and industrialized countries (Crocetti, Dudas, and Krugman, 2004; Barton, 2001). As previously shown in Chapter 3, working mothers encourage this practice to assure food security of their children while breast milk lactation is generally suspended over this returning-to work period.

When evaluating the findings of this study, methodological limitations should be considered. By following an interpretative approach, the researchers supported MDS' findings by incorporating qualitative information about food grouping provided by the alternate caregivers. We acknowledge discretion inherent to the method when identifying the MDS dimensions. We assumed that the single pile-sort exercise captured the most salient food arrangement. Consecutive pile-sorts, however, might provide insight about alternative food arrangements as those that emerged in the food attributes exercise.

The specific findings of this study cannot be generalized to the larger population, or alternate caregivers having different socio-demographic characteristics. These findings, though, provide insight to understand similar

urban ethnocultural groups and may guide inquiry for further quantitative studies in the region and targeted to Hispanic population. The findings reported here cannot be extrapolated to ill children, while different food classifications and contrasting food attributes might be obtained regarding this group. Further studies are necessary to have a better understanding of permanent and temporary proscriptions of complementary foods documented here in later developmental stages.

This study demonstrates that low-cost and feasible data-collection methods provide valuable qualitative information that can be used as formative research for developing behavior-change interventions aimed at improving complementary feeding (Kimmons 2004). Our definition of key foods was broader than used previously (PAHO, 2004) by adding low-nutrient and energy-dense foods such as soda and potato chips possibly related with child overweight, a relevant concern in public health.

As shown when alternate caregivers described secondary food classification systems (i.e., physical well-being and child nutrition). Nutrition content linked to health outcomes should continue being stressed by nutrition educators when promoting complementary foods. Similarly, folk terms might be used for designing culturally insightful nutrition messages targeted to alternate caregivers. We expect that the information reported here will help to have a better understanding of previous studies on complementary feeding, and to develop mission-based research oriented to improve adequate feeding choices of young children cared by alternate caregivers.

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## CHAPTER 5

### SUMMARY OF KEY FINDINGS, CONCLUSIONS, AND PROGRAMMATIC IMPLICATIONS

The key study findings are summarized below. A thorough description of these findings is provided in Chapters 2 to 4. The study group will not necessarily be specified in the statements that reflect commonalities across the four study groups: mothers, grandmothers, day-caregivers (alternate caregivers), and business representatives.

#### 5.1 INFANT FEEDING

##### 5.1.1 Complementary food classification and value attributes by mothers and alternate caregivers

Mothers and alternate caregivers grouped key foods into 9 and 10 classes, respectively. Food groups and food processing were primary classification systems shared by mothers and alternate caregivers. Group-specific primary classification systems were stages of food introduction in mothers, food healthiness in day-caregivers, and meal relevance in grandmothers. Common food classes across groups were vegetable, fruit, milk derivatives, complements, junk foods, and meats that study groups further classified as healthy/high cholesterol, expensive/accessible, and white/red. Secondary classification systems in mothers were healthy-junk, heavy-light,

hot-cold, good-bad fat, and main dish-complement. Secondary classification systems in alternate caregivers were main meal/breakfast/snack, eat a small portion/basic, cause health problems (i.e., digestive, allergies, choking)/safe, and expensive/inexpensive, among others. Mothers and alternate caregivers classified processed cereals as infant/pap or breakfast products, soda and potato chips as eat a small portion/ junk food and cream and cheese as dairy products.

Regarding complementary food value attributes, the main categories of positive and negative attributes were child well-being, nutrition, food preparation and consumption routines, food quality, age of food introduction, and food purchase. The “vitamin” content of foods was often considered as a key nutrition feature and as synonymous with “substantial, beneficial, and highly nutritious”. Convenience food attributes were highly valued by mothers and grandmothers but in less degree by day-caregivers. “Natural” foods such as fruit, vegetable, chicken, and broths were described mostly by positive attributes by both mothers and alternate-caregivers.

Participants expressed concerns about the nutrient value, expiration date, and safety of processed products, except for Danonino® (petit Swiss cheese) that was described mostly by positive attributes. Concerns about animal source foods were frequently highlighted related to allergies, digestion problems, risk of choking, cholesterol content, and lack of knowledge about their nutrient content. Cost of these foods was elicited mostly by grandmothers than mothers and day-caregivers. A widespread belief is that legume and

meat broths are highly nutritious, so the solids must not be given to young infants by considering these as “bagasse”. The notion of “strong foods” were either beneficial or harmful during the first year of age was shared by mothers and alternate caregivers. Local notions of food properties (i.e., *empacho*, hot/cold foods) and identities emerged when referring to tortilla and brown beans as “the food of the Mexican”. Grandmothers brought up the concepts of food “combination and variety” for improving the nutrient value of meals and child food acceptance. They also raised timing issues regarding food preparation and consumption.

#### 5.1.2 Timing of complementary food introduction by mothers and alternate caregivers

Mothers reported introducing complementary foods at two months in preparation for returning to work. Overall, both mothers and grandmothers recommended introducing foods earlier (2-3 months of age) than day-caregivers (3-4months of age). Foods reported by mothers and alternate caregivers to be introduced before 6 months of age were milk formula, fruit, vegetables, tortilla soaked in legumes broth, infant cereal, and Danonino®. Foods to be introduced at a year of age are whole egg, fish, and boxed cereal. Soda and potato chips were not recommended for children at any age.

