DIALOGUE EDUCATION IS EFFECTIVE AS A METHOD TO TEACH MATERNAL TODDLER FEEDING PRACTICES

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ABSTRACT

Dialogue education is effective as a method to teach maternal toddler feeding practices

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Objectives: 1) Measure the effectiveness of one or two workshops using dialogue education to teach healthy toddler feeding practices, specifically a) to allow child self-regulation of satiety, b) to maintain a schedule for meals and snacks and c) to role-model healthy eating when compared to a control group. 2) Measure the effectiveness of dialogue education to teach appropriate stages of growth in order to increase mothers' ability to know when their children are at a healthy weight compared to a control group 3) Compare baseline maternal toddler feeding practices between low-income Latina mothers participating in Early Head Start (EHS) and Early Migrant/Seasonal Head Start (EMSHS).

Methods: Sixty six mothers participating in EHS (n=25 and EMSHS (n=41) completed a 24 item Likert scale (1 to 5 with 1=Never/Not confident/Extremely unlikely, 5=Always/Very confident/Extremely likely) to assess behavior, self-efficacy and intent regarding 3 domains of toddler feeding practice: self-regulation of hunger and satiety, scheduling meals and snacks, and parental role modeling. Mean Likert scores for each question were analyzed by subgroup. A two-part educational intervention was developed to improve these three domains of healthy toddler feeding practices and knowledge of stages of growth. Participants were recruited primarily from EMSHS and were grouped based on level of participation (1 workshop, 2 workshops or control).

Results: One-way ANOVA analysis showed improvement from baseline to post-intervention for self-regulation (baseline x=3.130 $\pm$0.499; post-intervention

x=3.496±0.603; p=0.030) and role-modeling behavior (baseline x=3.757±0.467; post-intervention x=4.096±0.581, n=23, p=0.035) for those who participated in one or two workshops. Two-sample t-tests of post-intervention scores between control and a combined intervention group (Group 1 and Group 2) showed that the combined group scored significantly higher in allowing self-regulation behavior (control x=3.036±0.418, n=11; combined intervention group x=3.496±0.603, n=23, p=0.016). Regression showed that intent (p=0.03) and self-efficacy (p<0.001) were significant in explaining up to 63.3% of the variance in maintaining a schedule behavior. There were no other significant findings for intent and self-efficacy for the other behaviors. No significant changes in self-efficacy or knowledge of stages of growth were observed among the three treatment groups. Perceptions of healthy weight did not change significantly from baseline to post-intervention. Mothers in EHS and EMSHS groups were similar for the most part in their parental feeding practices. The EMSHS mothers maintained a schedule for meals and snacks more than EHS mothers (EMSHS x=3.323±0.064, n=41, EHS x=2.850±0.599, n=25; p=0.004). The EHS mothers, however, limited sweets more frequently than EMSHS mothers (EMSHS x=3.28±1.06, n=41, EHS x=2.66±1.04, n=25; p=0.024). Levels of self-efficacy and intent were similar for both groups, with EHS mothers scoring higher for confidence in staying calm during stressful meal times (EHS x=3.24±1.3, n=25; EMSHS x=2.56±1.23, n=41; p-value=0.004) and intent to allow self-regulation (EHS x=4.125±0.694, n=8; EMSHS x=3.532±0.974, n=25; p-value=0.068). Early Head Start mothers also identified the importance of exercise in maintaining a healthy weight significantly more than EMSHS mothers (p=0.031).

Conclusion: Dialogue education is effective as a method to improve some aspects of authoritative feeding behavior. One workshop was sufficient to observe improvements in self-regulation and role-modeling behavior. No improvements were observed in self-efficacy or knowledge of healthy weights. While similar for the most part, EHS mothers are more authoritative in their feeding practices compared to EMSHS.

Keywords: Toddlers, Head Start, Division of Responsibility, Dialogue Education

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CHAPTER 1: LITERATURE REVIEW

BACKGROUND INFORMATION AND PROBLEM STATEMENT

Obesity is a critical health issue in the U.S., especially within the Latino population. While nation-wide rates of obesity declined slightly from 2008-2011, for children ages 2-4 years, percentages are still too high according to many healthy experts (CDC, 2013). Additionally, children of Hispanic descent continue to be at much greater risk for obesity relative to the overall US population, with obesity rates of 16% and 12%, respectively. Children who are overweight or obese at this age are 5 times more likely to be overweight or obese as adults compared to children of healthy weight, putting them at much greater risk for Diabetes Mellitus Type 2 (DMT2), high blood pressure, and metabolic syndrome (CDC, 2013). Mexican Americans have the highest rate of DMT2 compared to African Americans and Caucasians (Cossrow & Falkner, 2004).

The most effective strategies in the fight against childhood obesity are based on prevention (Horodynski, 2011). Toddlers (aged 9-24 months) are at an especially important time developmentally for developing dietary habits and preferences (Carruth et al 2004). At this age, children start weaning from breast milk or the bottle and begin self-feeding, establishing their dietary preferences. The family environment can greatly influence a child's dietary habits through parental modeling and values (Skinner et al 2002). According to Patrick and Niklas (2005), by the time a child reaches 3 years, it's possible that their internal cues of hunger and satiety have been overridden by other factors, such as parental attitudes and values towards food or being encouraged to eat more than they need at meal times. Therefore, interventions targeted at this age group may prove effective in obesity prevention.

Studies show that traditional, lecture-style education may not be the most effective strategy in affecting health behavior change and increasing motivation in adults (Abusabha & Achterberg, 1997). Dialogue education, or learner-centered education, is attractive as an education intervention for multiple reasons. By encouraging and validating the contribution of the participants own knowledge, the facilitator can increase their client's sense of self-efficacy and confidence, factors which may explain up to 50% of the variability in outcomes of health education (Abusabha, 1999; (Abusabha & Achterberg, 1997).

CHILDHOOD OBESITY

According to the Centers for Disease Control and Prevention (CDC), obesity in children is defined as being equal or greater than the 95% on CDC sex-specific growth chart, whereas overweight is defined as being equal or greater than 85%. (Centers for Disease Control and Prevention, 2013). While there is evidence that obesity rates have remained stable since 2003, since 1980 the rates of obesity have doubled in children between ages 6-11 and quadrupled in adolescents between ages 12-19 (NCHS, 2010). Children who are overweight and obese are at higher risk for developing type II diabetes, cardiovascular disease, joint pain, and suffer from low self-esteem. In fact, according to the Bogalusa Heart Study, 70% of obese youth had at least one risk factor for cardiovascular disease (Freedman et al., 2007). In addition, preschoolers who are overweight and obese are 5 times more likely to be so as adolescents (Nader et al, 2006).

Currently, the overall rate of obesity for children ages 2-19 in the United States is 16.9%, with the highest rates among Hispanic youth at 22.4% (Ogden et al., 2014). Childhood obesity is also a concern in Mexico, with combined overweight and obesity rates for children ages 2-5 at 27.5% (Guendelman et al., 2010). While there is some

variability in obesity rates depending on the years and methods used to analyze results, research indicates the obesity rates increase consistently as a child ages. According to one study, rates of obesity for children between ages 2-5 are 8.4%, 17.7% for children between ages 6-11, and 20.5% for children between ages 12-19 (Ogden et al., 2014). Another study using National Health and Nutrition Examination Survey (NHANES) and the CDC's Pediatric Nutrition Surveillance System (PedNSS) puts the rate of obesity for infants and toddlers between 0-2 years at 8.1% and for children between 3-5 years at 12.1%. Unfortunately, low-income children between 3-5 years have an even higher prevalence of obesity, at 14.4% (Centers for Disease Control and Prevention, 2013).

Although childhood obesity rates increase with age, a recent report by the CDC described a decline in obesity rates among low-income preschool aged children (Centers for Disease Control and Prevention, 2013). Between 2008-2011, 19 states and US territories showed a decline in rates of obesity from between 0.6 and 2.3% (Figure 1.1). Reasons for this decline appear to be multi-factorial, including large-scale public health awareness campaigns like Let's Move!, an increase in breastfeeding, and changes in WIC-provided foods to be more consistent with US dietary guidelines. Even with this reported decline, the prevalence of obesity among low-income preschoolers is still high, especially for Hispanic and Non-Hispanic black children at 16.2% and 18.9%, respectively (Centers for Disease Control and Prevention, 2013).

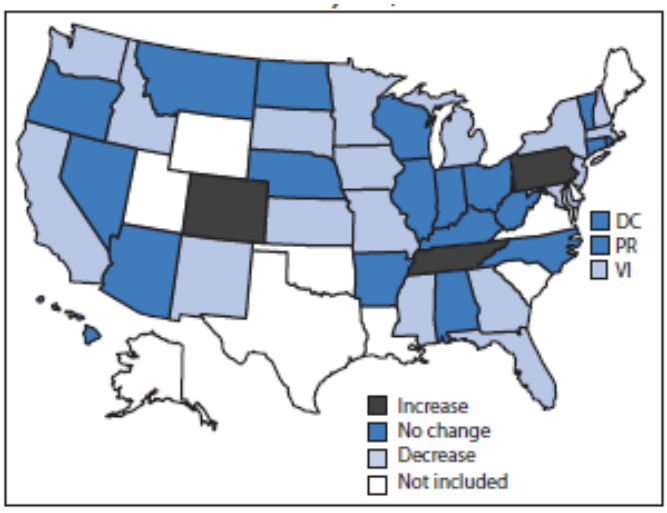

Figure 1.1 Decreases and increases in prevalence of obesity among low-income children in the United States, between 2008-2011. (excerpted from Centers for Disease Control and Prevention, 2013)

Childhood Obesity Among Latinos

Latino children are at much higher risk to be overweight or obese as compared to other ethnic groups. For Mexican-American children ages 2-5 years, rates of obesity are 19.2% compared with 8.4% for the overall rate for all children ages 2-5 (Ogden et al., 2014). Nationally, of all children aged 2-19 who are overweight or obese, 37% are Latino, followed by Black (35.1%) and White (33.5%) (Ogden et al., 2014). Latino children are almost twice as likely to be overweight or obese as compared to white or non-Latino black children (Kimbro et al., 2007). In fact, being Latino in the United States increases a child's risk of being severely obesity by 2.9 times (Flores and Lin, 2013).

The reasons for this association are multi-factorial. As with all ethnicities, socio-economic status appears to play a large role in the development of obesity among Latino children. Levels of acculturation, recency of immigration, and feeding styles may all contribute to the higher rates seen in this population (Williams, Kabukuru, Mayo, &

Griffin, 2005). Additionally, Latino mothers may have an incorrect perception of child weight which may lead Latino mothers to misidentify their own children as normal weight, when actually they are overweight or obese (Kimbro et al., 2007).

Nation-wide, more than 35% of Latino children under 6 are low income. In California, this proportion is slightly less at 31% (Bohn and Levin, 2013). Since low SES increases risk for obesity, large portion of Latino children at risk. As weight status tracks into adulthood, these children are at higher risk for developing expensive, life-threatening chronic diseases as they age (Williams et al., 2005).

Interestingly, immigration to the US increases one's risk, and the risk of their offspring, for becoming obese. Currently, 65.5% of immigrants to the US are from Mexico (Williams et al., 2005). Many of these immigrant work in low-paying jobs and are more likely to be less educated, have lower incomes, are undocumented and experience higher levels of unemployment than other immigrant groups (Schmit et al., 2013) (Williams et al., 2005). Latino's risk for becoming obese is significantly higher than other racial or ethnic groups immigrating to the US (Williams 2011). One potential explanation is the adoption unhealthy habits of the new culture, while dropping the healthy habits of tradition (Williams 2011). In focus group discussions among low-income Latinas of varying degrees of acculturation, accessing traditional, unprocessed foods is perceived to be one of the main barriers to healthy eating (Chavoor, 2013).

The relationship between acculturation and obesity has not been well-defined (Kilanowski, 2012). In some studies, acculturation appears to negatively affect child weight status. At 24 months of age, children of WIC participant mothers who spoke only Spanish had higher BMI z-scores than children of mothers who spoke both English and

Spanish (Sussner et al., 2009). In fact, nearly half of children of exclusively Spanish-speaking mothers were at or above the 85th percentile for height for weight, the CDC cut-off point for estimating overweight (Sussner et al., 2009). Other variables of acculturation measured in this study included nativity and years of residence in the United States. Interestingly, only language preference was predictive of weight status.

Other studies with Latinos show a contradictory effect of acculturation. Previous studies with older, adolescent age children have shown that second-generation children of Hispanic descent have poorer dietary and physical activity habits than first-generation children and are more likely to be obese (Gordon-Larsen et al., 2003). Numerous other studies have also found an overall healthier dietary pattern in recent immigrants, compared with those who have been in the US longer (Schaffer et al., 1998)(Siega-Riz & Popin, 2001). Indeed, a study of Hispanic maternal-child (ages 2-4 years) also showed a relationship between higher acculturation, serving more "non-core" foods items (aka junk foods) and higher child BMI (Figure 1.2, Wiley et al., 2014).

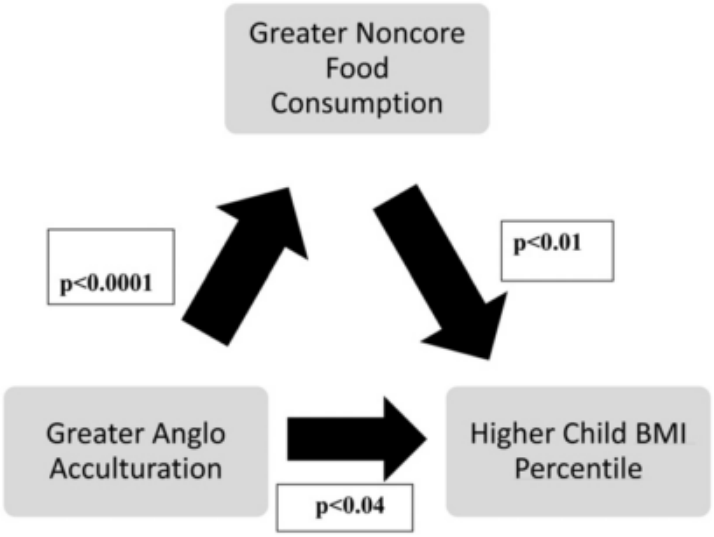

Figure 1.2 Relationship between higher US or Anglo acculturation, non-core food consumption (ie junk foods) and child BMI percentile. (excerpted from Wiley, et al., 2014).

This research appears to be in contrast with the Sussner et al study, which found a higher obesity rates among less acculturated children, or specifically, children of exclusively Spanish-speaking mother. One explanatory factor that was not assessed in either study was feeding styles. Numerous studies have shown Latino parents are more likely to engage in permissive or indulgent feeding practices compared to non-Latinos (Hughes et al., 2006)(Chaidez and Kaiser, 2011). Interestingly, less acculturated Latino parents may be more even more likely to engage in indulgent feeding styles, which is associated with childhood obesity, than their more acculturated peers (Dancel et al., 2015).

Low-income children experience a greater number of risk factors for developing obesity when compared to higher-income children, including higher rates of parental

obesity, lower rates of breastfeeding, and unhealthy feeding practices (Gibbs and Forste, 2014).

Risk Factors for Low-Income Children

There are several important risk factors in the development of childhood obesity. Unfortunately, many of these risk-factors are inter-related, making it difficult to target just one or two in prevention programs.

The link between socioeconomic status (SES) and obesity is a strong one; in fact, low SES might be the strongest predictor of childhood overweight and obesity, according to a recent Cochrane review (Waters, et al. 2011). A study of the association between SES—as measured by household income, parental education and job prestige—and childhood overweight found for each unit decrease of SES status, the risk of childhood obesity increased by 24% (Gibbs and Forste, 2014). Another longitudinal study looking at risk factors for the development of severe obesity (defined as >99% on CDC growth charts) found that 82.7% of families were under the poverty threshold, compared to 67.9% of children of non-severely obese families, $p=0.01$ (Flores and Lin, 2013). Low SES is linked to parental overweight, which is another of primary risk factors associated with childhood obesity.

Having an obese parent, and a mother in particular, increased the risk of being severely obese in kindergarten by a factor of 3.4 (Flores and Lin, 2013). Several explanatory mechanisms include a shared food and physical activity environment and genetics. Maternal Body Mass Index (BMI) most likely has a relationship with maternal eating and feeding styles, which can influence her child's weight. Emotional eating in the mother has been observed with a more restrictive feeding style, which is associated with higher childhood weights (Brown and Lee, 2011).

Breastfeeding has been found to have a role in prevention of childhood obesity (Dewey, 2003). Indeed, breastfeeding rates in overweight or obese mothers tend to be lower than mothers of a healthy weight. This association may also be multi-factorial, but the extra body weight associated with obesity may cause some impairment of lactation (Dewey, 2003). The low rates of breastfeeding only compounds the risk factors associated with having an obese mother.

A review article credits breastfeeding with a moderate level of protection against childhood overweight. This may be due to metabolic programming effects, protein intake and learned self-regulation for energy intake (Dewey, 2003). In the observational study by Gibbs and Forte, children predominately fed formula were 2.5 times more likely to be obese by age 2 compared with children who were predominately breastfed. In addition, children of low SES have much lower rates of being breastfeed when compared to children of high SES, and, therefore, are at higher risk of obesity. Moreover, infants from low SES who are exclusively fed formula are 2.5 times more likely to be obese by 24 months of age when compared to their peers of higher SES (Gibbs and Forste, 2014). In a 2003 review of 11 different studies on the association between breastfeeding and childhood overweight, being breastfed for longer than 6 months was associated with a reduced risk of overweight later on in childhood relative to children who were breastfed for less than 6 months. This analysis held true even when controlled for various confounding factors, including maternal BMI and socioeconomic status (Dewey, 2003). Other unhealthy infant feeding practices, like introducing solid foods before 4 months of age and going to bed with a bottle are also considered risk factors.

Inappropriate feeding styles and practices is another important risk factor in the development of childhood obesity. The early introduction of solid foods (<4 months) and being put to sleep with a bottle have been identified as factors which may increase a child's likelihood of developing obesity in the first 2 years by 40% and 30%, respectively (Gibbs and Forste, 2014). Parents of lower SES may be more likely to engage in these unhealthy feeding practices compared to parents of a higher SES (Gibbs and Forste, 2014)(Table 1.1).

Table 1.1 Associations between feeding practices and SES status. (adapted from Gibbs & Forste, 2014).

Feeding practice	Total Sample n=8030	Low SES (20%) n=1527	Middle to high SES (80%) n= 6502
Predominately formula fed	31.1%	47.9%*	27.2%
Put to bed with bottle	31.5%	47.9%*	27.6%
Solid foods < 4 months	20.8%	23.4%*	20.2%
*Means for low SES differ significantly at P<0.05 from middle to high SES			

Maternal feeding style is another important characteristic in the development of childhood obesity. Children have an innate ability to self-regulate hunger and satiety, but parent feeding styles could override those signals and lead to excessive intake and obesity (Stifter et al., 2011). In fact, feeding style has been identified as an important modifiable risk factors in the prevention of childhood obesity and will be discussed in greater detail in Chapter 2.2.

Early Childhood Obesity

Developmentally, toddlers ages 9-24 months are at an especially important time for acquiring dietary habits (Horodynski et al., 2011). At this age, children begin weaning from breast milk or formula, start self-feeding, and establish their dietary preferences. The family environment can greatly influence a child's dietary habits through parental modeling and values, mealtime structure, and feeding styles. In fact, by the time a child

reaches 3 years, it's possible that their internal cues of hunger and satiety have been overridden by environmental influences. (Patrick and Nicklas, 2005). Therefore, interventions targeted at children of this age and their parents may prove to be the most effective in life-long obesity prevention (Horodynski et al., 2011).

Studies show children's food preferences are highly influenced by the preferences of their role model, especially the mother (Patrick and Nicklas, 2005). In many cultures with traditional gender roles, like the Mexican-American culture, mothers are the primary care givers, thus spending more time with their children during mealtimes than fathers (Sosa, 2012). Because of this influential role, mothers' knowledge, attitudes and values towards food impact her feeding style and, therefore, her child's intake. While the influence of the mother who does not have healthy eating habits may be problematic, her importance as a powerful figure in the child's dietary habits presents great opportunity for education targeted at mothers (Horodynski and Stommel, 2005).

Besides developing food preferences, this age (3-5 years of age) is also important because of the changes experienced in normal patterns of growth. These changes, also known as Adiposity Rebound (AR), include a drop in BMI after infancy (0-12 months) to a minimum point between ages 5-6, after which BMI continues to increase until adulthood (Williams and Goulding, 2009). An early AR, around age 3, is associated with higher BMI in adolescence and adulthood, in addition to early menarche and lower bone density (Rolland-Cachera et al., 2006). This early increase in body weight, combined with a lack of parental awareness of proper growth and development might further contribute to the development of childhood and, later on, adult obesity.