Mothers and some grandmothers reported introduced foods according to developmental milestones. At least four stages of food introduction were identified:

- Stage one from 2 to 4 months, introducing formula and selecting foods according to food classes (fruit and vegetable), soft texture and lack of strings or seeds.
- Stage two from 5 to 6 months, when “the stomach is ready to receive solids” by avoiding foods thought to cause allergies, stomachache and choke.
- Stage three from 7 to 10 months, based on teeth eruption and the child’s capacity to tolerate “heavy foods”.
- Stage four from 11 months and over, when the digestive system is ready to tolerate food from the family table.

### 5.1.3 Breastfeeding at the workplace

All the study manufacturing businesses lacked a lactation room. There is a widespread perception of the lack of need of this facility shared by mothers and business representatives. Non-supportive attitudes from coworkers and supervisors about the time taken by mothers for expressing milk at work were reported by mothers. They described using the breastfeeding hour given as a benefit by businesses for catching up with other activities, particularly home-chores and care of their older children.

A common practice reported by mothers and grandmothers is the interruption of breastfeeding when returning to work to facilitate alternate caregivers feeding children and to avoid discomfort at work associated with lactation. Additionally, health personnel working in the study businesses barely

encourage breastfeeding, while providing advice to mothers about milk formula management. In contrast, mothers complain about having minimum child nutrition training provided to working women and their family by the businesses' health services.

## 5.2 WORK AND DAYCARE ARRANGEMENTS

### 5.2.1 Work Arrangements

Business representative reporting having minimum interaction between the business and day care centers associated with inter- and intra-organizational conflicts. They also highlighted the lack of daycare facilities in the Cuernavaca City industrial zone associated with non-reliable public transportation.

### 5.2.2 Family and institutional alternate care arrangement

Family care is usually provided by grandmothers. This was the preferred alternate care arrangement by mothers because of its convenience, shared child rearing practices, schedule flexibility, appreciation, and individualized attention to children.

Mothers not relying on institutional care, family members, and business representatives have concerns about the provision of government daycare services. An issue raised by mothers was the lack of flexibility in tolerance time policies for picking-up children limiting them working overtime and forcing them to rely on family members. Daycare schedules are not always compatible with the mothers' regular shift and weekend work. Free daycare

services not available after the fourth year of age, so mothers have to find a new facility and provide meals to their child previously offered by the daycare. Participants perceived that there is minimum nutrition training based on non-innovative educational techniques provided to parents, grandmothers & caregivers.

Favorable opinions of mothers relying on daycare services relate with child socialization and development, and availability of food and health services. Overall, the IMSS offered at the IMSS daycare centers were well accepted by mothers.

### 5.3 CONCLUSIONS AND PROGRAMATIC IMPLICATIONS

Main conclusions from this study are described below:

The mothers' work policies and environment related to non-supportive reward and sanction regulations, supervisory routines, inadequate physical working conditions, including lack of a lactation room, and lack of nutrition orientation are limiting maternal capacity to combine work and child-care.

Free institutional daycare services are also not supporting maternal capacity to work because of their schedule policies, location, and perceived low quality of services. Family care is supporting working mothers' young child care capacity by providing flexible services, convenience, and sense of appreciation to children.

Study mothers and alternate caregivers overall share primary complementary food classification systems, regarding the number of food

classes and the identification of a food group class, while these groups differ in their conception of secondary food classification systems.

Key value attributes about complementary foods in both mothers and alternate caregivers relate with child well-being, nutrition, food preparation and consumption routines, food quality/price, age of food introduction, and food purchase. Negative perceptions about the attributes of nutritious foods are shared by mothers and alternate caregivers.

Reported patterns of introduction of home and processed complementary foods such as early introduction of foods and delayed introduction of iron and zinc source foods are not consistent with international recommended infant feeding practices.

This study will inform decision-making to promote adequate complementary feeding and working women wellbeing at different programmatic levels:

**Nutrition Education.** This study provides evidence of the need of nutrition education initiatives about complementary feeding targeted to working women and alternate caregivers, implemented at the work site and daycare. Insights about food classification and food attributes can be used for developing educational tools and adapting biomedical concepts to local meanings about foods and feeding. Additionally, this study provides clues about food preparation and consumption strategies to improve acceptance of nutritious foods used in food-based programs to increase the consumption of iron and zinc such as chicken liver (Creed-Kanashiro et al., 2003). This study

also shows trends leading to practices that eventually would promote childhood obesity such as the use of simple carbohydrate and high fat foods (i.e., cream) as a reward or meal complements. Additionally, this study identified the importance of relating developmental milestones with the introduction of complementary foods when designing nutrition education messages.

**Nutrition Surveillance.** The research approach complement the data collection procedures and analysis proposed by the Pan American Health Organization in the *ProPan* manual (PAHO, 2004) aimed to improve infant and young child feeding practices to prevent early childhood malnutrition. This study also informs previous quantitative research conducted in Mexico addressing lack of compliance with breastfeeding and complementary feeding recommended practices (González-Cossío, 2003 and 2006; IMSS, 2004; Barquera et al., 2003; Villalpando et al., 2003; Rivera, 2003).

**Food and Nutrition Programs.** This study documents perceptions of animal food sources and processed complementary foods, which are of particular interest to the Pan American Health Organization's strategy to prevent early childhood malnutrition in the region (Lutter, 2002; Lutter, Leon-Cava, Pachon, 2001). In the case of Mexico, this study provides insight about the perceived qualities of milk products that can be used for social marketing of the milk-based food supplement that is currently distributed at the national level to less-than-two-years old children through a National Program run by the Mexican government (Rivera et al., 2000; Barquera, Rivera-Dommarco,

and Casca-Garcia, 2001). Additionally, this study provides insight about development of fortified foods with high probability of acceptance such as Danonino® that can be use in social programs targeted to urban populations.

**The Daycare System.** This study pulls together the perspectives from different stakeholders (mothers, day-caregivers and business representatives) about the perceived limitations of relying on family care and recommendations for improving daycare services. This issue will be of particular importance considering that women are increasingly accessing into the labor force, so the availability of home care arrangements might be limited in the following generations.

**Public Policy.** Our findings provide insight about the perceptions of the maternity leave and the practices conducted at work and the daycare limiting working mothers to combine work and child care. Specifically, this study illustrates the barriers to compliance with breastfeeding recommendations after mothers return to work. This information can guide health policies and business level initiatives promoting breastfeeding such as the availability of facilities for expressing and storage milk at the workplace and work-site complementary feeding and young child nutrition interventions.

The author expects to improve child well-being by having a better understanding of the impact of maternal employment on complementary feeding choices and advocate for equity and participation of women in the labor force by providing insight for the development work and daycare arrangements aimed to reduce work-family conflict.

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19. Do you regularly rely on family care?  No  Yes

If yes, please answer the following:

Who care for your child? \_\_\_\_\_

Where? \_\_\_\_\_

On which days? \_\_\_\_\_

At what time? \_\_\_\_\_

20. How old are you? \_\_\_\_ years

21. Civil status:  Single  Married  Other \_\_\_\_\_

22. Monthly wage \$ \_\_\_\_ Mexican pesos

23. Education:

Less than elementary school

Elementary school

Middle school

High school

College

Other \_\_\_\_\_

24. Please write down your address and some location guidelines

---

Street and number

Neighborhood \_\_\_\_\_ in  Cuernavaca  Jiutepec  Other \_\_\_\_\_

Phone \_\_\_\_\_

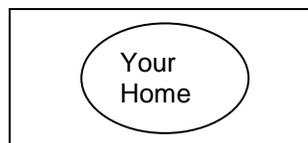
---

Please mention nearby businesses and other location points

Street

MAP OF YOUR HOME

Street



Street

Street

25. Would you like to participate in a study about complementary feeding that will include three interviews with you and one interview with alternate caregivers and business representatives?

**Yes**

**No**

☺ **Thank you so much!**

Please deliver this survey to your business' health department

## APPENDIX B

### MOTHERS' INTERVIEW GUIDE FOR THE FREE LISTING SURVEY

#### GUIA DE ENTREVISTA PARA LA LISTA LIBRE DE ALIMENTOS

Interviewer: Please give a copy of the informed consent letter to the key informant (mothers of less than one year of age children, pediatric nurse, and day-caregivers. Encourage informants to openly speak about the role of the key foods in complementary feeding.

Entrevistador: Por favor entregue una copia de la carta de consentimiento informado al informante clave (madres de niños menores de un año, enfermeras pediátricas y puericultoras). Permita que el informante hable libremente del papel de los alimentos en la alimentación complementaria.

1. Please list all the foods given to children during the first year of age?  
1. Por favor liste todos los alimentos que se acostumbran dar a un(a) niño(a) durante el primer año de vida
2. It would be other food, either natural or processed, offered to children during the first year of age in the region?  
2. ¿Habría algún otro(s) alimento(s) naturales como procesados que se ofrecen a un(a) niño(a) durante el primer año de vida en la región?

Food	Food	Food
1	21	41
2	22	42
3	23	43
4	24	44
5	25	45
6	26	46
7	27	47
8	28	48
9	29	49
10	30	50
11	31	51
12	32	52
13	33	53
14	34	54
15	35	55
16	36	56
17	37	57
18	38	58
19	39	59
20	40	60

APPENDIX C  
MOTHERS' INTERVIEW GUIDE ABOUT WORKING CONDITIONS AND  
CHILD-CARE

GUIA DE ENTREVISTA A LA MADRE ACERCA DE SUS CONDICIONES DE  
TRABAJO Y CUIDADO DEL NIÑO

*Interviewer: Please give a copy of the informed consent letter to the mother*

*Entrevistador: Por favor entregue una copia de la carta de consentimiento a la madre*

**1. IDENTIFICATION/ IDENTIFICACION**

**1.1 General / General**

Interview number / Entrevista número

Date mm/dd/yy/ Fecha mes/día/año

Interviewer code / Clave de la entrevistadora

Interview place / Lugar de la entrevista

Interview starting time / Hora de inicio de la entrevista

Interview ending time / Hora de fin de la entrevista

**1.2 The Mother / La madre**

Mother's code/ Clave de la madre

Age / Edad

Schooling / Escolaridad

Civil status / Estado civil

Place of origin/ Lugar de origen

Household members / Total de habitantes del hogar

Number of children/ Número de hijos

Number of children less than five years of age/ Menores de cinco años

Work schedule / Horario laboral

Type of shift (fixed/no flexible) / Tipo de turno (fijo, rotatorio)

Position / Ocupación

Monthly Wage / Sueldo mensual

Time working in this position / Antigüedad en el puesto actual

Do you usually work overtime?