Perceptions of body weight may impact feeding style and, therefore, food intake in young children. A normal-weight child that is perceived to be too thin may be pressured to eat more, whereas an overweight child that is perceived to be normal-weight may continue to receive larger portion sizes than he or she actually requires (Kroke et al., 2006). The commonly accepted feeding practices of pressuring children to eat more after they have said they are full or limiting high-energy foods may actually contribute to the development of overweight/obesity (Sherry et al., 2004). According to one focus group study conducted in the Atlanta area, believing that their children are prevaricating when claiming fullness may be more common with Latino mothers than other groups (Sherry et al., 2004). In addition, perceptions of body weight may vary across ethnic, SES, and even country of residence (Sherry et al., 2004; Guendelman, Fernald, Neufeld, & Fuentes-Afflick, 2010). According to a focus group study conducted in the Central Coast area of California, more acculturated Latina mothers may be less likely to believe health professionals when told their child is overweight compared to less acculturated mothers (Chavoor, 2013).

Once established, overweight and obesity are extremely difficult to reverse, therefore, the most effective strategies in the fight against childhood obesity are based on prevention (Horodynski 2011, Waters, et al., 2011).

INFLUENCES ON TODDLER FEEDING BEHAVIORS

Feeding Styles

Feeding style has been defined in different ways by nutrition researchers. As part of an overall parenting style, the term generally helps explain the structure and responsiveness a parent demonstrates towards a child's hunger and satiety cues. Because

feeding style is believed to be influenced by overall parenting style, similar constructs can be used to explain parental feeding styles. Based on the work of numerous studies from child development researcher like Baumrind and Macoby and Martin, these parenting styles are classified as authoritative, authoritarian, indulgent and neglectful (Chaidez and Kaiser, 2011). An example of authoritative feeding would be to offer a child a choice between two snacks, whereas an indulgent feeding style would be to cater to the child's demands for snacks. Authoritarian feeding would be if a parent forces a child to finish their plate even if the child is not hungry. Neglectful feeding would be if a parent is uninvolved in their child's eating habits.

Table 1.2 Summary of parental feeding style, adapted from Chaidez & Kaiser, 2011

	High demandingness	Low demandingness
High responsiveness	Authoritative Provides structure and rule-setting but is mindful of child's thoughts and feelings	Indulgent or permissive Receptive to child's wants and needs but offers little or no structure, expectations and discipline
Low responsiveness	Authoritarian Controlling, restrictive, and disciplinarian, without regard for child's input or needs	Neglectful or uninvolved Emotionally uninvolved and does not set rules or expectations

Numerous studies have shown that a parent's feeding style can influence their child's weight, although not all of these studies concur on which style is most predictive of childhood overweight and obesity (Chaidez and Kaiser, 2011). According to one longitudinal study of low-income Mexican-American children (ages 4-8) and their mothers, an indulgent feeding style was associated with the development of overweight/obesity after 3 years (Olvera and Power, 2010). Similarly, in a study of Head Start families, Latino parents were more likely to exhibit indulgent behaviors which encourage the child to eat more compared to African American parents. In this study, these behaviors lead to higher rates of overweight and obesity in Hispanic children, with

rates among boys particularly high at 46% (Hughes et al., 2006). Finally, in a study of Latino mothers with children 12-24 months of age, an indulgent feeding style was associated with a higher daily calorie intake—but not heavier weights—compared to other feeding styles (Chaidez and Kaiser, 2011). Indulgent parents may cater to food preferences or may be unable/unwilling to control access to the many obesogenic factors that could contribute to childhood overweight. Further, indulgent parents may not provide the guidance necessary to teach children how to self-regulate hunger/satiety (Olvera and Power, 2010).

In another study of 1st grade children and their parents, however, showed that parents with an authoritarian style were more likely to have overweight/obese children (Rhee, 2006). This difference could potentially by the age of the children as it included a larger sample size of older children across multiple ethnic and socioeconomic groups compared to the previously mentioned studied which included only low-income minority groups.

Ethnicity may also to influence feeding style. In one study of low-income Mexican-Americans, most mothers' parenting/feeding styles were characterized as uninvolved/neglectful (37%) or indulgent (28%), with a remaining 19% and 16% being authoritative and authoritarian, respectively (Olvera and Power, 2010). Conversely, a study of mostly white mothers in Oklahoma study showed the majority were authoritative (Hubbs-Tait et al., 2008).

Acculturation appears to play a role in parental feeding styles. In a study of 398 Latino maternal-child dyads, acculturation was assessed using the Short Acculturation Scale For Hispanics (SASH) and feeding styles were assess using the Infant Feeding

Style Questionnaire. Mothers who were less acculturated to the US were more likely to use pressuring or permissive practices when feeding their infants compared to more acculturated mothers (Dancel et al., 2015).

Feeding Practices vs. Feeding Style

Until recently, the link between parenting feeding *styles* and their actual feeding *practices* has mostly been a theoretical one (Birch and Fisher, 1997). Researchers predicted that controlling or restrictive feeding practices and pressure to eat would correlate with an authoritarian style, while more supportive practices like modeling, encouraging, and monitoring would correlate with an authoritative style. Logically, a permissive style of parenting would negatively correlate with the restriction, pressure to eat, modeling and monitoring. In order to verify these relationships, researchers in Oklahoma administered four validated surveys, including the Child Feeding Questionnaire (CFQ) to measure feeding practices and the Parenting Styles and Dimensions Questionnaire (PSDQ) to measure parenting style, to 239 parents of 1st graders. Interestingly, researchers found that 21%, 15% and 8% of the variance in authoritative, authoritarian and permissive parenting styles, respectively, were indeed explained by the feeding behaviors the researchers had associated with each style (Hubbs-Tait et al., 2008). Namely, that monitoring, modeling and encouraging behaviors were associated with an authoritative feeding style, controlling/restricting and pressure to eat behaviors were associated with an authoritarian feeding style, and not restricting or modeling behaviors were associated with a permissive feeding style. This link is important because much of the nutrition literature focuses on describing feeding practices and their impact on the weight of the child. The literature that connects both feeding

styles and feeding practices allows researchers to understand a more complete picture of the eating environment children experience with their families.

Child feeding practices are not necessarily intuitive. Parents who restrict access to high-sugar, high-fat foods may cause their children to fixate on those foods and consume more of those kinds of foods (Fisher and Birch, 2000). Similarly, a longitudinal study with young girls and their parents in Pennsylvania showed that a more restrictive maternal-child feeding style is associated with increased consumption of restricted foods when the child is able to access them, along with more increased consumption even when the child is not hungry. This association between restriction and eating in the absence of hunger may be problematic if the child is already overweight, causing eating in the absence of hunger (Birch et al., 2003). Additionally, a controlling maternal-child feeding style which encourages the consumption of certain foods is also associated with increased pickiness and even aversion to those foods in the child (Fisher and Birch, 2000; Blissett and Farrow, 2007).

Interestingly, restrictive behaviors were highest for parents of obese and normal weight children compared to parents of overweight children. It may be that once a child is in the obese category, parental concern over the child's weight increases leading to restriction of certain foods. Indeed, in this sample, parents of obese children showed the highest levels of concern for their child's weight. Other findings from this study suggest that the parents of overweight children are not as concerned about their child's weight as parents of obese children. Not perceiving a problem in their child's weight may lead to a more permissive approach to feeding (Karp et al., 2014).

Feeding style can influence child weight even in infancy. According to one study, infants of mothers who were less controlling in their feeding practices (ie mothers who followed their children's cues for hunger and fullness, rather than forcing children to finish the bottle or controlling/limiting the amount of food given) from 6-12 months showed healthier rates of weight gain at 12 months compared to mothers with a more controlling style. Interestingly, mothers who with greater duration of breastfeeding were less likely to display a controlling feeding style at 1 one year compared to mothers who did not breastfed as long (Blissett and Farrow, 2007). At one year and two years of age, mothers in this study were consistent in their feeding style, suggesting that, without intervention, feeding style remains constant. Therefore, early intervention in education around maternal-child feeding styles that promote healthy child weight may be an important factor to preventing onset of childhood overweight (Brown & Lee, 2011).

Maternal weight and eating style have also been shown to influence feeding style. In one survey of 642 mothers with children ages 6-12 months, a high maternal BMI was associated with higher concern for child's weight than mothers with normal BMIs. In addition, mothers who were scored as high in restrictive and emotional eating for their own eating style also reported higher concern for child weight, and were restricting and monitoring their child's diet. These mothers not only perceived their own weight to be heavier than reality, they also perceived their child to be larger than he or she actually was (Brown and Lee, 2011).

Across the socioeconomic and racial spectrum, many mothers may be engaging in unhealthful feeding practices (Sherry et al., 2004). According to one study with 101 mothers from diverse racial and socioeconomic backgrounds, the majority indicated they

used favorite foods (often sweets) as bribes or pacifiers and often encouraged their children to eat more even if the child indicated he or she was full (Sherry et al, 2004). These practices fall in line with a more authoritarian feeding style. Pressuring their children to eat more was especially prevalent in the Latina mothers interviewed for this study, which correlates with other research focused on this population (Sherry et al, 2004; Chavoor 2013). Additionally, many mothers indicated they accommodate specific requests made by their children during mealtimes. While all these strategies may be aimed at encouraging good nutrition for their children or peaceful mealtimes, they may be unintentionally interfering with a child's natural ability to self-regulate hunger/satiety.

Style and Dietary Intake

Feeding style impacts dietary quality in children in different ways. In a study of low-income African-American and Latino caregivers, authoritative caregivers were more likely to have fruits and vegetables available to their preschool-aged children than their authoritarian counterparts. As might be expected, the children of authoritative caregivers consumed more vegetable and dairy foods than those of authoritarian parents (Patrick et al., 2005). Consumption of fruit was not significantly different between the children of authoritative or authoritarian parents, potentially due to children's natural preference for these sweet foods.

Division of Responsibility

Division of Responsibility (sDOR) refers to different spheres of responsibility parents and children have in the context of feeding and eating. According to this model, parents of young children are responsible for deciding when, where and what the child will be offered and the child is responsible for deciding if and how much they will eat. For this model to be successful, it must be based on the trust of the parent that the child is

indeed autonomous in these areas (Satter, 2004). It also highlights the responsibility a parent has to be the "gate-keeper" as to what kinds of foods are available in the home, in addition to when and where a child has meals or snacks.

Allowing children to decide when they are hungry or full, as emphasized in the sDOR, is one example of an authoritative feeding style. Evidence shows that families who follow the sDOR feeding paradigm are less likely to have children with eating difficulties and decreases some risk factors for developing overweight/obesity healthier (Lohse et al., 2014).

In recent years, some interventions aimed at early childhood nutrition have focused on the sDOR. One such study focused on caregivers in the Santa Clara, California area and assessed whether their child-feeding knowledge and practices were in line with sDOR ideals (Freedman and Alvarez, 2010). Compared to Asian or White caregivers, Hispanic caregivers were more likely to make child finish food before desert, cook foods they knew the child likes, encourage child to eat amount of food they thought was appropriate, and not to eat with children during meals. Hispanic caregivers were also more likely to encourage children to eat foods they thought were good for them (Freedman and Alvarez, 2010). This authoritarian approach could actually lead to children being less likely to consume healthy foods, like vegetables and dairy (Patrick et al., 2005). The Hispanic caregivers were also 3 times more likely to cater to a child's food preferences than Asian or white caregivers. Catering or indulging in child food preferences could be considered a permissive feeding practice, therefore, this behavior is not consistent with the sDOR (Freedman and Alvarez, 2010). Compared to their Asian and White peers, Hispanic caregivers were more likely to enforce the "clean your plate"

rule before a child could leave the table (Freedman and Alvarez, 2010). This practice teaches children to eat according to external cues rather than listen to their own hunger and satiety mechanisms and is associated with a more authoritarian style.

Numerous researchers have called for more education around division of responsibility, particularly that parents serve as gatekeepers for their child's diet (Sherry et al., 2004; Chaidez and Kaiser, 2011). In fact, in a study of children ages 2-4 who were at risk of developing obesity, education based on sDOR decreased pressure to eat behavior by parents compared to a control group (Agras, 2012).

NUTRITION EDUCATION

Obesity is proving itself to be an almost intractable condition, therefore programs aimed at its prevention are considered to be the most effective form of intervention. Numerous studies have shown that early childhood is an important time in establishing dietary patterns and BMI trajectories (Birch and Fisher, 1997). Because of this, interventions aimed at this age group may be particularly effective at curbing childhood obesity (Horodynski et al., 2011).

Interestingly, there is a paucity of research on nutrition interventions aimed at early childhood, particularly toddlers (Barkin et al., 2012). A review of intervention strategies aimed at reducing early childhood overweight found only 3 of 9 studies included children less than 36 months of age (Campbell and Hesketh, 2007). Encouragingly, the review found most studies do lead to improvements in obesity-related behaviors (Campbell and Hesketh, 2007). A more recent review of interventions aimed at children in the same age group, however, found that none of the seven included studies produced any effect in BMI (Monasta, 2011). Most of these studies were school-based

and the study noted a lack of parental involvement could be to blame for why these interventions did not succeed in reducing BMI (Monasta 2011).

Thus far, the vast majority of interventions in early childhood obesity prevention focus on improving dietary intake and physical activity patterns. Obviously, these factors are relevant in preventing overweight and obesity. Some researchers, however, have called for more interventions that integrate parental feeding styles as a necessary component in preventing childhood overweight (Hubbs-Tait et al., 2008). Few studies, however, include interventions aimed at promoting healthy parental feeding behaviors as a way to moderate weight gain, even though these behaviors have been linked to weight status.

While several studies have shown the link between child feeding behaviors and weight status, there have been relatively few studies showing the efficacy of nutrition education to improve these feeding behaviors (Birch and Fisher, 1997; Fisher and Birch, 2000; Sherry et al., 2004). An intervention study with parents of children ages 2-4 who were at risk of obesity was conducted on whether an educational series based on sDOR would decrease pressure-to-eat behaviors. The study recruited 62 families to participate in a randomized-control study comparing the efficacy of an educational program based on Satter's Division of Responsibility (DOR) to a standard health-promotion program. After five weekly 60-minute meetings, families participating in the DOR intervention were significantly less likely to pressure their children to eat compared to the control families, with mean scores of 1.60 (0.10) vs 2.4 (0.12), respectively, on the corresponding items in a modified Child Feeding Questionnaire (Agras, 2012).

In the Agras study, parental responses for food restriction/controlling behavior was not different between the sDOR treatment and control groups, indicating that not all aspects of sDOR behavior were incorporated by parents. Interestingly, child gender appears to have moderated the response in food restriction/controlling behavior. Parents of girls decreased food restriction behavior by 117% in the treatment group compared to only 19% in control group ($p<0.05$) (Agras, 2012). This is consistent with other studies which show differentiated feeding practices based on gender (Birch et al., 2003) (Fisher and Birch, 2000).

One 2005 study with Early Head Start (EHS) mothers focused precisely on improving feeding behavior using the sDOR. In this study, the intervention group participated in four weekly 90-minute sessions on healthy feeding practices, healthy adult modeling of eating behavior, and what and how much to feed their toddler. In addition to the 4 classes, participants received 18 structured, reinforcement sessions—which were incorporated into their regular EHS program— that covered similar information. While some improvements were seen in child feeding self-efficacy and knowledge, there was no difference in feeding behaviors between the intervention and control groups (Horodynski and Stommel, 2005) (Campbell and Hesketh, 2007).

As the authors point out, it may be easier to affect knowledge than behavior. There may have been reasons, however, why this study did not achieve its hypothesized results. The self-reporting method of data collection may have led to participants giving answers they assumed were acceptable. Participants also complained that the intervention was too lengthy. This may have interfered with participants ability to absorb and implement new information (Horodynski and Stommel, 2005).

Parental Feeding Behavior Education with Latinos

Few intervention studies using the sDOR model or teaching authoritative feeding styles have been conducted with a primarily Latino demographic. One such study, however, was the The Salud con la Familia study. This intervention was a culturally-based 12-week randomized-control study of Latino families that sought to improve nutrition habits and weight status of preschool aged children in Tennessee. Topics included parental feeding styles, increasing physical activity and decreasing sedentary time, culturally-appropriate and healthy meals and snacks, and eating meals as a family (Barkin et al., 2012). Impressively, a mean reduction of –0.59 in absolute BMI was seen in the intervention group compared to a control group, when controlling for age, gender and initial BMI. Importantly, children categorized as obese according to their initial BMI experienced the most profound mean decrease in BMI, at –0.80 kg/m^2 compared to +0.08 kg/m^2 in the control group (Barkin et al., 2012). This program was successful for many potential reasons. While other obesity prevention programs aimed at this age group have been school-based, this program included parents (Montasta 2011). Furthmore, the relatively long timeframe, 12 weekly 90 minute nutrition education classes, allowed interventionists to cover a range of healthy lifestyle topics. It was also tailored to be culturally relevant to Latinos (Barkin et al., 2012).

As part of the curriculum, one of the first classes in the Salud con La Familia intervention taught the importance of healthy parental feeding practices (Karp et al., 2014). The study then measured levels of parental responsibility for feeding their children the right portions sizes and kinds of foods, concern for child weight status, monitoring their child's intake of high-calorie foods, and restricting access to high-calorie foods as measured by a modified Child Feeding Questionnaire (CFQ; Likert scale of 1-5,

with 1=low) (Karp et al., 2014). Baseline data showed that responsibility for feeding was lowest among parents of obese children, which is consistent with other research that shows low levels of parental responsibility towards feeding is associated with higher obesity rates in children (Karp et al., 2014; Spruijt-Metz, 2006). Interestingly, the low-responsibility parents also had the highest levels of concern regarding their child's weight. At a 3 month follow up, it was found that the intervention group had improved significantly in their levels of responsibility and monitoring by mean of +0.29 and +0.25, respectively, compared to the control group ($p<0.05$). However, these changes were not found to significantly correlate with changes in BMI between the groups (Karp et al., 2014).

Another childhood obesity prevention study aimed at parenting practices was the Aventuras para Ninos (AVN) study. This was a school-based, randomized-control, longitudinal study in the Southern California area that assessed the efficacy of different levels intervention levels on child BMI and parenting practices associated with childhood obesity (Ayala et al., 2010). The parenting outcomes targeted by this study included parenting strategies (ie limit setting, discipline, controlling, monitoring, and positive reinforcement), parental support for child physical activity, parent-mediated family behaviors (ie TV watching during dinner or bringing home fast food for dinner), and cognitive factors (ie perceived barriers and self-efficacy to provide healthy food and physical activity). Four different levels of intervention included 1) participants who received home visits from health educators (*promotoras*), 2) participants who only experienced health promotion campaigns in the environment (at their child's school, at local restaurants), 3) participants who received both home visits and saw changes in their

environment and a 4) control group. Home visits were conducted monthly for seven consecutive months in a school year (Ayala et al., 2010).

By the second year post-intervention, the parenting strategies monitoring and positive reinforcement both improved in the groups that received home visits ($p<0.05$) (Ayala et al., 2010). Controlling behavior also decreased for the participants who received the visits. Television watching, parental support for physical activity, and eating less meals away from home all improved as well (Ayala et al., 2010). While these behaviors have all been associated with healthy weights in children, no data was presented on the effects of the intervention on child BMI.

Theories of Behavior Change, Self-Efficacy and Intention

According to the Theory of Planned Behavior (TPB), behavior is determined by intention, which is influenced by a person's attitudes, social norms and perceived control over that behavior (Figure 1.3; Netemeyer, Ryn, & Ajzen, 1991). Social Cognitive Theory (SCT) is considered the standard theory by which nutrition interventions are designed, especially those involving young children (Berlin et al., 2013). Social Cognitive Theory postulates that the way in which a person incorporates and maintains health behaviors is influenced by a person's environment and cognitive and emotional processes and how these elements interact with each other (Bandura, 1997). According to SCT, self-efficacy is one key cognitive factor that shapes and determines behavior. (AbuSabha and Achterberg, 1997).

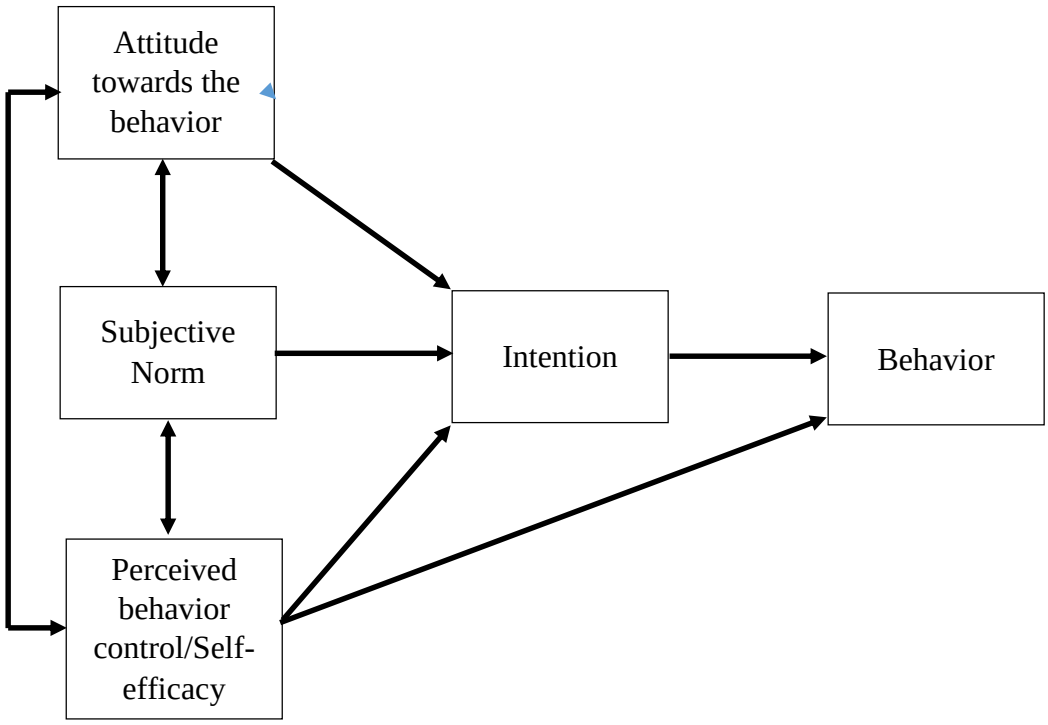

Figure 1.3 Theory of Planned Behavior, excerpted from (Netemeyer et al., 1991)

The constructs of self-efficacy and intent have been identified as strong determinants of behavior in both the TPB and SCT (Conner et al., 2013). Intent, sometimes referred to as behavioral intent (BI), reflects the desire or motivation to perform a specific behavior (Netemeyer et al., 1991). Self-efficacy is similar to the concept of "perceived behavioral control" characterized by the TPB and describes an individual's confidence in his or her ability to perform a specific behavior (Conner et al., 2013). While BI is often considered the most direct antecedent to behavior, for some behaviors, both intent and self-efficacy for the specific behavior are antecedents (Ajzen, 2002). Overall, these constructs have been shown to be good predictors of risky health behaviors, including dietary behaviors (McEachan et al., 2011).

The Role of Intention

According to Azjen, intent is behavior-specific. For example, the intent to increase vegetable consumption is distinct from the intent to drink low-fat dairy products, although both could be considered part of healthy eating (2002). Because intent is the most proximate determinant of health behavior, measuring this variable has been included in numerous health behavior studies (Azjen, 1991). Indeed, BI may be responsible for up to 39% of the variance in health behavior (Armitage and Conner, 2001). As strong an indicator of behavior as intention is, however, it must be noted that this construct is affected by other cognitions, including attitude, subjective norms and perceived behavioral control/self-efficacy (Armitage and Conner, 2001).

Because intention is strong indicator of motivation, measuring this construct has been an important component of many studies analyzing nutrition behaviors (Eto et al., 2011)(Lim et al., 2015). Intent has been shown to be a strong indicator of several health behaviors besides fruit and vegetable consumption including family meal frequency, label reading and breastfeeding (Lim et al., 2015). Interestingly, low SES, which is labeled as an environmental factor by SCT, may attenuate intent for certain health behaviors. In one study of intent to breastfeed, pregnant mothers who intended to breastfeed were 5.05 times more likely to breastfeed at follow up than mothers with lower levels of intention. However, the odds ratio between intention and breastfeeding dropped to 2.28 when analyzing intent among low SES (Conner et al., 2013). This could indicate that other factors, such as lack of financial resources or social support, moderate a person's ability to perform their intended behavior.

The Role of Self-Efficacy

Self-efficacy is an important concept in Social Cognitive Theory, and many other health behavior theories. Self-efficacy not only directly affects behavior through perceived capability, but it also impacts multiple other determinants of behavior, such as how one perceives barriers and opportunities, goals and aspirations, and outcome expectations (Bandura, 1997). Therefore, this construct has great effect on the ability of an individual to undertake new health behaviors.

An individual's sense self-efficacy is essential when implementing new behavior or dietary changes in their life. Bandura, one of the first characterize self-efficacy as a determinant of behavior, speaks of the importance of mastery experiences as essential in the process of developing self-efficacy for a specific task (2006). If a person experiences increased confidence and diminished anxiety, they are better able to implement and maintain new lifestyle choices. Similar to BI, self-efficacy is highly task-specific in that a high sense self-efficacy in one health related behavior is not necessarily generalizable to other health-related behaviors. According to one review, self-efficacy may explain up to 50% of the variability in health outcomes (AbuSabha and Achterberg, 1997).

Learner-Centered Education

Studies show that traditional, lecture-style education may not be the most effective strategy in affecting behavior change and increasing motivation in adults (WIC training, 2000). Dietary behavior is complex, which makes meaningful nutrition education a challenge. Many experts have called for more than just passive forms of learning and the need to develop educational strategies that respond to both the gaps in knowledge and to develop self-efficacy in order to really affect dietary behavior change (AbuSabha et al., 1999).

Learner Centered Education (LCE) or Dialogue Education, focuses on the process-based learning (Vella, 2002). By encouraging and validating the contribution of the participants own knowledge, the facilitator can increase their client's sense of self-efficacy and confidence (AbuSabha et al., 1999). In this style of education, traditional roles between teacher and student are redefined: the educator becomes an active listener and learner, while the learner's knowledge and experience is validated and respected. Ideally, the learners decide the content of educational session as well, although this is not always feasible in public health programs (Grant-Sigman 2004). The learner is recognized as the "expert" in their own lives and the educator recognizes the learner's role as decision maker for what, and if, he or she will learn the information (Crawford et al., 2008).

This method of education requires a great deal of flexibility on the part of the facilitator. The facilitator guides the conversation to cover certain perspectives or approaches he/she may want to address, but the learners should decide more specifically what they're interested in knowing more about (AbuSabha et al., 1999). In LCE, the nutritionist acts as a facilitator by encouraging the participants to contribute their own knowledge and experiences. Participants' viewpoints are not only shared but validated by the nutritionist, creating a positive learning environment. One reason for the success of LCE as a learning method is that it respects each participants experience and culture, while also providing a safe space to share personal concerns (Crawford et al., 2008). At it's core, LCE is non-paternalistic and inclusive learning modality. In other words, the educational program focuses on the learners needs. Importantly, the learner(s) should be responsible for at least 50% of the dialogue during the educational session (WIC 2005).

In 2005, California Women, Infants and Children (WIC) agencies participated in a large-scale studying evaluating the impact of LCE as compared to traditional, didactic education. The aim of the educational program was to improve fruit and vegetable consumption among participating mothers. The study found mothers who participated in this kind of education were more 1.2 times more likely to change fruit and vegetable consumption behaviors than those who had received traditional, didactic education (Crawford et al., 2008). Also, participants reported higher satisfaction with the learning model as compared to more traditional education.

HEAD START

Head Start is a federally funded preschool program for low-income children. Early Head Start (EHS) is a school-year based early preschool program for low-income (as defined by Federal Poverty Guidelines) children who are 6-weeks to 3 years of age. Early Migrant & Seasonal Head Start (EMSHS) has similar age and income guidelines but 51% of the family income must come from agriculture and the family must migrate every 2 years in search of work (Department Health and Human Services, 2015). As one would expect, rates of obesity in children participating in Head Start are higher than the national averages because they are, by definition, low-income (Lumeng et al., 2015). For 2012-2013 school year the combined overweight and obesity rates for children in Community Action Partnership San Luis Obispo's (CAPSLO) Head Start and Migrant/Seasonal Head Start programs were 33% and 42%, respectively (CAPSLO 2015). Importantly, these data are from children ages 3-5 years old, not the Early Head Start option.

The higher rates of overweight/obesity observed in CAPSLO's EMSHS program is not unusual. In fact, a study with the children (2-13 years old) of migrant farm workers

(MFWs) found the overweight/obesity rates to be 48% (Kilanowski, 2012). It must be noted that this rate was found in a sample that included older children, who have higher rates of overweight/obesity. Even still, this rate is higher than the national average in children 6-11 (Ogden et al., 2014).

The study of MWF parent-child dyads, in which almost all participants identified as Hispanic, found food insecurity to be greater in MFWs compared the national average for Hispanics (Kilanowski, 2012). Income was also low, with 83% of participants earning less than $1000/month. Acculturation, measured using the Short Acculturation Scale for Hispanics, was low among the MWF in this study. This suggests that children of MWF experience may be at higher risk for developing obesity compared to other low-income Latino children with greater food security, a relatively higher income, and greater parental acculturation (Kilanowski, 2012).

According to the Public Policy Institute of California, children in California have slightly higher rates of poverty than the rest of the nation, at 24.1% in 2011 compared to 21.4% in the rest of the country. Children of Hispanic descent have higher rates of poverty than white or Asian children, at 31.2%, 10.1% and 13.2%, respectively. Latino children, because of their large demographic presence in California, make up 64.3% of children living in poverty in the state (Bohn and Levin, 2013).

By some estimates, up to 42% of children living in poverty participate in Head Start nation-wide. This figure decreases to only 4%, however, when analyzing participation rates for Early Head Start, which is specifically for children 0-36 months (Schmit et al., 2013). This overall high participation rate makes Head Start program an

excellent point of access for interventions focusing on nutrition and childhood obesity among low-income children.

A large study conducted in Michigan found that children participating in Head Start have healthier BMI z-scores upon entering kindergarten when compared with other similarly aged children who did not participate. This difference was found when Head Start children were compared to both children insured by Medicaid (low-income children) and not insured by Medicaid (not low-income). More specifically, it was found that by the time obese children entered kindergarten, the children participating in Head Start had significantly lower mean BMI z-scores (1.66, SE=0.06) compared to Medicaid-insured children (2.046, SE=0.08) and not Medicaid-insured children (1.84, SE=0.05). Similar improvements were seen for children who were just overweight but not obese. There were no differences observed for normal-weight children (Lumeng et al., 2015).

There may be multiple reasons for the differences between groups. The meals and snacks provided by Head Start may be healthier than foods children receive at home, and may be offered in a more positive, child-centered way (Lumeng et al., 2015). Daily physical activity is included as part of the curriculum and nutrition and health monitoring are a mandated part of all Head Start programs. As part of this health monitoring, the parents of children who are considered obese are notified and receive educational materials and guidance from Head Start staff. These children are also measured and weighted monthly to monitor weight status.

Feeding practices at all Head Start centers are governed by a set of national standards. These practices incorporate authoritative, child-centered behaviors that Ellyn

Satter describes as the Division of Responsibility (Department Health and Human Services, 2015).

OBJECTIVES

This study aims to assess the efficacy of an educational intervention guided by Learner Centered Principles to teach healthy toddler feeding practices and stages of growth in order to prevent childhood obesity in low-income Latino children. This intervention will take place at Head Start centers in order to assess it's future feasibility as a regular component on their parent education program.

CHAPTER 2: MATERIALS AND METHODS

OBJECTIVES AND HYPOTHESES

This study aims to:

1. Measure the effectiveness of one or two workshops of dialogue education to teach healthy toddler feeding practices, specifically a) to allow child self-regulation of satiety, b) to maintain a schedule for meals and snacks and c) to role-model healthy eating when compared to a control group. Self-efficacy and intent were also measured as mediators of these specific behaviors.
2. Measure the effectiveness of dialogue education to teach appropriate stages of growth in order to increase mothers' ability to know when their children are at a healthy weight compared to a control group
3. Compare baseline maternal toddler feeding practices between low-income Latina mothers participating in Early Head Start (EHS) or Early Migrant/Seasonal Head Start (EMSHS).

Hypotheses:

1. After the dialogue education intervention, an increase in self-efficacy and intent will correspond with an increase in positive healthy toddler feeding behaviors, specifically allowing child self-regulation, maintaining a schedule, and role-modeling healthy eating.
2. Participation in two workshops will have more of an effect on healthy toddler feeding behaviors than participation in one workshop, or no workshops.
3. Participation will increase knowledge of stages of growth and self-efficacy of being able to tell when their child is at a healthy weight.

4. Maternal toddler feeding practices will be less healthy in EMSHS participants compared to EHS participants.

ASSUMPTIONS

- Migrant Head Start mother participants have similar demographic characteristics, behaviors, self-efficacy and intent for toddler feeding practices across San Luis Obispo, Santa Barbara and Monterey counties.
- Mothers who participate in one workshop, two workshops or none (control group) have similar demographic characteristics and baseline behaviors, self-efficacy and intent for toddler feeding practices.
- Participants answer questionnaires truthfully.
- Participants are fluent in Spanish.
- The questionnaire used in this study is accurate and reliable.

MATERIALS

Subjects

The subjects in this study were low-income Latina mothers with children under 3 years of age and were participants in Early Head Start (EHS) in San Luis Obispo County or Early Migrant & Seasonal Head Start (EMSHS) in San Luis Obispo, Santa Barbara and Monterey counties.

- Mothers of toddlers were chosen as the targets of this intervention for several reasons. Between 12 months and 3 years of age, children begin to establish more independence when self-feeding, therefore, parents of children this age are prime targets for child nutrition education focusing on developing healthy toddler feeding behavior. Mothers in particular were chosen because of their unique and

important role in toddler feeding and because of previous work in this population of Head Start, Latina mothers (Chavoor, 2013) (Brown and Lee, 2011).

Inclusion Criteria

- Self-identify as Latino
- Children more than 12 months and less than 3 years of age
- Mothers participating in EHS or EMSHS
- Spanish-speaking

Exclusion Criteria

- Not Latino
- Children younger than 12 months or older than 3 years of age
- Fathers
- Did not speak Spanish

METHODS

Recruitment

Participants were recruited from Early Head Start (EHS) or Early Migrant/Seasonal Head Start (EMSHS) preschool centers or home-based child-care providers by the principal investigator (PI), EHS/EMSHS staff, and undergraduate research assistants (RA) who explained the research study to the mothers who fit the inclusion requirements. The bilingual (English/Spanish) PI or the RAs went to the centers/home during previously scheduled parent meetings to explain the research study to interested mothers. At that time, a letter of interest (see appendix B) and letter of informed consent (see appendix C), in English or Spanish, was completed, in person, by interested mothers to gather contact information and obtain consent. As an incentive, it was explained that, after the study was complete, all participants would receive a $10 or $20 gift card to Wal Mart, depending on

their level of participation (Table 2.1). This project was approved by the Cal Poly San Luis Obispo Human Subjects committee on 12/18/2013.

All participants were invited to attend the workshops, which took place during their mandatory, monthly parent meetings. While all mothers received a reminder phone call before each meeting, not all of those who had given consent and completed the baseline survey actually attended the meeting. The reasons for their absence varied, but lack of transportation was often mentioned. Because these mothers would not receive the educational intervention, they were named the control group. These participants then completed a post-intervention questionnaire by phone at the same time as participants in Group 2.

Participants who were only able to attend the first workshop were named Group One. Again, participants were called 2-3 days prior to the workshop to remind them. Reasons given for inability to attend were the same as for the Control group. Fathers also frequently attended the parenting meetings, rather than the mothers. The Group 1 participants were then called to complete the post-intervention questionnaire 1-3 days after the second workshop (about one month after their first workshop).

Participants who were able to attend both meetings were named Group 2. Group 2 participants were called to complete the post-intervention questionnaire 2-4 weeks after the second workshop. See Figure 2.1 for a graphical representation of the intervention timeline.

Initially, the intervention was to include mothers participating in both EHS and Early Migrant & Seasonal Head Start (EMSHS). After a pilot workshop at an EHS center, it was found that presenting content in both English and Spanish created inherent

boundaries for some participants because they were not able to communicate with the entire group. As a result, it was decided that the intervention would be focused exclusively on EMSHS mothers. Additionally, the majority of EMSHS mothers were Latina, whereas roughly half of mothers in the EHS centers visited for this study were Latina.

Because the intervention was originally designed for low-income Latina EHS or EMSHS, baseline questionnaires had already been gathered with some EHS mothers before it became apparent that it would not be feasible to work with the EHS group. This change in study procedure, however, allowed us to compare baseline data on feeding practices between EMSHS and EHS mothers (Figure 2.1).

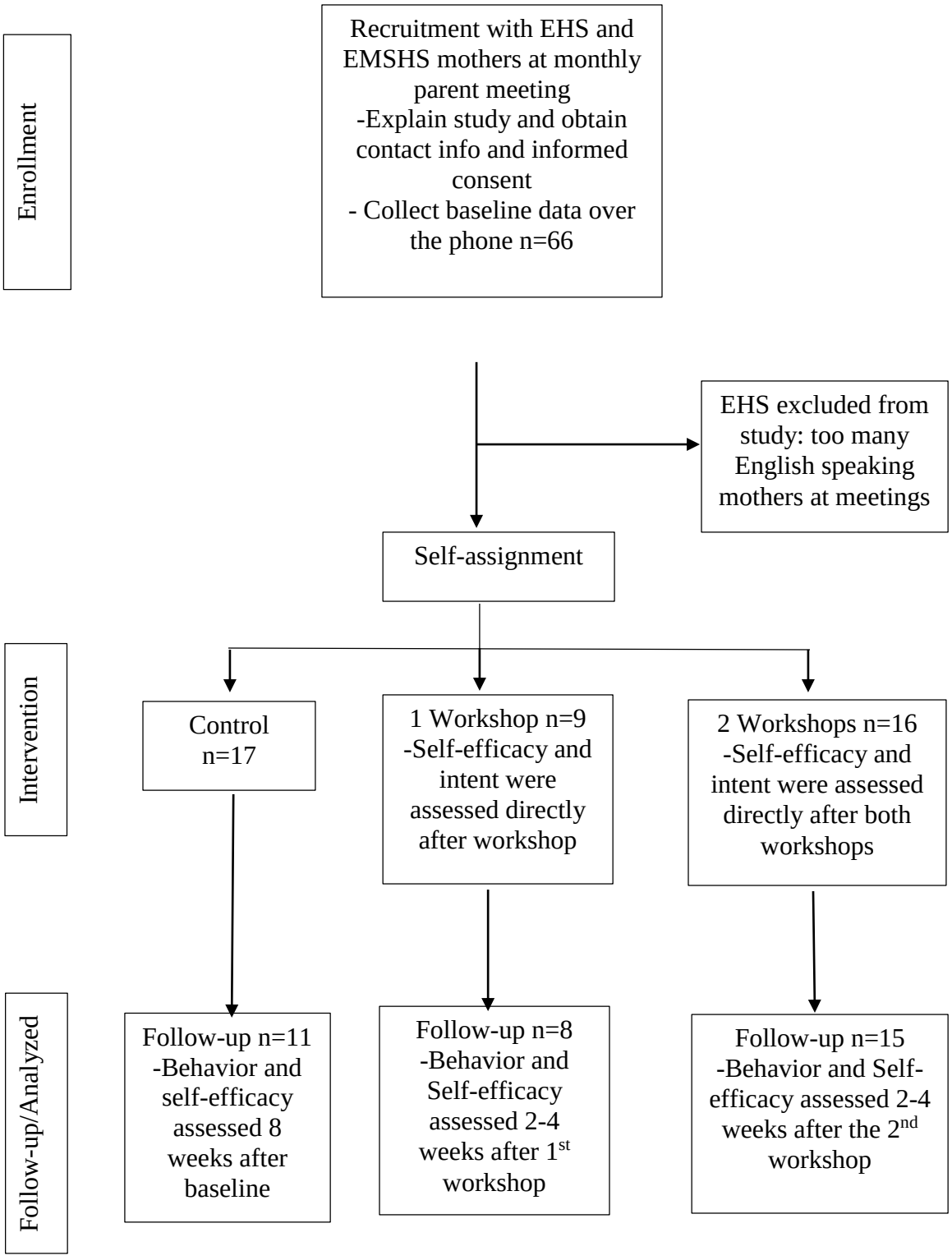

Figure 2.1 Study Flow

Intervention

This intervention was designed as a parent-teaching two-workshop series on healthy toddler feeding practices and appropriate stages of growth. Healthy toddler feeding practices were based on Ellyn Satter's Division of Responsibility (sDOR; Satter, 2007). Both workshops were designed using Dialogue Education, or Learner-Centered Education (LCE), principles (Vella, 2002).

The content of the workshops were based on previous work in this population. In focus group discussions, Head Start mothers reported a lack of confidence in knowing when their child was at a healthy weight and even a distrust of medical professionals' reports on their child's weight status (Chavoor 2013). Therefore, stages of growth and healthy body size for young children were determined as important themes for education. Teaching healthy toddler feeding practices was included as part of the intervention in order to give participants more action-oriented tools in order to help support healthy childhood development. Additionally, personal conversations with Head Start staff affirmed the importance of teaching healthy maternal toddler feeding practices.

Prior to the development of these workshops, the PI was trained in dialogue education by Global Learning Partners, Inc (GLP, Montpelier, Vermont). This training consisted of four one-on-one meetings with a GLP facilitator and owner where the PI developed a 7-step Lesson Plan to address the interventions objectives and a participant work-book for use during the workshops (see appendices D and E). Dialogue education is distinct from traditional, lecture-style education in many ways. When designed effectively, dialogue education encourages participants to draw from their own experiences, visually and kinesthetically engage with new information and skills and reflect on its relevance in their own lives. Rather than just the teachers being seen as the

experts whose responsibility it is to deliver the information, in dialogue education, participants are recognized as experts in their own lives (Vella 2002). This method was chosen because of its emphasis on learning by doing, an essential component of increasing self-efficacy (Figure 2.2; Bandura, 2006).