¿Normalmente se queda a trabajar tiempo extra?

How many extra-hours did you work on the past month?

¿Cuántas horas extra trabajo el mes pasado?

Hay many hours you could not attend to work on the past three months?  
¿Cuántas horas faltó a trabajar durante los pasados tres meses?

Commuting from home to work  
¿Cuántos minutos hace de su casa al trabajo?

Commuting from home to the daycare  
¿Cuántos minutos hace de su casa a la guardería?

Commuting from daycare to work  
¿Cuántos minutos hace de la guardería a su trabajo?

### **1.3 The Child/ El niño**

Child's code / Clave del niño

Birth date (age) / Fecha de nacimiento (anote también la edad en meses)

Does the child is going to the daycare while you are working? If so, is this an IMSS daycare? / ¿La(el) niña(o) va a la guardería mientras usted trabaja? Si la respuesta es "sí" pregunte... ¿es una guardería del IMSS?

If the child is not attending to a daycare who care for him/her and where?

Si la(el) niña(o) no va a la guardería quien y en donde cuidan de él/ella?

## **2. THE MOTHERS' WORKLIFE / TRABAJO MATERNO**

### **2.1 Returning to Work / Regreso al trabajo**

How old were you when starting on your first job and where do you have been working?

¿Qué edad tenía cuando empezó a trabajar y en qué lugares ha trabajado?

Is there anything in your routine that would have changed when you started working?

¿Hay algo en su rutina que haya cambiado desde que usted trabaja?

At what time after delivery did you return to work?

¿A los cuantos días meses de nacido "Juanita" regreso a trabajar?

How did you prepare for returning to work (i.e. child-care)?

¿Cómo se preparo para regresar a trabajar (Ej., cuidado del niño)

Did you discuss the issue of returning to work with someone else at home?

¿Comento con alguien en casa la posibilidad de regresar a trabajar antes de

decidir hacerlo?

How did you felt when actually come back to work, describe me your feelings your personal experiences?

¿Cómo se sintió y que experiencias tuvo cuando regreso a trabajar?

How is your work influencing either in a positive or negative way your current life, your relationship with your young children, with other family members?

¿Que representa su trabajo para usted, como afecta ya sea de manera positiva o negativa en el cuidado de su hijo pequeño, en su relación con otros miembros de la familia?

Who determine how the money you earn at work is spent?

¿Quién determina como se gasta el dinero que usted gana?

## **2.2 Working Conditions/ Condiciones de trabajo**

Please briefly describe the activities you usually perform at work.

Por favor describa brevemente las actividades que hace en su trabajo.

What do you feel about your work (e.g., demanding or simple tasks)?

¿Cómo se siente en su trabajo? Por ejemplo, las actividades que hace son demandantes o simples?

How is the supervision system in your business? How is your supervisor with you?

¿Cómo es la supervisión en su empresa? Como es su supervisor con Usted?

What happen at work if you have to go to the daycare or attend your other children during work-time?

¿Qué pasa si tiene que ir a la guardería o con sus otros hijos durante su horario de trabajo?

Do you easily get permission for leaving work to see your children anytime you need?

¿Le dan permiso fácilmente si requiere salir del trabajo para atender a sus hijos?

What happen when you ask for time-off, do you get discounts or is another way to pay back for this time (e.g., by working overtime)?

¿Qué pasa cuando pide permiso para salid de la empresa, le descuentan ese tiempo o hay manera de pagarlo luego (por ejemplo, trabajando tiempo extra)?

Describe the main reasons for which you do not attend to work?

¿Describa las principales razones por las que falta a su trabajo?

Do you usually work overtime, why or why not?

¿Generalmente trabaja tiempo extra, cuales son las razones por las que si o no trabaja tiempo extra?

In addition to social security benefits, including daycare, is there other benefits your business gives you?

¿Además del Seguro Social y el servicio de guardería hay algunos otros beneficios que reciba de la empresa?

Are you satisfied with the physical working conditions in your business (e.g., noise level, temperature, equipment)?

¿Qué le parecen las condiciones físicas en las que trabaja (por ejemplo, nivel de ruido, temperatura, equipo)

Is there a lactation room at work?

¿Hay cuarto de lactancia en su trabajo?

Is there anything about your work that makes you feel stressed or anxious?

¿Hay algo acerca de su trabajo que la haga sentirse presionada?

### **2.3 Off-Work Activities / Actividades fuera del trabajo**

Describe the activities that you usually do before coming to work?

¿Qué actividades acostumbra hacer antes de llegar a su trabajo?

Describe the activities that you usually do after work?

¿Qué actividades acostumbra hacer cuando regresa de trabajar?

### **2.4 The Daycare / La guardería**

*Question for all the mothers:*

*Pregunta para todas las madres:*

What is your opinion about the IMSS daycare centers?