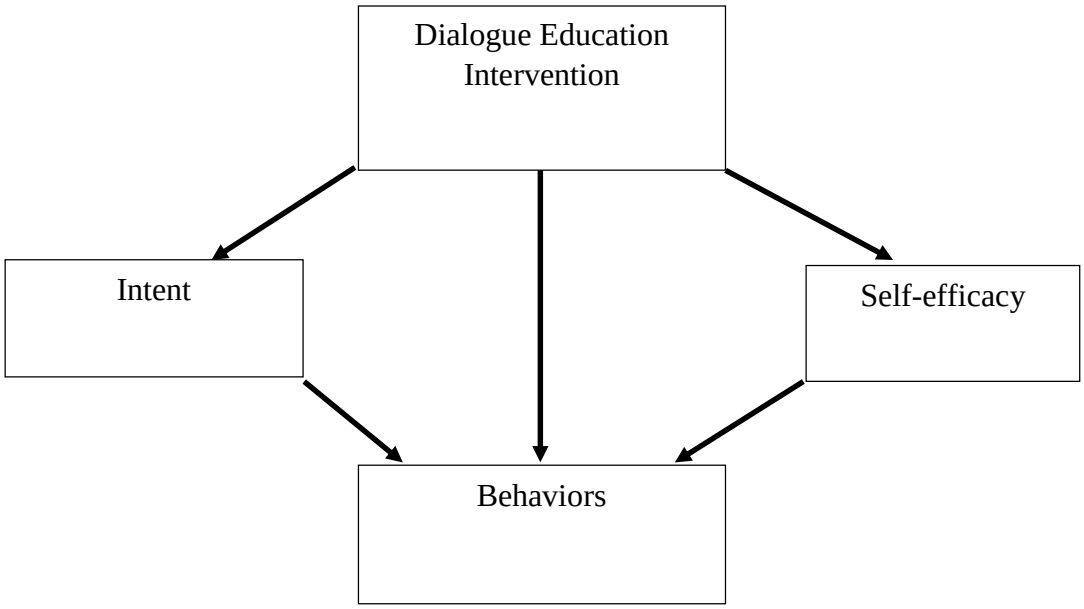

Figure 2.2 How dialogue education impacts mediators (self-efficacy and intent) and behaviors in the Healthy Toddler Feeding Intervention

The intervention workshops were held at participating Head Start centers in San Luis Obispo, Santa Barbara and Monterey counties during regularly scheduled parent meetings in which parents are required to attend/participate. The sessions were conducted entirely in Spanish. To facilitate participation, snacks and on-site child care were available. Each workshop was approximately 30-45 minutes in duration and was led by the PI.

The workshops had the following format:

1) Informal meet and greet

2) Introduction of facilitator and participants
3) Dialogue education focused on the following messages:
    1) Workshop 1: Healthy toddler feeding practices with three primary messages:
        a) Allowing child self-regulation of satiety (If/how much a child eats)
        b) Maintaining a schedule for meals and snacks (When a child is offered food)
        c) Role-modeling healthy eating with the family (What a child is offered)
    2) Workshop 2: Review of healthy toddler feeding practices and normal body size change from infancy to preschool
        a) Reviewed the three toddler feeding practices from the previous workshop
        b) Discussed normal body size changes using visual aids developed for the workshop (see appendix G)

Data Collection

All participants were administered the same baseline questionnaire (see appendix A) to establish their baseline behaviors, self-efficacy and intent around toddler feeding practices and knowing when their child is at a healthy weight. The questionnaire was administered by either the PI or RA to participating mothers over the phone before the first workshop. Directly after the first and second workshops, self-efficacy and intent was assessed.

Table 2.1 Intervention timeline for EMSHS participants

Study Group	Pre-Intervention	Intervention 1	Intervention 2	Post-Intervention	Incentive
Group 1 (n= 8)	Recruitment, informed consent, baseline questionnaire	Healthy toddler feeding practices workshop	None	Repeat of baseline questionnaire 2 weeks post-workshop; 1 month post-workshop	$10 gift card
Timeline	March through July 2014	April through August 2014		April through September 2014	April through September 2014
Group 2 (n= 15)	Recruitment, informed consent, baseline questionnaire	Healthy toddler feeding practices workshop	Review feeding practices, Normal stages of growth	Repeat of baseline questionnaire 2 weeks post-workshop; 1 month post- workshop	$20 gift card
Timeline	March through July 2014	April through August 2014	May through September 2015	May through September 2015	May through September 2015
Control (n=11)	Recruitment, informed consent, baseline questionnaire	None	None	Questionnaire	$10 gift card
Timeline	March through July 2014	April through August 2014	May through September 2015	May through September 2015	May through September 2015

For groups 1 and 2, two to four weeks after the final facilitated group discussion, the PI or RA called to administer the first post-intervention questionnaire. Originally, it was planned to obtain two post-intervention questionnaires, at 2 weeks and 4 weeks post-intervention. However, for most participants, only one post-intervention questionnaire was obtained due to difficulties in communication such as participants' cell phones being turned off, the numbers no longer working, or participants not being available during call-backs. For analysis, results from only the first post-intervention questionnaire (whether at the 2 week or 1 month interval) were used. For the Control group, the PI or RA called the participants around the same time as their Group 2 peers to administer a post-intervention questionnaire. Gift cards were distributed by the PI or Head Start Staff at the following parent meeting.

Questionnaire Design

To our knowledge, no previously validated questionnaires existed at the time of intervention to measure the constructs of maternal toddler feeding practices targeted by this intervention, specifically allowing child self-regulation of satiety, maintain a meal schedule and role-modeling healthy eating. In order to assess the effects of the intervention, the Healthy Toddler Feeding Questionnaire (HTFQ) was designed using some items from the previously validated Toddler Feeding Questionnaire and a survey utilized in previous Cal Poly San Luis Obispo research (Dawes, 2013; Chaidez & Kaiser, 2011). Using a Likert scale, the items included in the HTFQ assessed levels of self-efficacy and intent (1 to 5, 1=not confident/extremely unlikely, 5=very confident/extremely likely) and frequency of behaviors (1 to 5, 1=never, 5=always) in each of the three constructs of maternal feeding practices. Some items were reverse scored for analysis (Table 2.2).

Table 2.2 Index of items used to assess toddler feeding constructs (self-regulation, meal schedule, role-model).

Self-Regulation	
Behavior	How often do you allow your child to eat less than you think he or she should?
	How often to you allow your child to eat more than you think he or she should?
	How often do you do or say something to make your child eat more?†
	During meals or snacks, I let my child leave food on his or her plate
	I encourage or demand my child to eat more when he or she said he or she is full†
Self-Efficacy	At meals and snack times, I can allow my child to decide if he or she wants to eat or not.
	When my child says he or she is full, I can allow my child to decide when he or she has had enough to eat.
Intent	In the next 3 months, I intent to allow my child to decide if he or she wants to eat
	In the next 3 months, I intent to allow my child to decide how much he or she wants to eat
Meal schedule	
Behavior	How often does your child eat on and off throughout the day?†
	I let my child have something to eat whenever he or she asks*†
	I keep a regular snack schedule for my child *
	I keep a regular meal schedule for my child *
Self-Efficacy	I can keep a regular schedule for meals and snacks.
Intent	In the next 3 months, I intent to keep a schedule for meals and snacks for my child
Role Model Healthy Eating	
Behavior	My child eats the same foods prepared for the family*
	If my child does not want what is prepared, I give him/her something else*†
	When I eat meals or snacks with my child, I eat vegetables
	When I eat meals or snacks with my child, I eat fruit
	When I eat meals or snacks with my child, I eat or drink milk, cheese and yogurt
Self-Efficacy	I can model healthy eating habits with my child
Intent	In the next 3 months, I intent to make the same foods for everyone in my family
*Items excerpted from Chaidez et al Toddler Feeding Questionnaire †Items were reverse coded when entered into database.	

Statistical Analysis

All data collected was single-entered into an Access database designed specifically for this study. Some items were reversed coded (see Appendix F). One-way ANOVA was performed to detect differences in pre- and post-intervention behaviors between group 1, group 2 and the control group. Educational attainment was also added to this model to assess for differences in scores by this variable. One-way ANOVA was also performed to assess changes in the mediators of behavior (self-efficacy and intent) throughout the course of the intervention. For this analysis, Time 2 was taken directly after the first workshop

and Time 3 was taken directly after the second workshops. Two sample T-tests were also performed to analyze differences in baseline data for EHS and EMSHS participants. Regression analysis was performed to determine the relationship between self-efficacy, intent and number of workshops attended on behavior constructs. All analyses were performed using Minitab (Minitab, version 16, Minitab Inc., State College, Pennsylvania).

Quality Control

A pilot test of the HTFQ was performed March 2014. Face validity was first assessed by six Head Start health, nutrition and child development staff members. They read each item on the questionnaire and reported what they thought each question was asking. All questions were determined to be valid.

As of March 2014, it had not yet been determined that the intervention would only be conducted in Spanish, therefore, the test-retest reliability assessment of the HTFQ was conducted in both English and Spanish. Twenty participants (10 English speaking, 10 Spanish speaking) were recruited to complete the questionnaire in person at a Head Start center in Paso Robles. One week later, participants took the HTFQ again. Test-retest reliability for each item in the questionnaire was assessed with paired t-tests. All but one item passed ("If my child refuses to eat the meal I prepared for the whole family, I will not prepare something else") and this item was removed from the questionnaire. At this point, we then revised the questionnaire to ensure each item would reflect the actual content of the workshops. We also added a section on intent for each of the behaviors being taught in the intervention (Section E). In total, one multiple choice section on demographics, three multiple choice sections using a Likert-scale and one section with open-ended questions were included.

Internal reliability which refers to how well the questions within a construct actually relate to each other (Chaidez and Kaiser, 2011). For example, in the current study, one construct was self-regulation; behavior for this construct was assessed with 5 different items. Behavior for each construct (self-regulation, meal schedule, and role-modeling) was assessed with 4-5 items. Self-efficacy and intent, on the other hand, were only assessed using one item for the constructs of role-modeling and meal schedule. Self-efficacy and intent for self-regulation was assessed with two items (see Table 2.2 for a complete list of items in each construct).

The internal reliability of the items within each construct (i.e. self-regulation, meal schedule, and role-modeling) was determined using Chronbach's alpha with responses from EMSHS baseline. An acceptable Chronbach's alpha score is greater than **0.70** (Chaidez and Kaiser, 2011). Only intention to allow child self-regulation scored within this range, therefore, results obtained using this questionnaire must be interpreted cautiously.

Table 2.3 Internal reliability analysis for sub-groups associated with constructs of behavior

Construct of behavior	Chronbach's alpha
Section B – Behavior	
Role-model healthy eating	0.2941
Maintain a schedule for meals and snacks	0.2686
Allow child self-regulation	0.2482
Section C – Self-efficacy	
Allow child self-regulation	0.5419
Section E - Intent	
Allow child self-regulation	**0.7790**
*Note: An acceptable Chronbach's alpha ≥ 0.7	

CHAPTER 3: RESULTS

OBJECTIVE 1

The first aim was to measure the effectiveness of one or two workshops of dialogue education to teach healthy toddler feeding practices, specifically a) to allow child self-regulation of satiety, b) to maintain a schedule for meals and snacks and c) to role-model healthy eating when compared to a control group. Self-efficacy and intent were also measured as mediators of these specific behaviors.

Characteristics

A total of 42 Early Migrant/Seasonal Head Start Latino mothers living in Santa Barbara, San Luis Obispo and Monterey counties were originally enrolled in the intervention. Eight of these mothers were lost to follow-up, leaving 34 to complete the study. Age of participants ranged from 19 to 44 years, with a median age of 30 years. Number of children that participants had ranged from one to five, with a median of two children. Most participants were married or lived with their domestic partner. Almost all participants worked part-or full-time, with 79% working full-time.

Mothers participating in the three groups (control group participated in no workshops, group 1 participated in one workshop, and group 2 participated in two workshops) were similar in most respects, including age, number of children, and whether they worked, studied or had a domestic partner (Table 3.1). However, there was an important and significant difference in educational attainment between these groups. Mothers in the control group had significantly lower levels of education compared to

group 2 mothers. Although Group 2 mothers had, on average, higher levels of education than Group 1 mothers, this difference did not reach significance.

Table 3.1. Descriptive characteristics of participants (n=34)

Characteristics	Control n=11	Group 1 n=8	Group 2 n=15	P value
Age, mean (SD)	31.36 (5.12)	30.16 (4.88)	29.33 (6.15)	0.659
# of children, mean (SD)	2.18 (0.1.08)	1.88 (0.84)	2.40 (1.06)	0.505
Married/lives with partner	63.64%	87.5%	78.57%	0.488
Works FT or PT	100%	87.5%	100%	0.200
Studies FT or PT	0.0%	12.5%	6.67%	0.537
Does most food prep	100%	87.5%	100%	0.200
Highest level of education:				
Grade 8	81.82%*	50%	20%*	0.005
Some HS/Graduate	18.18%*	25%	66.67%*	0.024
Some college/Graduate	0.0%	25%	6.67%	0.163

Note: Percentages from general linear ANOVA.
*Indicates groups found to be significantly different from each other at p-value<0.05 level

Baseline vs Post-Intervention Scores for Maternal Toddler Feeding Behaviors

Maternal toddler feeding behaviors were the primary target of this intervention. Frequency of behaviors for each feeding practice, including self-regulation, schedule, and role-modeling, were measured with a Likert scale (one=never; five=always) at baseline and post-intervention (two to four weeks after their last workshop/eight weeks after baseline). A moderate score was considered 3.0, indicating the participant "sometimes" practices the behavior. Each feeding practice was assessed with a sub-set of items in the questionnaire (see Appendix G). Each treatment group (control who participated in no workshops; group 1 who participated in one workshop; and group 2 who participated in two workshops) was assessed at baseline and post-intervention.

In order to understand the differences between baseline and post-intervention mean scores in each intervention group, one-way ANOVA was also performed. For this analysis, the independent variable was assessment points (baseline, post-intervention) and the dependent variable was the mean score for each feeding practice. This was done in

order to compare the impact of the intervention on baseline and post-intervention scores for each treatment group. No significant differences were observed for any feeding practice (self-regulation, schedule, or role-model) in the Control group. Increases between baseline and post-intervention scores approach significance for the constructs of self-regulation and role-modeling in Group 1 (p=0.101, p=0.128, respectively) and Group 2 (p=0.127, p=0.119). When both intervention groups (Group 1 and Group 2) were combined, the improvements in self-regulation and role-modeling behavior were significantly improved post intervention (Table 3.2).

Table 3.2 Behavior mean scores by treatment groups for toddler feeding practices across assessment points.

	All groups N=34	Control N=11			Group 1 N=8			Group 2 N=15			Both Interventions N=23		
Assessment points	Pre	Pre	Post	p-value	Pre	Post	p-value	Pre	Post	p-value	Pre	Post	p-value
Self-regulation	3.071 (0.511)	2.946 (0.537)	3.036 (0.418)	0.663	3.275 (0.183)	3.70 (0.659)	0.101	3.053 (0.598)	3.387 (0.563)	0.127	3.130 (0.499)	3.496 (0.603)	**0.030**
Schedule	3.272 (0.607)	3.136 (0.360)	3.227 (0.596)	0.670	2.938 (0.623)	3.125 (1.077)	0.677	3.550 (0.649)	3.40 (0.784)	0.573	3.337 (0.693)	3.304 (0.882)	0.890
Role Model	3.835 (0.484)	4.00 (0.498)	3.891 (0.509)	0.617	3.60 (0.385)	3.95 (0.475)	0.128	3.840 (0.497)	4.173 (0.632)	0.119	3.757 (0.467(	4.096 (0.581)	**0.035**

Note: Values in cells are mean (SD)
Likert scale 1-5, with 1=never;5=always
Assessment points: Pre=baseline; Post=post-intervention
Both interventions=Group 1 and Group 2
One-way ANOVA

The difference in post-intervention behavior mean scores between treatment groups were assessed using one-way ANOVA. For treatment groups, the independent variable was treatment group (control, group 1, group 2), and the dependent variable was the post-intervention mean scores for each feeding practice. Post-intervention mean scores were used to assess differences in order to compare the impact of the intervention. A significant difference was found in self-regulation behavior between group 1 and control (Table 3.3). No significant difference was found between group 1 and group 2.

No other significant differences were found for the other two constructs of behavior (schedule or role-model). Post-intervention mean scores for both intervention groups (group 1 and group 2) were combined and compared the control group using a 2-sample t-test. A significant change was found between both interventions and the control for self-regulation (p=0.043), but not for schedule or role-model.

Table 3.3 Comparison of effectiveness of intervention between treatment groups using post-intervention behavior mean scores

	One-way ANOVA for each treatment group				T-test between both interventions and control		
	Control n=11	Group 1 n=8	Group 2 n=15	p-value	Control n=11	Both interventions N=23	p-value
Self-Regulation	3.036 (0.418)	3.700 (0.659)	3.387 (0.563)	**0.043**	3.036 (0.418)	3.496 (0.603)	**0.016**
Schedule	3.227 (0.596)	3.125 (1.077)	3.400 (0.784)	0.718	3.227 (0.596)	3.304 (0.882)	0.767
Role Model	3.891 (0.509)	3.950 (0.475)	4.173 (0.632)	0.413	3.891 (0.509)	4.096 (0.581)	0.306

Note: Values in cells are mean (SD)
Likert scale 1-5, with 1=never;5=always
Both interventions=Group1 and Group 2

Finally, mean scores were analyzed by educational level in order to determine if education influenced feeding practices using one-way ANOVA. For this test, the independent variable was educational level (grade 8 or less, some high school/graduate, some college/graduate) and the dependent variable was the overall mean score for each feeding practice. This test combined scores across treatment groups in order to detect differences in mean scores by educational attainment. In fact, no difference in behavior mean score was observed (Table 3.4).

Table 3.4 Educational attainment's effects on toddler feeding practice mean scores

	Education Level			
	<8th grade N=16	Some high school/graduate N=15	Some college/graduate N=3	p-value
Self-Regulation	3.088 (0.482)	3.313 (0.632)	3.333 (0.561)	0.248
Schedule	3.25 (0.681)	3.392 (0.646)	2.833 (0.983)	0.198
Role Model	3.900 (0.416)	3.927 (0.625)	4.133 (0.589)	0.616

Note: Values in cells are mean (SD)
Likert scale 1-5, with 1=never;5=always
One-way ANOVA

Results of each maternal toddler feeding practice are presented separately below.

Allowing Child Self-Regulation

Mean scores at baseline to allow child self-regulation of satiety across all groups was moderate (x=3.071 $\pm$0.511, n=34), indicating that mothers "sometimes" practiced this behavior at the beginning of the intervention (Table 3.2). Self-regulation behavior consistently improves between assessment points for all groups, although not all of these improvements were significant. Analysis within each treatment group showed no significant difference between baseline and post-intervention for the control group (baseline x=2.946 $\pm$0.537; post-intervention x=3.036 $\pm$0.418; n=11, p-value=0.663; Table 3.2; Figure 3.1). When Group 1 and Group 2 were analyzed separately, no significant difference was observed from baseline to post-intervention. However, when both these intervention groups were combined, an 11.6% increase was observed in means (combined baseline x=3.130$\pm$0.499; combined post-intervention x=3.496$\pm$0.60; n=23, p-value=0.03).

There was also a significant difference in post-intervention mean scores for allowing child self-regulation behavior between Control (x=3.034$\pm$0.418, n=11) and Group 1 (x=3.700$\pm$0.659; n=8, p=0.043; Table 3.3). Scores for Group 1 and Group 2 (x=3.387$\pm$0.563, n=15) were not significantly different from each other. When the post-

intervention mean scores of both intervention groups were combined to increase power of detection and compared with the control group, the intervention group was found to score significantly 15.15% higher than the control group (both interventions x=3.496±0.603, n=23; control x=3.034±0.418, n=11; p-value=0.016; Figure 3.1).

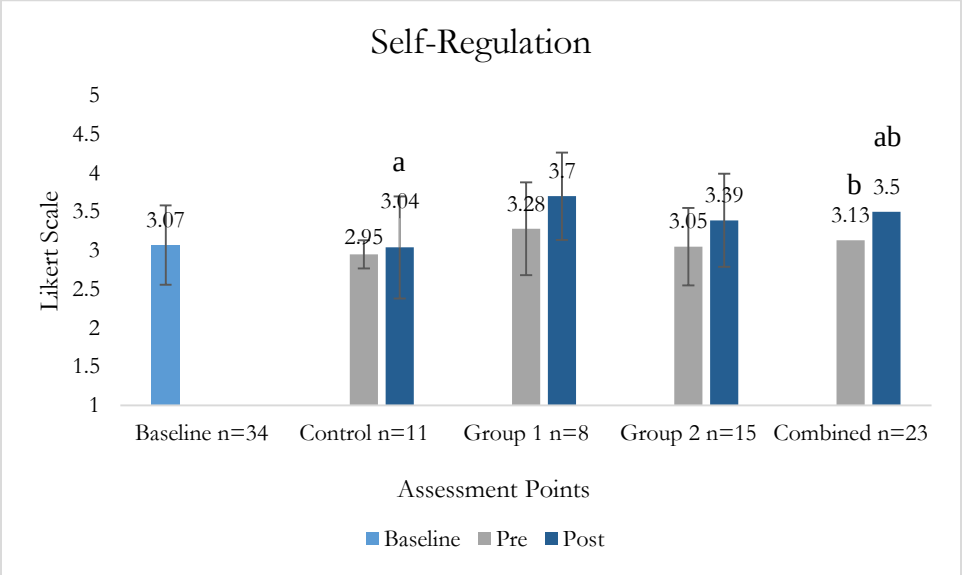

Figure 3.1 Baseline to post-intervention means scores of allowing self-regulation behavior. Columns marked with the same letter are significantly different from each other $p<0.05$.

Maintaining a schedule for meals and snacks

Baseline mean scores for maintaining a schedule behavior (x=3.272±0.607; n=34) across the three treatment groups were slightly higher than that of self-regulation, indicating that mothers "sometimes" maintained a schedule for meals and snacks (Table 3.2; Figure 3.2). Unlike with self-regulation, however, maintaining a schedule behavior hardly improved from baseline to post-intervention. Even when Group 1 and Group 2 were combined to increase sample size for the one-way ANOVA analysis, no change in post-intervention scheduling behavior was noted when compared to baseline.

No significant differences were noted in post-intervention mean score between treatment groups (Table 3.3). Group 2 scored highest (x=3.40±0.784, n=15) compared to Group 1 (x=3.125±1.077, n=8) and Control (x=3.227±0.596, n=11), however these differences were not significant (p-value=0.718).

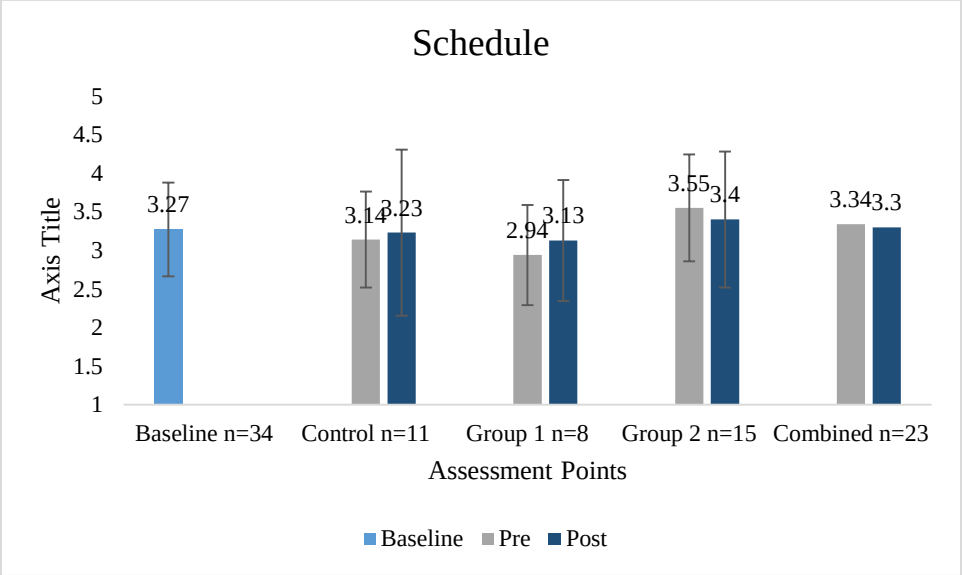

Figure 3.2 Baseline to post-intervention means scores of maintaining a schedule behavior.

Role-modeling healthy eating behaviors

Baseline mean scores for role-modeling behavior were high (x=3.835±0.484, n=34), indicating that mothers role model healthy eating behaviors were between "sometimes" and "most of the time" (Table 3.2). Both intervention groups (Group 1 and Group 2) saw a moderate increase from baseline to post-intervention in role-modeling, but these differences did not reach significance (Table 3.2; Figure 3.3). When these groups were combined, however, their post-intervention score increased by 9.03% (baseline x=3.757±0.467; post-intervention x=4.096±0.581; n=23, p-value=0.035).

Therefore, post-intervention, mothers who participated in the workshops engaged in role-modeling behavior “most of the time”.

Interestingly, no significant differences were observed in post-intervention role-modeling behavior between treatment groups. On average, Group 2 scored highest for role-modeling behavior (x=4.173±0.632, n=15), with Group 1 (x=3.950±0.475, n=8) scoring second highest (Table 3.3). When these two intervention groups were combined and compared to the control, the intervention group scored higher (x=4.096±0.581, n=23) than the control group (x=3.891±0.509, n=11), however this difference did not reach significance (p-value=0.306).

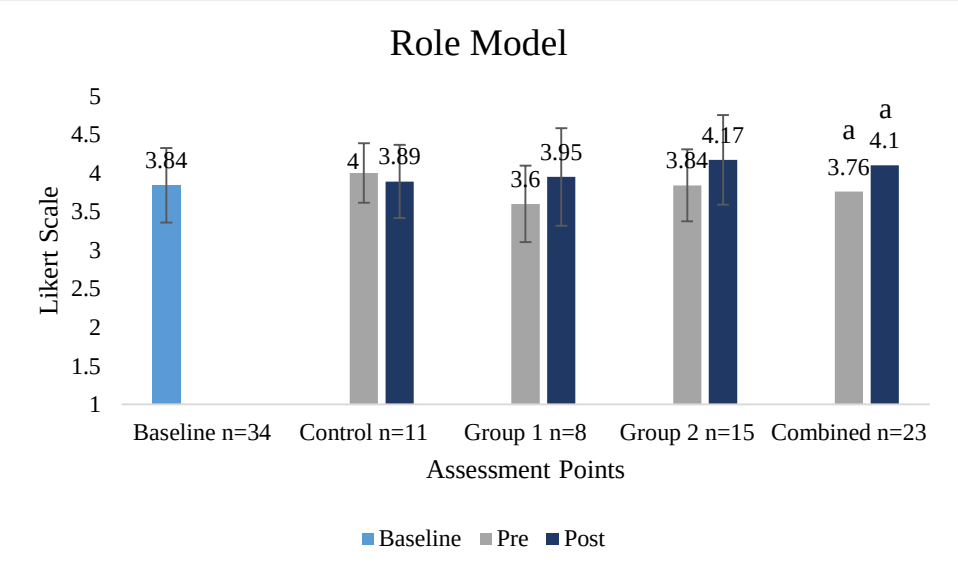

Figure 3.3 Baseline to post-intervention means scores role-modeling healthy eating behavior. Columns marked with the same letter are significantly different from each other $p<0.05$.

Changes in mediators of behavior

Self-efficacy

The mediators of behavior self-efficacy and intent were also targeted in this intervention. Self-efficacy for each feeding practice, including self-regulation, schedule,

and role-modeling, was measured with a Lickert scale (1-5, 1=not confident; 5=very confident). Each feeding practice was assessed with either one or two items in the HTFQ questionnaire (see Appendix G). A moderate score was considered 3.0, indicating the participant feels "somewhat confident" for their self-efficacy to perform a specific toddler feeding practice. Measurements were taken at baseline, Time 2 (directly after the first workshop), Time 3 (directly after the second workshop) and post-intervention (two to four weeks after their last workshop/8 weeks after baseline). All participants had measurements at baseline and post-intervention, however, only groups 1 and 2 had measurements at Time 2, and only group 2 had measurements at Time 3.

Similar procedures were followed for assessing differences in self-efficacy mean scores as were followed for behavior. A one-way ANOVA analysis was conducted to understand the changes in self-efficacy across assessment points in each treatment group. For this test, the independent variable was the assessment points (baseline, Time 2, Time 3, and post-intervention), while the dependent variable was self-efficacy mean score for each feeding practice. An overall trend was an increase in self-efficacy from baseline to time 2, however, this increase only achieved significance in self-efficacy to role-model healthy eating for Group 2. Interestingly, both intervention groups (Group 1 and Group 2) saw self-efficacy scores declines for all three constructs from their last workshop (Time 2 or Time 3) to post-intervention. For Group 1, this decline was significant for self-efficacy to allow self-regulation. When both intervention groups (Group 1 and Group 2) were combined, an increase between baseline and post-intervention scores was observed in self-efficacy to role-model.

Table 3.5 Self-efficacy mean scores in each treatment groups across assessment points.

Treatment group	All groups n=34	Control n=11		Group 1 n=8			Group 2 n=15				Both interventions n=23	
Assessment point	Pre	Pre	Post	Pre	Time 2	Post	Pre	Time 2	Time 3	Post	Pre	Post
Self-Regulation	3.603 (1.021)	3.545 (1.193)	3.318 (0.874)	3.50 (0.964)	**4.063 (0.177)**	**2.938 (0.904)***	3.70 (0.978)	3.967 (0.972)	3.967 (1.008)	3.70 (0.676)	3.63 (0.956)	3.44 (0.83)
Schedule	3.294 (1.268)	3.091 (1.221)	3.273 (1.348)	3.250 (1.165)	3.375 (1.061)	2.375 (1.506)	3.467 (1.407)	3.867 (0.834)	3.80 (0.862)	3.533 (1.187)	3.391 (1.305)	3.13 (1.392)
Role Model	3.353 (1.252)	3.364 (1.286)	3.545 (0.820)	3.375 (1.188)	4.0 (0.756)	3.750 (0.463)	**3.333 (1.345)**	**4.40 (0.632)***	4.20 (0.775)	4.067 (0.704)	**3.35 (1.265)**	**3.96 (0.638)***

Note: Values in cells are mean (SD)
Likert scale 1-5, with 1=not confident;5=very confident
Asterisk indicates p-value for difference between previous time interval using one-way ANOVA <0.05
Time 2 was taken directly after the first workshop. Time 3 was taken directly after the 2nd workshop.

In order to detect differences between treatment groups, a one-way analysis was performed. Independent variables included treatment group (control, group 1, group 2), whereas dependent variables were the post-intervention self-efficacy mean score for each feeding practice. While participants in Group 2 had higher levels of self-efficacy in all three constructs (self-regulation, schedule, and role-model) compared to the other two treatment groups, these differences did not reach significance (Table 3.6). Post-intervention mean self-efficacy scores for both intervention groups (group 1 and group 2) were combined and compared the control group using a 2-sample t-test. No significant differences were observed in these post-intervention scores.

Table 3.6 Comparison of effectiveness of intervention between treatment groups using post-intervention self-efficacy mean scores

	One-way ANOVA for each treatment group				T-test between interventions and control		
	Control n=11	Group 1 n=8	Group 2 n=15	p-value	Control n=11	Both interventions n=23	p-value
Self-Regulation	3.318 (0.874)	2.938 (0.904)	3.700 (0.676)	0.102	3.318 (0.8739)	3.435 (0.829)	0.709
Schedule	3.273 (1.348)	2.375 (1.506)	3.533 (1.187)	0.144	3.273 (1.348)	3.130 (1.92)	0.780
Role Model	3.545 (0.8202)	3.750 (0.463)	4.067 (0.704)	0.179	3.545 (0.820)	3.957 (0.638)	0.163
Note: Values in cells are mean (SD) Likert scale 1-5, with 1=not confident; 5=very confident One-way ANOVA							

Self-efficacy mean scores were also analyzed by educational level in order to determine if educational attainment influenced the results. No difference in behavior was observed (Table 3.7).

Table 3.7 Educational attainment's effects on self-efficacy mean scores

	Education Level			
	<8th grade n=16	Some high school/graduate n=15	Some college/graduate n=3	p-value
Self-Regulation	3.406 (1.132)	3.60 (0.712)	3.5 (0.775)	0.721
Schedule	3.063 (1.243)	3.40 (1.380)	3.33 (1.366)	0.592
Role Model	3.375 (0.942)	3.70 (1.179)	4.167 (0.408)	0.171
Note: Values in cells are mean (SD) Likert scale 1-5, with 1=not confident; 5=very confident One-way ANOVA				

Self-regulation

Overall baseline score was slightly higher than moderate with a mean of 3.603 ± 1.021 across treatment groups (n=34), indicating that these mothers were between "somewhat confident" and "confident" in their ability to allow child self-regulation (Table 3.5). Group 1 saw a significant decline from time 2 ($x=4.063 \pm 0.177$) to post-intervention ($x=2.938 \pm 0.904$; n=8, p-value=0.028; Table 3.5). Group 2, however, did not see the same significant decline. For Group 2, after increasing at Time 2 and Time 3, post-intervention means for allowing child self-regulation dropped to back to baseline (Time 3 $x=3.967 \pm 1.008$; post-intervention $x=3.70 \pm 0.676$, n=15). The control group

also saw a slight decline in self-efficacy for this construct, but not significantly so. For this construct, there were no significant differences in post-intervention mean self-efficacy scores between treatment groups (Table 3.6). However, Group 2 scored highest ($x=3.70\pm0.676$, n=15), especially compared to Group 1 ($x=2.938\pm0.904$, n=8; p-value=0.102). Control had a mean self-efficacy score of 3.318 ± 0.874, n=11 (Table 3.6).

Schedule

Baseline mean scores for self-efficacy to maintain a schedule for meals and snacks were slightly lower than those of allowing child self-regulation at $x=3.294\pm1.268$, n=34 (Table 4.1.5). One-way ANOVA analysis of each treatment showed little difference across assessment points for this construct (Table 3.5). Similar to the other two constructs, in both intervention groups (Group 1 and Group 2), self-efficacy mean scores for maintaining a schedule increased slightly from baseline to Time 2. For these groups, their scores then declined from their last workshop (Time 2 or Time 3) to post-intervention, but not significantly so. Again, Group 2 ($x=3.533\pm1.187$, n=15) had the highest post-intervention mean score for self-efficacy to maintain a schedule compared to Group 1 ($x=2.375\pm1.506$, n=8) or Control ($x=3.273\pm1.348$, n=11) but not significantly so (p-value=0.144; Table 3.6).

Role-model

Baseline mean score for self-efficacy to role model healthy eating was also slightly higher than moderate at $x=3.353\pm1.252$ (n=34) indicating that participants are between "somewhat confident" and "confident" in their ability to role-model healthy eating (Table 3.5). Similar to the other constructs, self-efficacy to role-model healthy eating increased in both intervention groups from baseline to time 2, however, this

increase was only significant for Group 2 (baseline x=3.333±1.345, Time 2 x=4.40±0.632; n=15, p-value=0.013; Table 3.5). Group 2 (x=4.067±0.704, n=15), again, scored highest in post-intervention mean self-efficacy scores for role-modeling, compared to Control (3.545±0.820, n=11) and Group 1 (3.750±0.463, n=8), but this difference did not reach significance (p-value=0.179, Table 3.6).

Interestingly, when both intervention groups (Group 1 and Group 2) were combined, an increase was observed between baseline and post-intervention means scores (baseline x=3.35±1.265, post-intervention x=3.96±0.638, n=23, p=0.045). When post-intervention scores were compared between the combined intervention group and the control group, no significant difference was observed (p=0.163).

Intent

Intent for each feeding practice (self-regulation, schedule, and role-modeling) was measured with a Lickert scale (1-5, 1=extremely unlikely; 5=extremely likely). A moderate score was considered 3.0, indicating the participant feels "neutral" in their level of intent to perform the toddler feeding practice in question. Measurements were taken at baseline, Time 2 (directly after the first workshop) and Time 3 (directly after the second workshop). Intent was not assessed post-intervention, therefore, the control group has only one measurement (baseline). Importantly, the sample size for intent was smaller than for self-efficacy or behavior because this section was added to the HTFQ after the first group of EMSHS mothers were assessed.

The same procedure was followed to detect changes in levels of intent as for self-efficacy and behavior. One-way ANOVA was performed to detect changes in mean intent scores across assessment points, between treatment groups, and by education level.

Across assessment points, the independent variable was assessment point (baseline, Time 2, or Time 3) while the dependent variable was intent mean score (Table 3.8). No significant differences were observed between assessment points in Group 1 or Group 2 (the control group only had one assessment point). When the baseline and last assessment points of both intervention groups (Group 1 and Group 2) were combined, no significant differences were observed.

Table 3.8 Intent mean scores in each treatment groups across assessment points.

	All groups n=26	Control n=7	Group 1 n=6		Group 2 n=13			Both interventions n=19	
	Pre	Pre	Pre	Time 2	Pre	Time 2	Time 3	Pre	Post
Self-Regulation	3.462 (1.029)	3.286 (1.286)	3.667 (0.816)	3.750 (1.214)	3.462 (1.030)	4.115 (0.768)	3.846 (1.068)	3.53 (0.95)	3.81 (1.083)
Schedule	4.160 (0.624)	4.167 (0.408)	4.333 (0.516)	4.333 (0.516)	4.00 (0.739)	3.917 (0.996)	3.692 (0.855)	4.158 (0.688)	3.895 (0.809)
Role Model	3.962 (0.824)	3.429 (0.976)	3.833 (0.983)	4.167 (0.753)	4.308 (0.480)	4.462 (0.519)	4.231 (0.832)	4.158 (0.688)	4.211 (0.787)

Note: Values in cells are mean (SD)
Likert scale 1-5, with 1=extremely unlikely;5=extremely likely
Time 2 was taken after the first workshop. Time 3 was taken after the 2nd workshop. Post was the last assessment point taken.
One-way ANOVA detected **no significant differences** between assessment points

In order to detect differences in levels of intent between treatment groups, a one-way analysis was performed. Independent variables included treatment group (control, group 1, group 2), whereas dependent variables were the intent mean score for each feeding practice (Table 3.9). Because post-intervention intent was not measured, intent mean scores were used from each treatment group's last measurement. For control, the baseline mean score was used, while for groups 1 and 2, the mean score was obtained from their last workshop (either Time 2 or Time 3). While participants in Group 2 had higher levels of intent to allow child self-regulation and role-model healthy eating, compared to the other two treatment groups, these differences did not reach significance. When both the post-intervention scores of both intervention groups were combined and

compared with the Control group, no significant differences were observed. Interestingly, however, intent to role-model approached significance (p=0.089).

Table 3.9 Comparison of effectiveness of intervention between treatment groups on intent mean scores

	One-way ANOVA for each treatment group				T-test between interventions and control		
	Control N=7	Group 1 N=6	Group 2 N=13	p-value	Control n=7	Both n=19	p-value
Self-Regulation	3.286 (1.286)	3.750 (1.214)	3.846 (1.068)	0.586	3.286 (1.29)	3.82 (1.08)	0.357
Schedule	4.167 (0.408)	4.333 (0.516)	3.692 (0.855)	0.154	4.167 (0.408)	3.895 (0.809)	0.291
Role Model	3.429 (0.976)	4.167 (0.753)	4.231 (0.832)	0.140	3.429 (0.976)	4.211 (0.787)	0.089

Note: Values in cells are mean (SD)
Last measure of intent was used for each treatment group: Control group=baseline mean scores; Group 1=Time 2 mean scores; Group 2=Time 3 mean scores
Likert scale 1-5, with 1=extremely unlikely; 5=extremely likely
One-way ANOVA

No significant differences were observed in intent mean score by educational attainment (Table 3.10).

Table 3.10 Educational attainment's effects on intent mean scores

	Education Level			
	<8th grade n=16	Some high school/graduate n=15	Some college/graduate n=3	p-value
Self-Regulation	3.80 (0.992)	3.710 (1.001)	3.571 (1.239)	0.875
Schedule	3.950 (0.826)	3.967 (0.765)	4.571 (0.535)	0.150
Role Model	4.0 (0.973)	4.290 (0.461)	4.00 (1.155)	0.363

Likert scale 1-5, with 1=extremely unlikely
General Linear ANOVA

Self-regulation, Schedule, Role-model

Baseline mean scores for intent were generally higher than those for self-efficacy. For self-regulation, participants' baseline levels of intent were between "neutral" and "likely" ($x=3.462\pm1.029$; n=34, Table 3.8). Intent to maintain a schedule and intent to role-model healthy were both high at $x=3.905\pm0.624$ (n=34) and $x=4.0\pm0.824$ (n=34), respectively, indicating that participants were "likely" to perform these behaviors in the beginning of the intervention (Table 3.8). While there was a very slight increase from

baseline to their second assessment for all three toddler feeding practices (self-regulation, schedule, and role-model) in Group 1 and Group 2, no detectable change occurred (Table 4.1.8).

For intent to allow self-regulation and intent to role-model, Group 2 scored highest compared to the other treatment groups (Table 3.9). Group 2 intent to allow self-regulation mean score was 3.846 ± 1.068 (n=15), while Group 1's mean score 3.750 ± 1.214 (n=8) and Control's was 3.286 ± 1.286 (n=11; p-value=0.586). Group 2 intent to role-model mean score was 4.231 ± 0.832 (n=15), compared to $x=4.167 \pm 0.753$, (n=8) for Group 1 and $x=3.429 \pm 0.976$ (n=11) for the Control (p-value=0.140).

Role of mediators to predict behavior

Many health behavior theories, including social cognitive theory and theory of planned behavior, indicated self-efficacy and intent are important predictors of behavior. To test this hypothesis, a regression analysis was performed to test the explanatory relationship of self-efficacy, intent, and treatment group on behaviors. The means used in this analysis were the last ones obtained in the intervention; mean intent was collected after their last workshop, while mean self-efficacy and mean behavior were obtained post-intervention.

Self-efficacy, intent and treatment group explained little variance in behavior for allowing child self-regulation and role-modeling healthy eating as shown in Table 3.11. Interestingly, mean self-efficacy and intent explained up to 63.32% of the variance in maintaining a schedule behavior, with p-value=0.001 and p-value=0.03, respectively. For this particular construct, treatment group did not appear predictive of mean scores.