¿Cuál es su opinión acerca de las guarderías del IMSS\*

*\*IMSS= National Institute of Social Security-Mexico / Instituto Mexicano del Seguro Social*

*Questions for mothers relying on daycare:*

*Preguntas para las madres que usan guardería:*

Why did you choose to send your child to a daycare?

¿Cuáles fueron las razones por las que prefirió enviar a su hija(o) a la guardería?

What is the name of the daycare your child is currently attending?  
¿Cómo se llama la guardería a la que va su hija(o) actualmente?

What is the daycare schedule?  
¿Cuál es el horario de la guardería

What is your child's daycare schedule?  
¿Cuál es el horario al que va normalmente su hija(o) a la guardería?

Who do usually bring your child to the daycare?  
¿Quién lleva generalmente a su hija(o) a la guardería?

Who do usually pick-up your child at the daycare?  
¿Quién generalmente pasa por su hija(o) a la guardería?

What happens in the daycare if you have to stay overtime at work and you cannot pick-up your child on time?  
¿Qué pasa si tiene que trabajar tiempo extra y no puede pasar por su hija(o) a tiempo?

If your child's day-caregiver needs to contact you at work, would you receive the message?  
¿Cuando necesitan contactarla de la guardería en su trabajo generalmente le pasan el mensaje?

Does the daycare receive mid-ill children?  
¿Sabe si la guardería recibe a niños que están un poco enfermos?

Who takes care of your child when daycare is not available?  
¿Quién cuida a su hija(o) cuando no hay servicio de guardería?

What is your opinion about the quality of care provided to your child at the daycare?  
¿Cuál es su opinión del cuidado que le dan a su hija(o) en la guardería?

What is your opinion about the quality of the food service provided to your child at the daycare?  
¿Cuál es su opinión de la alimentación que le dan a su hija(o) en la guardería?

Is the food offered at the daycare somehow different or similar to the food offered to your child at home?  
¿La alimentación que le dan en la guardería es diferente a lo que le preparan a su hija(o) en casa?

## **2.5 Recommendations/ Recomendaciones**

Is there anything else that you would suggest to improve the IMSS daycare centers?

¿Qué sugeriría para mejorar las guarderías del IMSS?

What kind of services or support do you think working mothers would like to get from the non-IMSS daycare centers to facilitate child-care?

¿Qué servicios o apoyo cree que necesitan las madres trabajadoras por parte de las guarderías participativas para facilitar el cuidado de sus hijos?

What kind of services or support would you like to receive from your business to facilitate childcare?

¿Qué servicios o apoyo cree le gustaría recibir por parte de su trabajo para facilitar el cuidado de sus hijos?

*Thank you so much, your comments are confidential and very valuable for us. Muchas gracias, le reitero que sus comentarios son confidenciales y muy importantes para nosotros.*

## APPENDIX D

### BUSINESS REPRESENTATIVES' INTERVIEW GUIDE ABOUT THE BUSINESS' ORGANIZATION

### GUIA DE ENTREVISTA A REPRESENTANTES DE LAS EMPRESAS SOBRE LA ORGANIZACION DE LA EMPRESA

*Interviewer: Please give a copy of the informed consent letter to the business doctor or human resource executive.*

*Entrevistador: Por favor entregue una copia de la carta de consentimiento al doctor o jefe de recursos humanos de la empresa*

#### **1. IDENTIFICATION / IDENTIFICACION**

##### **1.1 General information / Datos generales**

Interview number / Entrevista número

Date mm/dd/yy/ Fecha mes/día/año

Business code / Clave de la empresa

Total of employees / Total de empleados

Total of female blue-collar manufacturing workers / Total de mujeres  
trabajando en areas de produccion

Interviewer code / Clave de la entrevistadora

Interview starting time / Hora de inicio de la entrevista

Interview ending time / Hora de fin de la entrevista

##### **1.2 Business representative /Representante de la empresa**

Code / Clave

Age / Edad

Education / Escolaridad

Position / Ocupación

Time working in this position / Antigüedad en el puesto actual

Work schedule / Horario laboral

Monthly wage/ Sueldo mensual

#### **2. THE MEDICAL SERVICE/ EL SERVICIO MEDICO**

What is the schedule of the health service?

¿En qué horario se ofrece el servicio médico en la empresa?

Is there any difference between the frequency that working mothers with young children ask for time off permissions in comparison to other working

women?

¿Hay alguna diferencia en la frecuencia con que las obreras con hijos pequeños solicitan permisos, en comparación con otras obreras?

What happen if a working women does not attend to work because his child is sick?

¿Qué pasa si una obrera no atiende al trabajo porque su hijo está enfermo?

Did working mothers ask you for child feeding advice during medical appointments?

¿Las obreras le preguntan cómo alimentar a sus hijos pequeños cuando atienden a consulta médica?

Did working women have expressed you the need of a lactation room at the workplace?

¿Alguna vez le han comentado las obreras que les gustaría tener un cuarto de lactancia en la empresa?

What do you think are the working mothers' issues to combine work and family responsibilities?

¿Qué problemas cree Usted que enfrentan las obreras con hijos pequeños para combinar su trabajo y el cuidado de la familia?

Please describe the health and nutrition actions performed during the last year in the business?

¿Qué acciones de salud y nutrición se han llevado a cabo durante este año en la empresa?