Table 3.11 Regression analysis showing relationship between mediating variables (self-efficacy, intent, and treatment groups) on the response variable (behaviors for toddler feeding practices). N=19

	Adjusted R^2	P-value Self-efficacy	P-value Intent	P-value Treatment Group
Allow child self-regulation of satiety	-1.97%	0.211	0.371	0.238
Role-model healthy eating	2.95%	0.440	0.138	0.837
Maintain a schedule for meals and snacks	63.32%	**<0.001**	**0.030**	0.303
Note: General regression analysis used mean scores (on Likert scale 1-5) for self-efficacy, intent and behavior. Treatment group was categorical (1=group 1; 2=group 2) Self-efficacy and behavior mean scores measured post-intervention, intent measured after participant's last workshop				

Unfortunately, the sample size may not have had enough power to detect differences for regression analysis, if other differences did exist. Indeed, a least significant number analysis reveals a sample size of 80 participants would be necessary in order to detect a difference (Appendix H). In addition, low internal reliability for the constructs of behavior (self-regulation, schedule, and role-model) could affect the relationship between variables.

OBJECTIVE 2

The second aim was to measure the effectiveness of dialogue education to teach appropriate stages of growth in order to increase mothers' ability to know when their child is at a healthy weight compared to a control group.

Self-efficacy and knowledge of stages of growth

Self-efficacy

Self-efficacy for knowing when your child is at a healthy weight was measured on a Likert scale 1-5, with 1 being not confident. A moderate score was considered 3.0, indicating the participant felt "somewhat confident" that she could tell when their child was at a healthy weight. Self-efficacy for knowing when your child is at a healthy weight was measured at baseline, Time 2 (directly after the first workshop), Time 3 (directly after the second workshop) and post-intervention (two to four weeks after their last workshop/8 weeks after baseline). All participants had measurements at Time 1 and Time 4, however, only groups 1 and 2 had measurements at Time 2, and only group 2 had measurements at Time 3.

In order to detect the changes caused by the intervention, one-way ANOVA was performed with assessment point (baseline, Time 2, Time 3, and post-intervention) as the independent variable and self-efficacy mean score as the dependent variable. Treatment group (control, group 1, group 2) and educational attainment (1=grade 8 or less, 2=some high school/graduate, 3=some college/graduate) were also assessed using the same procedure as for previous analysis in this study. Post-intervention self-efficacy mean scores were used to determine differences between treatment groups.

Only one treatment group, group 2, received education regarding stages of growth. Therefore, it was expected that this group that would improve in their sense of self-efficacy for knowing how to tell when a child is at a healthy weight. This was not the case. No significant changes were observed between assessment points in any treatment group. Post-intervention self-efficacy mean scores were not significantly different between treatment groups, with scores for Group 2 ($x=3.60\pm0.910$, n=15) similar to scores for Control ($x=3.636\pm1.120$, n=11; Table 3.12).

Some difference was observed in self-efficacy mean score between those with some college education ($x=3.90\pm0.994$,=3) and those with <8th grade education ($x=3.295\pm1.112$, n=16). This difference, however, did not reach significance (p-value=0.095).

Table 3.12 Factors affecting mean scores for self-efficacy of being able to tell when their child is at a healthy weight.

Assessment Point												
	Control n=11			Group 1 n=8				Group 2 n=15				
	Pre	Post	p-value	Pre	Time 2	Post	p-value	Pre	Time 2	Time 3	Post	p-value
Healthy Weight	3.0 (1.342)	3.636 (1.120)	0.241	3.375 (0.916)	4.00 (0.756)	3.50 (0.756)	0.287	3.40 (1.298)	3.667 (0.900)	3.667 (0.900)	3.60 (0.910)	0.875
Treatment Group												
Healthy Weight	Control n=11			Group 1 n=8				Group 2 n=15				p-value
	3.636 (1.120)			3.50 (0.756)				3.60 (0.910)				0.952
Education Level												
Healthy Weight	<8th grade n=16			Some high school/graduate n=15				Some college/graduate n=3				p-value
	3.295 (1.112)			3.673 (0.901)				3.90 (0.994)				0.095

Note: Values in cells are mean (SD)
Likert scale 1-5, with 1=not confident
Assessment points: baseline, Time 2=directly after first workshop, Time 3=directly after second workshop, post=post-intervention
One-way ANOVA

Knowledge

Participants in Group 2 participants were the only ones that received education on appropriate stages of growth for young children. Their pre- and post-workshop

knowledge of stages of growth was assessed using a 5-point staircase (similar to a Likert scale) to indicate how their knowledge had grown from the intervention. Paired t-tests were conducted to assess their knowledge scores. Although knowledge did increase from pre- to post-intervention, but this increase was not significant at the 0.05 level (Table 3.13).

Table 3.13 Mean knowledge scores for stages of growth

Group 2 N=7			
Assessment points	Time 3, pre-workshop	Time 3, post-workshop	p-value
Knowledge of stages of growth	3.714 (1.380)	4.571 (0.535)	0.172
Note: Values in cells are mean (SD) Likert scale 1-5, with 1=not confident Assessment points: Time 3=directly after the second workshop Paired t-tests			

Role of knowledge to predict self-efficacy

In order to assess the relationship between knowledge regarding stages of growth and self-efficacy to know when a child is at a healthy weight, a regression analysis was performed. This analysis, however, showed that only 1.01% of the variance in self-efficacy was explained by knowledge. It is important to note, however, the sample sizes may have been too small to detect a difference.

Table 3.14 Regression analysis showing relationship between knowledge, a mediating variable, on self-efficacy, the response variable, for ability to tell when a child is at a healthy weight (N=7)

	Adjusted R^2	P-value Knowledge
Self-efficacy to know when a child is at a healthy weight	1.01%	0.341
Note: General regression analysis used mean scores (on Likert scale 1-5) for self-efficacy and knowledge Self-efficacy and knowledge mean scores were used from Time 3 (directly after the second workshop)		

Perceptions of Child Body Size

At baseline and post-intervention, participants were asked three different open-response questions in order to determine key factors for how mothers understand their

child's needs for growth and a healthy body size. Post-intervention responses were reviewed and an index of key factors was created for each question. For example, a key factor for the question "how do you know when your child is at a healthy weight" was Doctor/WIC. Each participant identified up to 3 different key factors for each question, which allowed for up to 102 different responses from 34 mothers. Responses were then coded categorically (0=participant did not mention factor, 1=participant did mention factor). Percentages were determined by the frequency in which each factor was mentioned by participants in each group.

First, participants were asked to name 3 ways they know when their child is at a healthy weight (Table 3.15). Participants mentioned the doctor's office or WIC and looking at or comparing with other children most frequently. Other common responses included when the child eats health/well, is exercising, is growing, and is happy. Interestingly, of the three groups, the Control group seemed to be least influenced by health professional's opinion, although not significantly so (p-value=0.487).

Table 3.15 How do you know when your child is at a healthy weight?

Items	Control n=11	Group 1 n=8	Group 2 n=15	P value
Doctor/WIC	63.6%	81.25%	73.3%	0.487
Look/Compare	22.7%	18.75%	10%	0.462
Clothes	0.0%	6.25%	6.67%	0.487
Eats healthy/well	18.2%	6.25%	23.33%	0.366
Exercises/plays	4.55%	0.0%	6.67%	0.578
Growing/tall	4.55%	0.0%	0.0%	0.357
Happy	4.55%	0.0%	6.67%	0.591
Other	12.6%	0.0%	3.33%	0.159

Note: Percentages from Analysis of Means (One-way ANOVA).

When asked what their child needs to be healthy, treatment groups had many characteristics in common (Table 3.16). All mentioned the importance of eating

healthy/eating well, exercise, and specific foods like milk, fruits and vegetables frequently. Interestingly, a one-way ANOVA test detected a significant difference between Group 1 and Group 2 in the importance of minimizing television (p-value=0.036). Also, 23.7% of the control group mentioned the importance of limiting junk foods, compared to none in Group 1 or 2. However, because of the small sample sizes, these differences must be interpreted cautiously.

Table 3.16 What are the three most important things your child needs to be healthy?

Items	Control n=11	Group 1 n=8	Group 2 n=15	P value
Eat healthy/Eats well	45.55%	37.5%	60.0%	0.318
Exercise	40.9%	56.25%	40.0%	0.541
No TV	0.0%	12.5%	0.0%	**0.036**
Milk	18.18%	18.75%	20.0%	0.986
Fruits and vegetables	54.55%	62.5%	70.0%	0.537
Whole Grains	4.55%	0.0%	0.0%	0.357
Water	9.1%	12.5%	10.0%	0.943
Protein/meat	4.55%	12.5%	0.0%	0.140
Sleep	13.6%	0.0%	6.67%	0.291
No Junk	27.3%	0.0%	0.0%	**0.001**
Other	18.2%	6.25%	6.67%	0.342

Note: Percentages from Analysis of Means (One-way ANOVA).

Finally, participants were asked what concerns they had for child's growth and development (Table 3.17). Participants had a variety of concerns regarding their child's growth and development, such as picky eating, their weight, and whether the child is eating too much or not enough. Interestingly, most participants responded they had no concerns. Additionally, 31.25% of Group 1 participants responded that they were concerned about their child's weight, much more frequently than the Control group (p-value=0.073). Almost one quarter (27.27%) of the Control group responded that they were concerned that their child eats too little, significantly more than Group 2 (0.0%, p-value=0.040).

Table 3.17 Responses to the "Three things you're concerned about your child's growth and development."

Items	Control n=11	Group 1 n=8	Group 2 n=15	P value
None	40.91%	62.5%	60.0%	0.306
Picky Eater	22.73%	6.25%	10.0%	0.276
Weight	4.55%	31.25%	13.33%	**0.073**
Eats too much	0.0%	0.0%	3.33%	0.538
Eats too little	27.27%	10.0%	0.0%	**0.040**
Diet	0.0%	12.5%	3.33%	0.163
Growth/height	4.55%	0.0%	6.67%	0.591
Other	27.27%	0.0%	6.67%	**0.018**
Note: Overall mean responses as percentages from one-way ANOVA				

OBJECTIVE 3

Finally, the third aim was to compare baseline toddler feeding practices, including behaviors, self-efficacy and intent, and qualitative descriptions around healthy weights for children between low-income Latina mothers participating in Early Head Start (EHS) and Early Migrant Seasonal HeadStart (EMSHS).

Characteristics

Originally, this study intended to include participants from both EHS and EMSHS. By the time it was decided to include only EMSHS mothers in the intervention due to language barriers on the part of EHS mothers, baseline data had already been gathered for 25 EHS participants. This additional data allowed us to compare toddler feeding practices between the two groups.

Mothers participating in EHS or EMSHS were significantly different in several respects (Table 3.18). Mothers in EHS had significantly higher educational levels, were more likely to have a domestic partner or husband, and went to school full- or part-time more when compared to EMSHS. On the other hand, EMSHS mothers were more likely to work full- or part-time, do most of the food preparation and were older.

Table 3.18 Descriptive statistics of participants (n=65)

Characteristics	EMSHS (n=40)	EHS (n=25)	P value
Age, mean (SD)	29.48 (5.59)*	25.71 (7.28)*	**0.035**
# of children, mean (SD)	2.20 (0.992)*	2.24 (1.20)*	0.89
Married/lives with partner	77%	30.4%	**0.001**
Works FT or PT	97.5%	80%	**0.05**
Studies FT or PT	0.05%	36%	**0.006**
Does most food prep	95%	76%	**0.052**
Highest level of education:			
Grade 8	51.3%	13%	**0.001**
Some HS/Graduate	41%	60.9%	0.218
Some college/Graduate	7.7%	26.1%	0.097

Note: From two Sample T-tests of means.

Toddler Feeding Behaviors

The same feeding practices were assessed with this baseline questionnaire as with the intervention arm of the study. Frequency of behaviors, including self-regulation, schedule, and role-modeling, was measured with a Likert scale (1-5, 1=never) only once at baseline. Each feeding practice was assessed with the same sub-group of items in the questionnaire used in the intervention, with the addition of "limiting sweets". Limiting sweets was assessed with single-item that was not included in the other sub-sets (see Appendix G). Differences between groups were assessed using two-sample t-tests.

Somewhat surprisingly, mothers participating in EMSHS more frequently maintained a meal and snack schedule ($x=3.32\pm0.064$, n=41) compared to EHS mothers ($x=2.85\pm0.599$, n=25) as shown in Figure 3.4. Allowing child self-regulation was almost identical between groups. Early Migrant/Seasonal mothers scored slightly higher in role-modeling healthy eating compared to EHS mothers, $x=3.83\pm0.506$ (n=41) and $x=3.64\pm0.529$ (n=25), respectively, but this difference was not significant. Interestingly, EHS mothers scored better at limiting the frequency of sweets, a behavior associated with authoritative feeding (EHS $x=3.28\pm1.06$, n=25; EMSHS $x=2.66\pm1.04$, n=41; p-value 0.024).

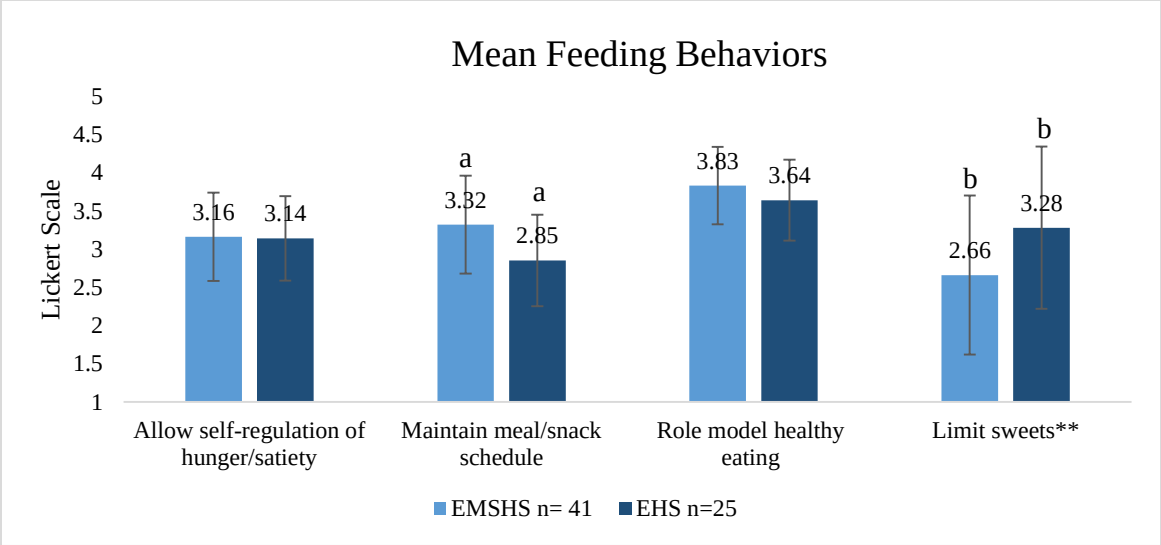

Figure 3.4 Frequency of behaviors between groups. Columns marked with the same letter are significantly different from each other $p<0.05$. **Based on a single item.

Levels of self-efficacy for meal scheduling, role-modeling, allowing self-regulation of child's appetite and knowing when their child was at a healthy weight were similar between EHS and EMSHS, as shown in Figure 3.5. Interestingly, EHS mothers scored significantly better at being able to stay calm when a child refuses to eat certain foods (EHS $x=3.24\pm1.3$, n=25; EMSHS $x=2.56\pm1.23$, n=41; p-value=0.004).

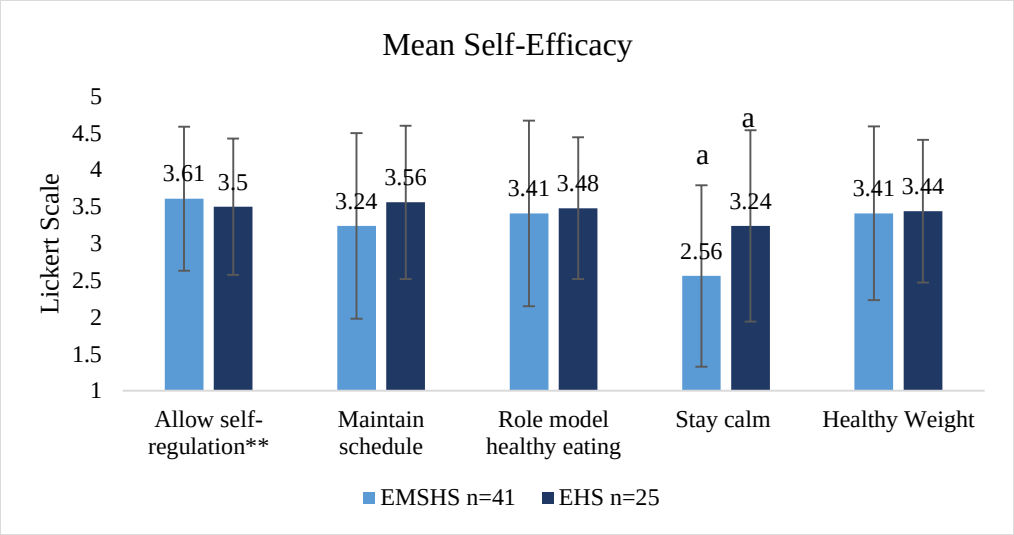

Figure 3.5 Mean self-efficacy for constructs of authoritative feeding behaviors two sample t-tests between groups. Columns marked with the same letter are significantly different from each other $p<0.05$.

Intent was added as a component to the questionnaire later on in the study, therefore, very few measurements of intent were available for the EHS group (n=8). Taking this into account, levels of intent were not significantly different between the two groups (Figure 3.6). However, difference in means for allowing child self-regulation approached significance, with EHS mothers scoring higher (p-value=0.068). Interestingly, among EMSHS mothers, intent to maintain a meal/snack schedule was significantly higher than their intent to allow child self-regulation.

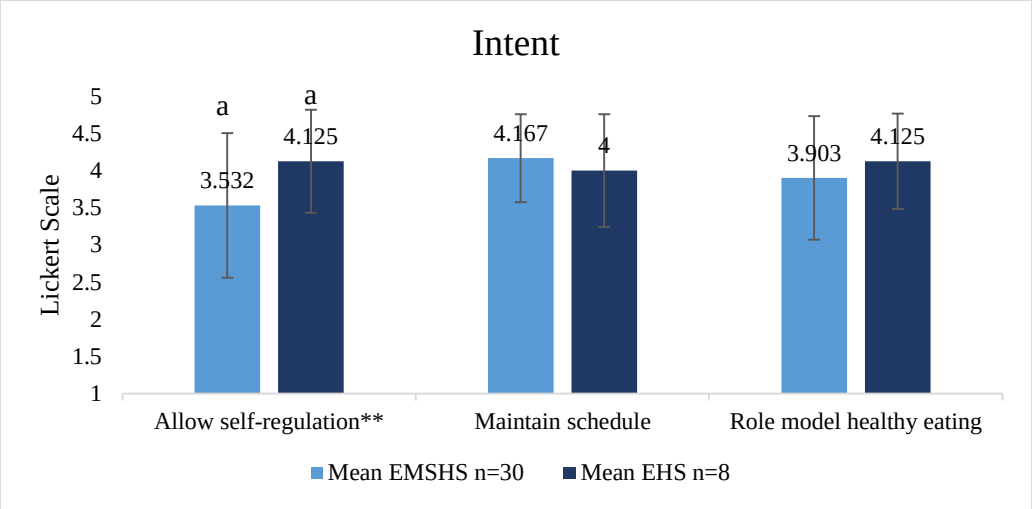

Figure 3.6 Intent of participants for constructs of authoritative feeding behaviors. Two sample t-tests between groups and constructs. Columns marked with the same letter are significantly different from each other at the 0.068 level.

Perceptions of Child Body Size

Participants from EHS were asked the same three open-response questions in order to determine key factors for how they understand their child's needs for growth and healthy body size as the EMSHS mothers. Therefore, we were able to analyze differences found between these groups. The same procedure for coding and analyzing participant responses was followed as in the intervention arm of the study.

As described previously, participants were asked to name 3 ways they know when their child is at a healthy weight. Responses provided by EHS and EMSHS mothers, answers were similar. The majority of mothers in both groups rely on health professionals to tell them when their child is at a healthy weight, at 66.7% and 52% for EMSHS and EHS, respectively. Participants from both groups identified the importance of eating well for a healthy weight, however, this could be interpreted both as eating healthfully or eating enough. A relatively large percentage (24%) of EHS mothers also identified in the importance of exercise or play in knowing that their child is at a healthy

weight, compared to only 7.14% of EMSHS mothers (p=0.051). Only EHS mothers identified healthy growth or their children getting taller (12%, p=0.021) as ways they knew when their child was at a healthy weight.

Table 3.19 How do you know when your child is at a healthy weight?

Items	EMSHS (n=42)	EHS (n=25)	P value
Doctor/WIC	66.7%	52%	0.240
Look/Compare	14.3%	16%	0.852
Clothes	4.7%	12%	0.283
Eats healthy/well	19.1%	36%	0.127
Exercises/plays	7.14%	24%	0.051
Growing/tall	0%	12%	0.021
Happy	4.76%	8%	0.595
Other	7.14%	28%	0.02

Note: P-values from Analysis of Means (One-way ANOVA).