Have the health service conducted nutrition actions specifically targeted to working mothers with young children? Yes, please explain

¿Se han llevado a cabo acciones de nutrición dirigidas específicamente a las obreras con hijos pequeños por parte del servicio médico de la empresa? Si, ¿En que consistieron?

Have the health service conducted nutrition actions targeted to the family of working mothers with young children? Yes, please explain

¿Se han llevado a cabo acciones de nutrición dirigidas a las familias de las obreras con hijos pequeños? Si, ¿En que consistieron?

### **3. WORKING CONDITIONS / CONDICIONES DE TRABAJO**

Shifts schedule / ¿Cuántos turnos hay en la empresa y que horario tienen?

Is there any difference between the job schedule of women with young

children and the schedule of other working women (e.g., lactation break).  
¿Hay alguna diferencia en horarios de trabajo entre las obreras con hijos pequeños y otras obreras? (Ejemplo, hora de lactancia).

Is there any difference between the frequency with which working women with young children and other working women work extra time?

¿Hay alguna diferencia en la frecuencia con que las obreras con hijos pequeños trabajan horas extra en comparación con otras obreras?

Does the business provide transportation services to the employees? Yes, please describe how it works.

¿La empresa ofrece servicio de transporte a sus empleados? Si, describa como opera este servicio.

In your opinion, how appropriate are the physical working conditions in this business? (e.g., environmental noise, lighting, room temperature, equipment)

En su opinión ¿Como están las condiciones físicas de trabajo en la empresa? (ejemplo, ruido ambiental, iluminación, temperatura, equipo)

What this business could do to support working mothers with young children?

¿Qué sería factible de realizar en esta empresa para facilitar a las madres obreras combinen su trabajo y el cuidado de sus hijos pequeños?

#### **4. REWARD AND SANCTION POLICIES**

Please describe how the maternity leave policy operate in this business?

¿Podría describirme como opera la política de ausencia por maternidad en esta empresa?

Would you describe the business' reward and sanction policies?

Podría describirme ¿En qué consisten las políticas de estímulos y recompensas en la empresa?

What are the business' benefits offered to blue-collar workers?

¿Cuáles son las prestaciones que ofrece la empresa a sus obreros?

Does the business have a career development plan for blue-collar workers? If yes, please explain?

¿La empresa tiene algún plan de desarrollo para obreros? Si, podría describir en qué consiste?

## 5. IMSS DAYCARE SERVICES

What is your opinion about the IMSS daycare centers?  
¿Cuál es su opinión acerca de las guarderías del IMSS?

What are the comments you have heard from working mothers about the IMSS daycare services?  
¿Cuáles son los comentarios que ha escuchado de las obreras acerca de las guarderías del IMSS?

Why do you think some mothers are not using free daycare services provided to working women as part of their social security benefits?  
¿Por qué cree que algunas madres no usen el servicio gratuito de guardería a que tienen derecho como parte de su seguro social?

Is there anything that IMSS daycare centers should do to better support working women?  
¿Habría algo que las guarderías deberían hacer o cambiar para apoyar más a la madre trabajadora?

*Thank you so much, your comments are confidential and very valuable for us. Muchas gracias, le reitero que sus comentarios son confidenciales y muy importantes para nosotros.*

## APPENDIX E

### DAY-CAREGIVERS' INTERVIEW GUIDE ABOUT THE DAYCARE ORGANIZATION

#### GUIA DE ENTREVISTA A LA PUERICULTORA SOBRE LA ORGANIZACION DE LA GUARDERIA

*Interviewer: Please give a copy of the informed consent letter to the daycaregiver.*

*Entrevistador: Por favor entregue una copia de la carta de consentimiento a la puericultora.*

#### **1. IDENTIFICATION / IDENTIFICACION**

##### **1.1 General information / Datos generales**

Interview number / Entrevista número

Date mm/dd/yy/ Fecha mes/dia/año

Daycare center code / Clave de la guardería

Number and type of groups of less than two years of age children/ Grupos de niños menores de dos años

Mean of children per group / Número promedio de niños por grupo

Mean of caregivers per group / Número promedio de puericultoras por grupo

Interviewer code / Clave de la entrevistadora

Interview starting time / Hora de inicio de la entrevista

Interview ending time / Hora de fin de la entrevista

##### **1.2 Caregiver / Puericultora**

Code / Clave

Age / Edad

Education / Escolaridad

Work schedule / Horario laboral

Position / Ocupación

Monthly wage/ Sueldo mensual

Time working in this position / Antigüedad en el puesto actual

How longer have you been working as a caregiver?

Desde hace cuando trabaja como puericultista?

Would you describe briefly the activities you perform at the daycare center?

Cuáles son sus actividades principales en la guardería?

What is your work schedule?/ Cuál es su horario de trabajo?

Do you usually work extratime?/¿ Normalmente se queda a trabajar tiempo extra?

## **2. DAYCARE ORGANIZATION / ORGANIZACION DE LA GUARDERIA**

### **2.1 Schedules/ Horarios**

What is the schedule of this daycare center? / ¿Qué días y en que horario abre la guardería?

Do mothers working in alternate shifts have to do paper-work for changing their child's schedule? / ¿Las madres que rolan turnos y necesita cambiar el horario de su hijo en la guardería necesitan hacer algún trámite especial?

Do mothers working at the night shift can bring their children to the daycare in the mornings? / ¿Las madres que trabajan en el turno nocturno tienen derecho a traer a su niño a la guardería en las mañanas?