When asked *what* their child needs to be healthy, both groups had many characteristics in common. Although it EHS mothers identified "healthy eating" as an important factor in being healthy significantly more frequently than EMSHS mothers, both groups identified the importance eating fruits and vegetables, protein, water and limiting junk foods in similar proportions. Again, the EHS group identified the importance of exercise significantly more frequently than EMSHS mothers, 64% versus 36.59%, respectively (p=0.031). Interestingly, Early Migrant/Seasonal Head Start mothers described the importance of sleep more frequently than EHS mothers, 24% compared to 4.88%, respectively (p=0.021).

Table 3.20 What are the three most important things your child needs to be healthy?

Items	EMSHS (n=42)	EHS (n=25)	P value
Eat healthy	21.95%	52%	**0.012**
"Eats"	34.15%	24%	0.392
Exercise	36.59%	64%	**0.031**
No TV	4%	2.44%	0.725
Fruits and vegetables	48%	58.54%	0.412
Water	12.2%	24%	0.218
Protein/meat	4%	7.32%	0.591
Doctor	8%	2.4%	0.300
Sleep	24%	4.88%	**0.021**
No Junk	12.2%	8%	0.598
Other	4.88%	8%	0.613

Note: P-value from Analysis of Means (One-way ANOVA).

Finally, participants were asked what concerns they had for child's growth and development. Both groups had a variety of concerns regarding their child's growth and development, weight, eating too much or not enough most frequently. Mothers in EHS appear to be more concerned about their child's diet and picky eating behaviors, although these differences were not significant at the 0.05 level. Early Migrant Seasonal Head Start mothers were more likely to not have any concerns regarding their child's growth, 56.94% compared to 27.27% of EHS mothers (p-value=0.004). It is interesting to note the EHS mothers appear to be more concerned than EMSHS mothers that their child does not have a set eating schedule, especially because EHS mothers scored lower at maintaining a schedule for meals and snacks.

Table 3.21 Please name 3 things you're concerned about your child's growth and development?

Items	EMSHS (n=42)	EHS (n=25)	P value
Weight	14.47%	15.63%	0.879
Eats too much	1.32%	6.06%	0.167
Eats too little	12.12%	12.0%	0.986
Diet	5.26%	15.15%	0.086
Picky Eater	13.16%	27.27%	**0.076**
Scheduled eating times	0%	9.09%	**0.007**
Growth/height	3.95%	0.0%	0.251
None	56.94%	27.27%	**0.004**
Other	10.53%	21.21%	0.139

Note: P-value from Analysis of Means (One-way ANOVA).

CHAPTER 4: DISCUSSION

In this study among migrant, low-income Latina Head Start mothers, learner-centered workshops improved mothers' ability to allow child self-regulation of satiety, a hallmark characteristic of authoritative feeding. There was evidence role-modeling healthy eating behavior also improved however maintaining a meal schedule behavior did not. Self-efficacy for these three behaviors (self-regulation, role-modeling, and meal schedule) decreased with time, although not all of these decreases were significant. From baseline, intent for these three behaviors did not improve significantly, however participants who attended two workshops had significantly higher levels of intent than the Control group. No significant improvements in knowledge or self-efficacy to know when a child is a healthy weight was observed.

Regarding toddler feeding practices, Early Migrant/Seasonal Head Start (EMSHS) mothers were significantly different than their Early Head Start (EHS) counterparts in several ways. Early Head Start mothers limited access to sweets more frequently, had higher levels of self-efficacy to stay calm after child food refusals, and higher levels of intent to allow child self-regulation of satiety, compared to EMSHS mothers. Early Migrant/Seasonal Head Start mothers, on the other hand, maintained a meal schedule and role-modeled eating fruit more frequently than EHS mothers. In open-ended questions regarding healthy weights for young children, EHS mothers identified the importance of exercise significantly more than EMSHS mothers.

EFFECT OF EDUCATIONAL ATTAINMENT ON BEHAVIOR AND MEDIATORS

Because participants self-assigned to the different treatment groups, it was important to look at the differences in participant characteristics that could have accounted for the changes observed during the intervention. Across the three groups, there were no detectable difference in age, employment, and marital status. However, an important difference was found in educational attainment. Group 2 (two workshops) had a significantly larger proportion who completed at least some high school compared to the Control group. Indeed, the majority of the Control group had only an 8th grade education. In a previous study of caregivers, educational level proved to be influential in feeding behaviors (Freedman and Alvarez, 2010).

Behavior

Most importantly, no differences in behavior, our primary outcome measure, were detected by educational attainment. This suggests that education level was not a significant factor in explaining the changes observed as a result of this intervention.

While numerous studies have reported on the interaction between income and feeding practices, income and weight status, or maternal education and weight status, few studies have reported on the role of educational attainment and feeding practices (Melgar-Quiñonez and Kaiser, 2004; Freedman and Alvarez, 2010; Ogden et al., 2014). In a study of feeding practices among childcare providers in Northern California, Freedman found no difference in allowing child self-regulation behavior by education level. Indeed, the only difference in feeding practices by education level that the author found was that those with at least some college education were more likely to eat with children during meal times than those with lower levels of education (Freedman and

Alvarez, 2010). While this is an important aspect of authoritative feeding and could be considered positive role-modeling of eating behavior, in the current study, this behavior was not specifically measured. This study found no difference in role-modeling behavior by educational attainment.

Self-Efficacy and Intent

To account for the impact of educational attainment may have had on the results, it was included in the one-way ANOVA analysis and some differences in the results were observed. Participants with some college education scored higher in *self-efficacy* to role-model than participants with only an 8th grade education, but not significantly so. A difference was also observed in levels of *intent* to maintain a schedule between those with some college and an 8th grade education. These results must be interpreted with caution, however, since there were only three participants (out of 34) that had some college education.

TODDLER FEEDING BEHAVIORS

In this study, just one workshop on healthy toddler feeding practices had some impact on behaviors associated with the Division of Responsibility (sDOR) (Lohse, Satter, & Arnold, 2014). Allowing child self-regulation of satiety behavior was significantly better in the intervention groups than in the control group. When both intervention groups were combined, the power to detect significant differences increased and it was found that post-intervention scores for allowing child self-regulation and role-modeling healthy eating improved significantly from baseline. No improvement from baseline was seen for behaviors associated with maintaining a schedule, and no difference was observed between control and intervention for this construct.

Self-regulation

The improvements observed in self-regulation behavior correlate with a 2012 study that also used the sDOR as the basis of an educational intervention. In a randomized-control study, Agras et al. found that parents who participated in the sDOR-based intervention decreased pressure to eat by 57% to 67% (Agras, 2012). Although pressure to eat was described by Agras et al., pressure to eat and ability to allow self-regulation of satiety are similar constructs.

Compared to Agras's study, this study observed a much smaller improvement in behavior, but the frequency of lessons were also less. Agras's intervention consisted of five weekly, hour-long meetings, whereas our intervention consisted of only one or two 30 minute meetings at one-month intervals. This discrepancy in the total amount, length of sessions, and time in between session could explain the differences observed in improvements. We designed our educational intervention in order to fit into the existing format of Head Start parent education in which Head Start centers invite guest speakers to present on a given topic for about 30 minutes, usually only once per season (Department Health and Human Services, 2015).

Role-modeling

While significant differences in role-modeling behavior was found between treatment groups, when Groups 1 and 2 (both intervention groups) were combined there was also a significant improvement. This is consistent with another health behavior intervention in the Hispanic community which sought to improve parental role-modeling behavior associated with childhood obesity. In this study, monthly home-visits were aimed to address parent-mediated behaviors that affect childhood obesity (ie parenting strategies like monitoring of child's diet and limit setting, parental support of physical

activity, family eating behaviors such as eating in front of the TV). At the 2-year follow, improvement in these role-modeling behaviors was observed (Ayala et al., 2010).

The finding that role-modeling of healthy eating behavior in the intervention groups is significant for several reasons. Many previous studies have found a significant correlation between maternal BMI and childhood overweight status in low-income, Latino families (Kaiser et al., 2001; Melgar-Quiñonez and Kaiser, 2004; Guendelman et al., 2010). This could be partly due to biological or genetic reasons; indeed, a high maternal BMI is associated with a high birth weight, which is also a risk factor for developing overweight later on in childhood. However, the relationship between maternal and child BMI is also due to a shared environment and poor role-modeling of eating habits (Ayala et al., 2010). Preventative interventions, therefore, that improve maternal role-modeling of a healthy diet can impact an important risk factor in the development of childhood obesity.

Maintaining a schedule

After the intervention, no change was observed in the frequency in which participants maintained a schedule for meals and snacks. Child-led snacking is common in Latino households (Kaiser, Melgar-Quinonez, Lamp, Johns, & Harwood, 2001). Indeed, one study showed that Mexican preschool aged children took the lead when it came to the frequency in which they ate, how much they ate, and what they ate (Garcia et al 1990). Many of the parents in the present study likely grew up in a similar environment, therefore, changing habits to adhere to a more structured meal and snack pattern may prove difficult and even be culturally foreign.

In addition, the mothers participating in this intervention were migrant agricultural workers. By participant testimony, their daily work schedules were long and

unpredictable. This external barrier may also account for the lack of change observed over the intervention when it came to keeping a schedule for meals and snacks as their schedule was simply out of their control.

MEDIATORS OF BEHAVIOR

Self-efficacy and intent were measured as potential mediators of child feeding behavior. For the most part, these mediators showed little improvement over the course of the intervention.

Self-efficacy

As predicted, trends for all constructs showed at least small increase in self-efficacy from baseline to Time 2 or 3 in the intervention groups, significantly so for Group 2 in role-modeling. Scores in self-efficacy, however, then dropped two to four weeks post-intervention. For Group 1, this drop was significant for allowing child self-regulation. Group 2, the group that participated in two workshops, had highest scores post-intervention scores in all three constructs (self-regulation, schedule, and role-model), although these scores were not significantly higher.

Interestingly, in 2013, a similar study conducted in the San Luis Obispo area observed significant increases in self-efficacy for authoritative feeding practices, including keeping a schedule, preparing one meal for the whole family, and allowing child self-regulation of hunger (Dawes, 2013). This discrepancy could be explained by several factors. The present study was exclusively with low-income, Latino mothers, the majority of whom worked full time, whereas Dawes's study had no such inclusion criteria for ethnicity or income (no demographic data was presented) and, on average, participants worked half-time. The education format was different in that Dawes's workshops were conducted in smaller, facilitated group discussions (5-7 participants)

rather than as larger, learner-centered workshops during parent meetings (as many as 30 total participants). These important differences in hours worked, income, ethnicity and presentation style may have accounted for the differing results.

In a study with similar demographics of Early Head Start parents, Horodynski et al. saw lack of improvement in self-efficacy to allow self-regulation after intervention (Horodynski and Stommel, 2005). Horodynski et al. credited the lack of improvement in self-efficacy to inconsistencies in the self-reported questionnaires completed by participants and the lack of flexibility in the design of the intervention to address the learning needs of the participants. The lack of improvement in self-efficacy to allow self-regulation correlates with the current study's findings.

One possible explanation is that after learning new information during a workshop, participants may feel like they are capable of carrying out the new behavior, thus accounting for the observed upward trend in self-efficacy directly after the first workshops. However, after a few weeks, the newly gained confidence subsides and the reality of the task sets in, thus accounting for the decreases observed.

Interestingly, the decrease in confidence for a particular construct does not necessarily correlate with a decrease in its corresponding behavior. As noted above, while self-efficacy to allow child self-regulation decreased in Group 1, self-regulation behavior actually improved from baseline. This could indicate that although participants are acting accordingly, they are not yet confident in this new skill.

Intent

Since no increases in intent were observed across assessment points in the intervention, it is unlikely that the intervention had an effect on intent. Group 2, however, did have higher post-intervention mean score for intent to allow self-regulation

and role-model healthy eating compared to the Control or Group 1, but these differences were not significant. Group 2 had also significantly higher levels of education than the Control group, so this could be a factor in explaining the difference. However, when levels of intent were analyzed by education levels, no significant differences were observed. Therefore, educational attainment may not have been the explanatory factor accounting for differences in intent between Group 2 and Control.

ROLE OF MEDIATORS TO PREDICT BEHAVIOR

According to Bandura, self-efficacy is a necessary component of behavior change (Bandura, 1997). Therefore, one would predict that an increase in self-efficacy for a particular behavior would correspond with an increase in behavior. However, that is not what was found in the current study.

In a regression analysis of the relationship between self-efficacy and intent with behavior for each of the three constructs of toddler feeding behavior, there was only one significant relationship and that was for schedule. This suggests that intent and self-efficacy for maintaining a schedule actually does have more predictive power to explaining one's behaviors in actually maintaining a schedule than intent and self-efficacy for the other two constructs (self-regulation and role-modeling). The lack of a relationship for the other two constructs (self-regulation and role-modeling), however, could have been due to problems with the internal reliability of the three identified constructs, as measured by Chronbach's alpha.

In addition, the weak relationship between self-efficacy/ intent and behavior for role-modeling and self-regulation could be explained by other mediators described by Social Cognitive Theory such as attitude and perceived social norms (Armitage and Conner, 2001). These other mediators were not measured in this intervention. During the

course of the intervention, allowing child self-regulation seemed to be particularly novel and even strange for many participants. If allowing child self-regulation was not accepted by peers or even perceived negatively, the lack of support could have influenced the participant's behaviors. Finally, the sample size in the current study may have been too small to detect a significant relationship between the variables.

PERCEPTIONS OF CHILD BODY SIZE

Few significant differences were found among the treatment groups or as compared to baseline for the open-ended questions regarding healthy weights and growth for young children. The most commons responses for knowing when their child was at a healthy weight was through the doctor/WIC, by comparing with other children, or when the child eats healthy or "well". It could not be distinguished whether eating "well" meant eating healthy foods, eating enough quantity of food or having a good appetite. No significant differences were found between treatment groups in how participants know when their child is at a healthy weight.

By far the most common response for when participants were asked what their primary concerns was considering their child's growth and development was "none". Previous research indicates that recent immigrant mothers, like those in the EMSHS, may be more concerned with language and cultural acquisition than nutrition and healthy growth (Chavoor 2013). Interestingly, the control group was more significantly concerned that their child ate too little compared to Group 2 (p-value=0.040). This response could be related to allowing child self-regulation behavior, for which the intervention groups scored significantly better than the control group. The control group also identified "other" concerns significantly more than the intervention groups. These "other" responses included being sad, being sick or being tired.

Eating healthy/well was by far the most common response among all treatment groups when asked what your child needs to be healthy. Exercise, milk, and fruits/vegetables were also common responses. Interestingly, Group 1 was the only group that mentioned the importance of limiting television in order to be healthy. Our intervention did not focus on the importance of limiting television, so it's likely this was a pre-existing value.

STAGES OF GROWTH

No significant improvements were observed in self-efficacy to know when their child is at healthy weight from baseline to post-intervention, and no significant differences were apparent between treatment groups. Interestingly, knowledge of stages of growth increased from pre- to post-intervention, but not significantly so. It should be noted that the sample size that completed in knowledge assessment was much smaller than the sample size that completed the self-efficacy section. Due to time constraints, one of the five EMSHS centers did not receive the education on stages of growth. Furthermore, some of the participants who did receive the education did not complete this part of the assessment.

Not knowing how to tell when their child is at a healthy was an important theme identified in previous research with Latino, Head Start mothers in the Central Coast area (Chavoor, 2013). Current CDC guidelines advise parents to use a growth chart or consult with the child's doctor in order to assess appropriate body size (CDC, 2015). While the current intervention did review the use of growth charts, it is possible that a child's school site is not best-suited to review physical health information. A doctor's office or healthy clinic may be a more appropriate place to review how to use growth charts to increase a parent's self-efficacy to know when their child is at a healthy weight. This

may be especially true since a majority of participants responded they rely on their healthy professional to tell them when their child is at a healthy weight.

LEARNER CENTERED EDUCATION

Because improvement from baseline was observed for allowing child self-regulation control and Group 1, it may be concluded that the educational intervention, based on learner-centered principles, did have some effect on behavior. When compared to the control group, self-regulation behavior improved slightly but significantly. This study had similar findings a previous, large-scale study which showed that participants in Women, Infants and Children (WIC) who received learner centered education had families with improved vegetable consumption, compared with those in a control group who received lecture-style education (Crawford et. al, 2008).

One weakness in our own study is that the control group received no education at all. Therefore, we may be able to conclude that our educational program was effective at improving some behaviors, but we do not know whether the kind of education they received was more effective than any other.

TODDLER FEEDING PRACTICES BETWEEN EHS AND EMSHS MOTHERS

In their toddler feeding practices, numerous differences were found between Early Head Start and Early Migrant/Seasonal Head Start mothers were found. Two additional items (limiting sweets and staying calm during meal times) were included in the comparison between EHS and EMSHS mothers that were not included in the three primary constructs of behavior targeted by the intervention (self-regulation, role-modeling and meal schedule). In general, EHS mothers scored better in several constructs associated with authoritative behaviors.

Sweets

In terms of behavior, EHS mothers appeared to limit the availability of sweets more frequently than EMSHS mothers. While minimizing the availability of sweets could be considered a controlling behavior, frequently providing children with sweets is considered indulgent. Indulgence is associated with larger body sizes in children, especially in Latino families (Olvera and Power, 2010). Since EHS mothers are likely less acculturated than EHS mothers, this finding is consistent with previous research that shows less acculturated mothers tend to be more indulgent than more acculturated mothers (Dancel et al., 2015).

Staying calm during meals

Early Head Start mothers also appear to be more confident in their ability to stay calm when their child refuses to eat certain foods. Staying calm during chaotic meal times is not necessarily a behavior identified with authoritative feeding, however, it could suggest that EHS mothers are not as bothered by limit setting as EMSHS mothers.

One possible explanation in the difference in confidence levels of staying calm during picky eating episodes is that EMSHS mothers work full or part time significantly more EHS mothers, who are more often in school. Therefore, EMSHS mothers likely spend less time with their children during the workweek. It could be hypothesized that because EHS mothers may spend more time and even more meals together, they are more comfortable in their ability to manage a child's food refusals.

Self-Regulation

Although scores in self-regulation behavior and self-efficacy were very similar for EHS and EMSHS mothers, EHS mothers had higher levels of intent for this construct of behavior than EMSHS mothers ($p=0.068$). Since allowing child self-regulation of if and

how much he or she wants to eat is an important component of authoritative feeding, this provides further evidence that more acculturated mothers are more authoritative than less acculturated mothers (Chaidez and Kaiser, 2011; Dancel et al., 2015).

Meal Schedule

One behavior that appears contradictory to the suggestion that EHS mothers are more authoritative than EMSHS mothers is the discrepancy in maintaining a schedule. The current study found that EMSHS mother maintained a schedule for meals and schedule more frequently than EHS mothers. Since EHS mothers work less than EMSHS, this more flexible schedule may complicate efforts to maintain a schedule. However, the fact that EHS mothers expressed their concern over a lack of schedule significantly more than EMSHS mothers also indicates their awareness of its importance. It is possible EMSHS mothers scored higher on the schedule maintenance questions because their child eats meals more frequently at head start centers/provider homes, where they do eat on a regular schedule.

Additionally, in their open-ended responses around concerns they had regarding health and development, 9.1% of EHS mothers responded they were concerned around their child's lack of schedule for meals. In one interpretation, this concern consistent with their lower score for maintaining a schedule behavior. On the other hand, EMSHS mothers had modestly, although not significantly, higher levels of intent to maintain a schedule than EHS mothers, which then correlates with their higher scores for maintaining a schedule.

Role-modeling

This study is novel in that it found that EMSHS mothers scored higher in certain aspects of role-modeling healthy eating behavior compared to EHS mothers. When

individual questionnaire items were analyzed, EMSHS mothers scored significantly higher in role-modeling eating fruit with their children compared to EHS mothers. Interestingly, EMSHS mothers work almost exclusively in agriculture, primarily in the strawberry picking industry. It is reasonable to hypothesize that EMSHS mothers may have more access to fruit, thus facilitating their intake.

Perceptions of Child Body Size

Mothers in both groups had similar responses for the open-ended questions around healthy weight and development. One key difference, however, is how EHS and EMSHS viewed the importance of exercise. For both "how do you know when your child is at a healthy weight?" and "what are three things your child needs to be healthy?", EHS mothers identified the importance of exercise significantly more than EMSHS mothers. This is consistent with other research that suggests that less acculturated, Spanish-speaking immigrants are less likely to engage in sports and physical activity compared to their more acculturated peers (Taverno et al., 2010).

Acculturation

Acculturation may be another key explanatory factor in differences observed between EHS and EMSHS mothers. In 2013, Chavoor measured acculturation among Head Start mothers by assessing the use of Spanish or English in a variety of settings. Although acculturation was not directly measured in this current study, approximately 50% of EHS mothers indicated their preferred language was Spanish, compared to 100% of mothers in EMSHS. Additionally, numerous other studies have found that migrant farm-workers have low levels of acculturation (Taverno et al., 2010). From this, it can be assumed that EMSHS mothers are less acculturated than EHS mothers.