Are children regularly picked-up on time? Generalmente traen/llegan por los niños a tiempo?

How do you estimate the tolerance period for picking-up the child? What is the tolerance time range? / ¿Cómo se determina el tiempo de tolerancia para recoger al niño y cuanto es el rango?

What happen if the child is picked-up after the tolerance period? / Que pasa si llegan por el niño después del periodo de tolerancia?

Do children drop-up the day care because a family member disagree with the service? ¿Les ha pasado que saquen algún niño porque algún familiar no quiere que lo traigan a la guardería?

### **2.2 Provision of Services/ Servicios de guardería**

Would you list some of the differences between the IMSS daycare centers and the other type of child-care facilities affiliated to the IMSS?

¿Cuáles son las principales diferencias entre las guarderías del IMSS y las participativas?

What are the reasons for denying the services to a child who was already accepted in the day-care?

¿Cuáles son las razones por las que no se puede recibir a un niño unas ves que está inscrito en la guardería?

Are children mildly ill allowed to come to the day-care?

¿Reciben a niños que están un poco enfermos?

What are the requirements to allow the entrance to a child that have been sick?

¿Que se necesita para permitir la entrada al niño que estuvo enfermo y ya se recupero?

Is there currently availability for children less than two years of age in all the groups? ¿Actualmente hay cupo para menores de 2 años en los distintos grupos?

How often this facility works at its maximum capacity?  
¿Y les ha pasado que se llene el cupo? Con que frecuencia pasa esto?

Would you describe the adaptation period?  
¿En qué consiste el período de adaptación?

What do mothers tell you about the period when the child at four years of age have to leave the day-care?  
¿Que comentan las mamás cuando a los 4 años se termina el periodo de guardería?

How is the communication with the businesses, do they inform mothers if you notify them a child emergency?  
¿Cómo es la comunicación con las empresas, les pasan el recado si ustedes llaman a la mamá para informar sobre alguna emergencia?

### **2.3 The Food Service/ El servicio de alimentación**

In your opinion how acceptable by children are the menus designed by the IMSS?

En su opinión ¿Como aceptan los niños los menús del Seguro Social que ofrecen aquí, en la guardería?

Do you think it would be necessary to do any changes at the IMSS menus?  
¿Ha habido necesidad de hacer algún cambio en los menús del IMSS?

Is there a procedure to inform the IMSS about changes needed?  
¿Hay algún mecanismo para informar al IMSS sobre la necesidad de cambiar alguno de los menús?

What do you do if the children reject some of food provided to him/her?  
¿Qué hace la puericultora si algún alimento no le gusta al niño?

What is the schedule of the last meal offered to children?  
¿A qué hora es la última comida que se da a los niños?

Can the children bring food to the daycare center?  
¿Está permitido que el niño traiga alimentos a la guardería?

## **2.4 Health Services and Nutrition Promotion/ Servicio de salud y orientación en nutrición**

Are both a doctor and a nurse attending the daycare health service? If so, what are their schedules?

¿Tienen medico y enfermera atendiendo el servicio de salud? Si, en que horarios prestan sus servicios el/la doctor(a) y la enfermera?

Have you participated in a health and/or nutrition promotion activities (i.e., workshops) in the last 6 months? What was (were) the topics addressed there?

¿Ha participado en algún curso de salud y/o nutrición en los últimos 6 meses? Si, ¿Cuales fueron los temas principales?

How often are these educational actions being conducted?

¿Con que frecuencia llevan a cabo estas acciones educativas?

Have the food service manager participated in nutrition education activities (i.e., workshops) in the last 6 months?

¿La encargada de nutrición ha acudido a algún curso o seminario de alimentación?

How often are these actions conducted?

¿Con que frecuencia llevan a cabo estas acciones?

What are delivery channels the daycare provide nutrition information to parents and/or the family?

¿Por qué mecanismos proporcionan información sobre nutrición a los padres y/o familiares?

Does the daycare have been conducted health promotion and/or nutrition education actions with the parents and alternate caregivers in the last six months?

¿Se han llevado acciones de promoción de la salud y/o nutrición dirigidas a padres de familia y a familiares que ayudan al cuidado del niño en los últimos seis meses?

How often are these actions conducted?

¿Con que frecuencia llevan a cabo estas acciones?

What are the topics of these actions?

¿Cuáles son los temas principales de estas acciones de salud-nutrición?

How do you promote the day-care service among working mothers (e.g., in businesses)? Como promocionan la guardería entre las madres trabajadoras (por ejemplo, en las empresas)?

### **3. WORKING WOMEN ISSUES/ PROBLEMATICA DE LA MADRE TRABAJADORA**

What are the working mothers' issues related to work and family demands?

¿Cuáles son los principales problemas que observa en las madres trabajadoras?

Have you been notice distress signs in working mothers?

¿Como la ve en cuanto al stress?

How do mothers deal with child illnesses at the work and household?

¿Cómo se organizan las madres que trabajan cuando tienen a su hijo enfermo tanto en su trabajo como en su casa?

Have usually mothers receive support from their partners or family members regarding the daycare (e.g., for bringing or picking-up the child, for attending to daycare workshops)?

¿Las madres que trabajan tienen apoyo de sus parejas y familiares con relación a la guardería (por ejemplo, llevar o traer al niño, asistir a cursos que da la guardería)?

What is the proportion of single mothers currently relying on this daycare?

¿Qué porcentaje de madres solteras tienen actualmente?

Why do you think some mothers are not using free daycare services provided to working women as part of their social security benefits?

¿Por qué cree que algunas madres no usen el servicio gratuito de guardería a que tienen derecho como parte de su seguro social?

### **4.RECOMMENDATIONS/RECOMENDACIONES**

What do you suggest employers do to support working mothers?

¿Que podrían hacer en las empresas para apoyar a la madre trabajadora?

What do you suggest daycare centers do to support working mothers?

¿Que podrían hacer las guarderías para apoyar a la madre trabajadora?

Is there something else that you suggest could be done to support working mothers?

¿Habría algo más que quiera proponer para apoyar a las madres que trabajan?

*Thank you so much, your comments are confidential and very valuable for us. Muchas gracias, le reitero que sus comentarios son confidenciales y muy importantes para nosotros.*

APPENDIX F  
MOTHERS, DAYCAREGIVERS AND GRANDMOTHERS' INTERVIEW  
GUIDE FOR THE FOOD ATTRIBUTES AND PILE SORT EXERCISES

GUIA DE ENTREVISTA PARA LOS EJERCICIOS DE ATRIBUTOS Y  
SORTEO DE MONTONES DIRIGIDOS A MADRES, PUERICULTORAS Y  
ABUELAS

*Interviewer: Please give a copy of the informed consent letter to the interviewee.*

**1. IDENTIFICATION/ IDENTIFICACION**

**1.2 General / General**

Interview number / Entrevista número  
Date mm/dd/yy/ Fecha mes/día/año  
Interviewer code / Clave de la entrevistadora  
Interview place / Lugar de la entrevista  
Starting time / Hora de inicio  
Ending time / Hora de fin

**1.2 The informant / El informante**

Informant's code (mother, grandmother or daycarergiver) / Clave del informante (madre, abuela o puericultora)  
Age / Edad  
Schooling / Escolaridad  
Civil status / Estado civil  
Place of origin/ Lugar de origen  
Position / Ocupación  
Monthly Wage / Sueldo mensual  
Household members / Total de habitantes del hogar  
Number of children less than five years of age at the household/ Menores de cinco años en el hogar

**2. FOOD ATTRIBUTES EXERCISE / EJERCICIO DE ATRIBUTOS**

Show the cards with each of the key foods to the informant and ask her the following question:

Muestre las cartas con los alimentos clave a la entrevistada y haga la siguiente pregunta:

Would you please tell me what do you know or think about this food regarding child feeding during the first year of age?

Podría decirme todo lo que sabe o piensa de este alimento con relación a la alimentación del niño durante el primer año de vida?

For short answers, rephrase the above question:

Si la entrevistada da una respuesta muy corta repita la pregunta de la siguiente forma:

What else do you know about this food? What do other mothers say about this food?

Que más sabe de este alimento? Que ha oído que las madres opinen de este alimento?

You may also ask the following questions if the informant do not answer or ask for a frame of reference:

Puede agregar las siguientes preguntas si la entrevistada se queda callada o le pide alguna referencia:

- What are the positive attributes or characteristics of this food?  
¿Cuáles son los atributos o características positivas de este alimento?
- What are the negative attributes or characteristics of this food? ¿Cuáles son los atributos o características positivas de este alimento?
- Do you feed it to your child now at home or the daycare?  
¿Le dan este alimento al niño actualmente en el hogar o guardería?
- If the informant does not feed the food to the child ask her questions to determine possibilities for behavior change such as: *Can you think of a way to prepare this food so that your child can eat it without getting harmed?*  
¿Si le dicen que no le dan el alimento pregunte de que otra forma podría dárselo para que no le afectara o lo tolerara?
- What happens if you feed this food to an infant?  
¿Qué pasa si le da este alimento a un bebe menor de un año?
- How do you prepare it for a young child (specify the age)?  
¿Cómo prepararía este alimento, a qué edad daría esta preparación?
- How would you prepare it for a 6 month old infant?  
¿Cómo lo prepararía para un bebe de 6 meses?
- What are the conditions necessary to feed it to a child less than one year of age?  
¿Cuáles son las condiciones necesarias para que el niño de un año pudiera comer este alimento?

- What are your sources of information about the role of this food in complementary feeding?  
¿En dónde o quien le ha comentado acerca del papel de este alimento en la alimentación del niño pequeño?

### **3. PILE SORT EXCERSICE**

Give to the informant the cards with the 31 key foods. Ask her to sort these cards by forming as many groups as she want with at least two foods each. Afterwards, ask her for the reasons of forming each of the food piles. It is important to allow informants spending the necessary time to sort the cards.

De a la entrevistada las cartas con los 31 alimentos clave. Pídale que las agrupe como quiera siempre y cuando cada grupo tenga al menos dos alimentos. Después de que la entrevistada termino de formar los grupos pregunte la razón de formar cada uno de estos. Es importante que le dé el tiempo necesario para formar los grupos.

*Thank you so much, your comments are confidential and very valuable for us. Muchas gracias, le reitero que sus comentarios son confidenciales y muy importantes para nosotros.*