Chavoor's study noted that less acculturated mothers within Head Start may be less likely to believe their child is overweight when told by health professionals (Chavoor 2013). Paradoxically, when asked how they knew when their child was at a healthy weight, 67% of EMSHS mothers reported knowing from a doctor or WIC visit, compared to only 52% of EHS mothers, however, these differences were not significantly different. This appears to contradict Chavoor's findings that less acculturated mothers may be less likely to believe health care professionals. Interestingly, the current study observed essentially no difference between EMSHS and EHS mothers in their self-efficacy to determine when their child is at a healthy weight. Both groups were moderately confident. However, numerous studies suggest a discrepancy between how a mother perceives her child's weight and the child's actual weight (Sherry et al., 2004) (Guendelman et al., 2010).

When asked what concerns participants had for their children's growth and development, EMSHS and EHS mothers responded similarly. Almost 16% of EHS and 15% EMSHS mothers were concerned about their child's weight. About half of the EHS mothers who worried about their child's weight indicated that they thought he or she was underweight. Alarmingly, this compares to 33% and 42% of children who are overweight or obese in CAPSLO's Head Start and Migrant/Seasonal Head Start programs in 2012-2013, respectively (CAPSLO 2014). Importantly, however, these figures are from children 3-5 years old, an age group that tends to have higher overweight/obesity rates than the children ages 12-36 months whose mothers were included in this study.

While these groups had similar percentages of participants who were worried about their child's weight, EMSHS mothers had much less concerns in general than their

EHS counterparts. This could indicate a lack of awareness of the problems in healthy growth actually faced by their children.

While this study does not confirm previous research that less acculturated mothers may not trust height and weight information provided by health professionals, it does still validate the need for nutrition education focusing on healthy body sizes for young children. Since only a small percentage of mothers whose children are actually overweight are concerned about the issue, education around the importance of healthy weight is clearly needed.

In 2015, Dancel et al found that less acculturated mothers use more pressuring and more permissive practices than more acculturated mothers (Dancel et al., 2015). This supports the current study's findings that EMSHS mothers gave sweets (a permissive practice) more frequently than EHS mothers (p-value=0.024). Early Head Start mothers also appear to have higher levels of intent to allow child self-regulation of satiety, an important component of authoritative feeding behavior, as opposed to permissive or pressuring feeding behavior.

LIMITATIONS

The major limiting factor in our study was the small sample size. In order to detect significant differences between treatment groups, at least 30 participants in each group were originally required. Our sample sizes were much smaller with 11, 8, and 15 in the control, Group 1 and Group 2, respectively. It was difficult to find, and retain, 90 participants who matched the inclusion criteria (low-income, Latina mothers with children under 36 months) in Early Head Start/Early Migrant Seasonal Head Start centers in the area. This was further complicated when it was decided workshops needed to be conducted entirely in Spanish, thus eliminating the possibility of recruiting from Early

Head Start centers. This small sample size may have inhibited our ability to detect significant differences among treatment groups and across time points. It could also mean, however, that the differences we were able to detect between treatment groups were very significant.

Another major limitation on the current study was that participants were not randomized into treatment groups. Considering the relatively limiting inclusion criteria, it was challenging to find enough Early Migrant/Seasonal Head Start centers in the San Luis Obispo region for randomization to occur. Even when the intervention was expanded to Monterey County, there were still not enough centers to randomize treatment groups.

Additionally, no data was collected on the gender of the children of participants. Numerous studies show that a child's gender can significantly affect their mothers feeding practices. Specifically, mothers of female children are more likely to exhibit controlling behavior than mothers of male children (Fisher and Birch, 2000).

Another limitation of our study was that we did not use a previously validated questionnaire. At this time, there are no validated scales available to assess the behaviors associated with the sDOR. The Ellyn Satter Institute, however, is currently developing a questionnaire that could be used in the future for educational programs based on the sDOR (Lohse et al., 2014). Therefore, in order to assess targeted behaviors, a novel scale was developed for this study.

All items used were from other validated surveys or had been previously used in other research, such as the Toddler Feeding Questionnaire or the questionnaire used by Lisa Dawes (Dawes, 2013) (Chaidez and Kaiser, 2011). However, the items in their

present configuration was novel. While we did conduct a pilot test to assess test-retest reliability, the internal reliability of the sub-groups associated with each construct was not assessed until later on in the study. The low levels of internal reliability means that the items we associated with the constructs might not actually correlate as intended. This could have affected the regression analysis conducted to assess how well the mediators correlated with behavior.

CONCLUSIONS

Contrary to our hypothesis, participation in two workshops did not create more of an effect on toddler feeding practices than participation in just one. Participation in at least one workshops, however, did produce an effect. While few baseline to post-intervention improvements were noted in mediators of behavior, significant improvements were observed in self-regulation and role-modeling behavior. The evidence to suggest the intervention had an impact on self-regulation behavior is particularly strong. While the 11.6% improvement for this particular behavior is a relatively small advancement, considering this intervention fits well into the existing structure of Head Start parental education, it may be worth including in future programming. A larger-scale, randomized control study using this educational model would be useful in assessing the efficacy of learner centered education to promote more authoritative feeding practice. Additionally, a longitudinal analysis that includes measures of child BMI percentiles throughout the intervention would provide further evidence to the relationship between feeding styles and child weight. A comparison of the learner-centered model with lecture-style education for teaching authoritative feeding practices would also be valuable.

Participation in this intervention did not appear to have a significant effect on knowledge nor self-efficacy to know when their child is at a healthy weight. Future research on the impact of additional education with more opportunities for reinforcement on this topic is needed. In addition, future research on the development of a non-clinic based tool to help parents assess whether or not their child is at healthy weight could be useful.

While both Early Migrant/Seasonal Head Start and regional Early Head Start programs would likely benefit from education around the importance of the Division of Responsibility and authoritative feeding, Migrant/Seasonal participants appear to engage in more indulgent feeding practices and, therefore, may benefit even more than their Early Head Start counterparts. Furthermore, the importance of exercise as a necessary component of healthy growth and development may need to be especially emphasized with Migrant/Seasonal participants. A comparison of toddler feeding practices between mothers and fathers is needed in order to better understand how they might differ. This would be important when designing future education interventions that include both parents. Finally, more research is needed to understand how educational attainment may impact toddler feeding practices.

This study provides additional evidence to support the benefit of interventions based on parental feeding styles to improve feeding behaviors that can promote healthy weights in young children. Furthermore, education based on learner-centered principles have been shown to be an effective tool for low-income Latina mothers.

PUBLICATION PLANS

This thesis will be published by California Polytechnic University San Luis Obispo. It will be available at the library and online in the Digital Commons. This results of this study will be broken into at least two separate manuscripts and be submitted to the Journal of Nutrition Education. A poster summarizing this research was presented at the 2015 Experimental Biology Conference in Boston.

TIME TABLE

Table 6.1. Timetable of Master's Degree activities for 2013-2014.

	2013-2014											
	Performance Period											
Major Activity/Objective	J	A	S	O	N	D	J	F	M	A	M	J
Coursework	c----------c											
Establish committee	s----------f											
Literature review	s----------s											
Determine study design	s----------f											
Pilot test of questionnaire	s-----f											
Create Access Database	s----------f											
Data Collection	s---------c											

	2014-2015											
	Performance Period											
Major Activity/Objective	J	A	S	O	N	D	J	F	M	A	M	J
Coursework	c----------f											
Data collection	c-------f											
Data analysis	s----------f											
Revise literature review	c----------f											
Write results, defend thesis	s----------f											
Submit manuscripts for publication	s-----f											

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APPENDIX A: QUESTIONNAIRE

Pre-Q

Please complete all questions and return to the researcher or Head Start Staff. There are 5 pages in the questionnaire, it should take between 15 and 20 minutes to complete.

Thank you for your participation!

Section A

1. What is your birth date? _____/_____/_____
   Month (*Write out*) Day Year

2. What is the birth date of your child? _____/_____/_____
   Month (*Write out*) Day Year

3. What is your ethnicity?
   ☐1 Hispanic or Latino (A person whose culture or origin is from Cuba, Mexico, Puerto Rico, Central or South America, regardless of race)
   ☐2 Not Hispanic or Latino

4. What is the number of children you have that live with you?
   ☐1 1 ☐2 2 ☐3 3 ☐4 4 ☐5 5 ☐6 6
   ☐7 7 ☐8 8 or more

5. Do you have a domestic partner/spouse living in home? ☐1 Yes ☐2 No

6. Do you work outside the home? ☐1 No ☐2 Yes, full-time ☐3 Yes, part-time

7. Do you go to school? ☐1 No ☐2 Yes, full-time ☐3 Yes, part-time

8. Who does most of the food preparation in your home? ☐1 I do ☐2 Someone else does

9. What is the highest year of school you have finished? (*Please mark only <u>one</u>.)*

   ☐1 Grade 8 or less ☐2 Some high school ☐3 High school graduate or GED completed
   ☐4 Some college ☐5 College graduate ☐6 Other (*Please specify* _____*)*

10. Do you participate in WIC? ☐1 Yes ☐2 No

11. Since September 2013, have you received nutrition education materials from Head Start?

☐1 Yes ☐2 No

12. Since September 2013, have you attended any parent meetings or socializations at Head Start where someone presented about Nutrition? ☐1 Yes ☐2 No

    If so, what was the topic? _____

13. Please indicate your preferred language for group discussions: ☐2 English ☐2 Spanish

Please continue to the next page

Section B						
In the following questions, please indicate how often to these situations happen in your life.						
1	How often does your child eat on and off throughout the day?	Never	Rarely	Sometimes	Most of the time	Always
2	How often do you allow your child to eat less than you think he or she should?	Never	Rarely	Sometimes	Most of the time	Always
3	How often to you allow your child to eat more than you think he or she should?	Never	Rarely	Sometimes	Most of the time	Always
4	How often do you do or say something to make your child eat more?	Never	Rarely	Sometimes	Most of the time	Always
5	How often do you allow your child to eat sweets, such as ice cream and candy?	Never	Once a week	3-4 times per week	Once a day	Twice a day
6	I let my child have something to eat whenever he or she asks	Never	Rarely	Sometimes	Most of the time	Always
7	I keep a regular snack schedule for my child	Never	Rarely	Sometimes	Most of the time	Always
8	I keep a regular meal schedule for my child	Never	Rarely	Sometimes	Most of the time	Always
9	My child eats the same foods prepared for the family	Never	Rarely	Sometimes	Most of the time	Always
10	If my child does not want what is prepared, I give him/her something else	Never	Rarely	Sometimes	Most of the time	Always
11	During meals or snacks, I let my child leave food on his or her plate	Never	Rarely	Sometimes	Most of the time	Always
12	I encourage or demand my child to eat more when he or she said he or she is full	Never	Rarely	Sometimes	Most of the time	Always
13	When I eat meals or snacks with my child, I eat vegetables	Never	Once a week	3-4 times per week	Once a day	Twice a day
14	When I eat meals or snacks with my child, I eat fruit	Never	Once a week	3-4 times per week	Once a day	Twice a day
15	When I eat meals or snacks with my child, I eat or drink milk, cheese and yogurt	Never	Once a week	3-4 times per week	Once a day	Twice a day

Section C

There are a number of reasons that might make it difficult to get your child to eat healthfully. Please mark on the line **how confident you feel** in each situation. Your answers will be kept strictly confidential and you will not be identified by name.

Example:

I can lift 50 pounds.

Not confident	Slightly confident	Moderately confident	Confident	Highly confident

1) At meals and snack times, I can allow my child to decide if he or she wants to eat or not.				
Not confident	**Slightly confident**	**Moderately confident**	**Confident**	**Highly confident**
2) When my child says he or she is full, I can allow my child to decide when he or she has had enough to eat.				
Not confident	**Slightly confident**	**Moderately confident**	**Confident**	**Highly confident**
3) I can allow my child to just look at or play with the food on his or her plate, without demanding he or she actually eat the food.				
Not confident	**Slightly confident**	**Moderately confident**	**Confident**	**Highly confident**
4) If my child refuses to eat certain foods, I can stay calm and feel in control.				
Not confident	**Slightly confident**	**Moderately confident**	**Confident**	**Highly confident**
5) **When my child does not want to eat the meal I prepared for the family, I will not prepare something else for him or her.**				
Not confident	**Slightly confident**	**Moderately confident**	**Confident**	**Highly confident**
6) I know how to tell when my child is full.				
Not confident	**Slightly confident**	**Moderately confident**	**Confident**	**Highly confident**
7) **I can keep a regular schedule for meals and snacks.**				
Not confident	**Slightly confident**	**Moderately confident**	**Confident**	**Highly confident**
8) I can model healthy eating habits with my child.				
Not confident	**Slightly confident**	**Moderately confident**	**Confident**	**Highly confident**
9) I know when my child is at a healthy weight.				
Not confident	**Slightly confident**	**Moderately confident**	**Confident**	**Highly confident**

Please continue to the next page

Section E					
In the next 3 months, I intend to…					
keep a schedule for meals and snacks for my child	Extremely unlikely	Unlikely	Neutral	Likely	Extremely Likely
allow my child to decide if he or she wants to eat	Extremely unlikely	Unlikely	Neutral	Likely	Extremely Likely
allow my child to decide how much he or she wants to eat	Extremely unlikely	Unlikely	Neutral	Likely	Extremely Likely
to make the same foods for everyone in my family	Extremely unlikely	Unlikely	Neutral	Likely	Extremely Likely

Section D

1) I know my child is at a healthy weight when

1) _____

2) _____

3) _____

2) What are the 3 most important things your child needs to be healthy

1) _____

2) _____

3) _____

3) Please name 3 things you're concerned about in regards to your child's nutrition or development

1) _____

2) _____

3) _____

APPENDIX B: LETTER OF INTEREST

Research Study: Nutrition Education with Latina Mothers

We are looking for mothers who are of Latino descent who are interested in taking part in a research study! We will be using a participant-based method of education called Facilitated Group Discussions to teach mothers about toddler feeding styles and healthy growth and development for their children.

Requirements: You must be a mother of Latino descent with a child 24 months or younger. You must agree to participate in either:
1) one group discussion, lasting from 45 to 60 minutes
2) two group discussions, each lasting from 45 to 60 minutes
3) no group discussions, only filling out a survey.
The group you will participate in will be decided by the researcher.

What's in it for you? You can help us better understand what works best in nutrition education. You may learn helpful techniques in creating healthy eating environments for your children and how to know when your child is at a healthy weight for their age. You will also receive a Wal Mart gift card, from $10 to $30, and there will be snacks and free child care during the discussions. Group discussions will be held in your language of preference, Spanish or English.

Yes!

_____ I am interested in participating in this study

_____ I am mother of Latino descent

_____ I have a child who is 24 months old or younger

Name: _____

home phone: _____

cell phone: _____

work phone: _____

What's the best time to contact you?
_____ email: _____

I agree to allow Head Start to release to the key investigator my contact information and understand that it will be not shared with any person not involved in the research study. I also understand that this is a Cal Poly study and authorize the researchers to call me to ask me questions about how I feed my child and to arrange for participation in a focus group.

_____ _____
(Sign Here)

APPENDIX C: INFORMED CONSENT

INFORMED CONSENT TO PARTICIPATE IN

> A research project on the effectiveness of group nutrition education as a type of education around how to feed your child and stages of growth by Grace Voorheis, a graduate student under the supervision of Dr. Peggy Papathakis, as part of her thesis research for the Food Science and Nutrition department at Cal Poly, San Luis Obispo.

The purpose of the study:

In this study, we want to find out whether group nutrition discussions as a type of nutrition education are effective with Latina mothers. We will determine if two group nutrition discussions are better than just one group discussion in supporting and building self-confidence in mothers around toddler feeding practices and growth.

Why is this study important?
Obesity in young children is a rising concern for all parents. We want to identify the most effective education strategies for Latina mothers to prevent overweight and obesity in young children before it becomes a lifelong problem. If this group discussion model works well, we hope to use it as an example for other programs.

What is expected of participants?
If you agree to consent, you will fill out a questionnaire now and then again in a 2-3 months. You will be placed in one of three groups: one group that meets twice, one group that meets only once, and one group that won't meet at all. If you are assigned to a group, the group discussion will take place in your language of preference, Spanish or English. Groups will be decided by the researcher and will take into account group size, language preference, location of participants, and age of mother and child. The group discussion meetings will take place in January and February, 2014.

If you are placed in the discussion groups, we will call you over the phone sometime in early December to schedule the group meetings. The group meetings will last 45-60 minutes each. Each group will have 4 to 6 other mothers present and will discuss certain areas of your child's nutrition and development. The discussion will include strategies on how to feed your toddler and how to know when your child is a healthy weight as he or she grows up.

A bilingual woman will lead the discussion in Spanish or English, depending on what you prefer, with one or two note takers also present. We will discuss the important role of nutrition in your child's growth and problem-solve feeding challenges. The discussion will also be audio-recorded. During the discussion and on the recording, only first names will be used. Your personal information will be kept confidential. Any personal information will be kept separate from the recorded and noted discussion and will be stored in a locked file only the facilitator has access to.

If you agree to participate in this study, you will be placed in one of three groups. Please see below for a more detailed description of the study timeline.

Group 1	Questionnaire	1st Facilitated Group Discussion	Questionnaire 1 month post-discussion	Questionnaire 2 months post-discussion		$10 gift card
Timeline	**November 2013**	**January 2014**	**February 2014**	**March 2014**		**March 2014**
Group 2	Questionnaire	1st Facilitated Group Discussion	2nd Facilitated Group Discussion	Questionnaire 1 month post-discussion	Questionnaire 2 months post-discussion	$20 gift card
Timeline	**November 2013**	**January 2014**	**February 2014**	**March 2014**	**April 2014**	**April 2014**
Group 3	Questionnaire	No group discussion	No group discussion	Questionnaire		$10 gift card
Timeline	**November 2013**			**March/April 2014**		**March/ April 2014**

Benefits and Risks:

If you participate in the group discussions, it may increase your self-confidence in feeding your young child and in knowing when they're at a healthy weight. Participation in the focus group may also give you a chance to get to know the other mothers in your community better. To thank you for your time, you will be given either a $20 or $30 gift certificate to Walmart (depending on if you participate in one or two groups) after the completion of the study. The study will end after the completion of the group discussions and the completion of two follow up surveys one month and then two months after the final group discussion. The follow up surveys will be administered in person at your local Head Start center, by the researcher or the Head Start staff. Snacks and free childcare will also be available on site during the discussion session.

While we will establish safe discussion guidelines, please keep in mind that what we talk about in the groups could be revealed by other participants in the group.

If you only participate in the questionnaire, it will help us know how to give information to parents in an effective way that will aid them in feeding their children properly. To thank you for your time, you will be given a $10 gift certificate to Walmart at the end of the study. The study will end after the completion of both surveys, one in November and one in March/April. These surveys will be administered in person at your Head Start center, by the researcher or Head Start staff.

There is a minor psychological risk. It is possible that some aspects of the group discussion or questionnaire may make you uncomfortable. For example, talking or answering questions about your child's weight or how you feed your child might make you feel uncomfortable. If so, here are ways you can receive support services:
Call 800 944 4773 for the post-partum depression support line.
Call 800 783-0607 hotline for Transitions Mental Health.

Invitation to Participate:

We would like to invite you to be a part of this study. However, if you do not want to be in this study, **it will not affect your benefits from Head Start in any way**.

The decision to be in this study or not is entirely up to you. If you do not want to participate, you are free to say, "No". If you agree to take part in the study, but later decide that you do not wish to, you can terminate your participation at any point during or before the group discussion or questionnaire.

How will we protect your confidentiality?
The information you provide will only be used for research purposes. If you participate in group discussions, the recordings of the discussion (both audio and written) will only include first names. The list of the participants, made during recruitment, with your contact information will be kept separately from the recordings. Reports of the study will not give any names or personal details. Once the study is completed, a copy of the findings will be available to you at this site, but it will not include any identifying information.

Who do I contact if I want to know more, or if I have a problem at any time?
If you want more information about the study before deciding whether or not to participate, or if you participated in the study and have questions please call: Grace Voorheis (909) 210-1901 for assistance in English or Spanish.

If at any time you have concerns about the manner in which the research has been conducted, you may contact Dr. Steve Davis, Chair of the Cal Poly Human subjects Committee, at 756-2754, sdavis@calpoly.edu or Dr. Dean Wendt, Dean of Research and Graduate programs, at 756-1508, dwendt@calpoly.edu. Also, you may contact Dr. Peggy Papathakis, professor of Food Science and Nutrition and the supervisor for this research study, at 756-7205, ppapatha@calpoly.edu.

I, _____agree to participate in a study comparing different
(print name here)
methods of nutrition education.

I understand that this study involves research.

I have discussed the advantages and disadvantages of participating in the study.

I agree to participate in a either**: a)** a group discussion that meets once and to fill out the questionnaires**, b)** a group discussion that meets twice and to fill out the questionnaires, or **c)** to only complete questionnaires about how I feed my child and about my child's weight. I understand that the group I am placed in will be decided by the researcher.

I am aware that I am free to leave the study at any time without any consequence. I will still be able to attend and make full use of all the facilities at Head Start as usual. I freely agree to participate in this study.

I agree to allow Head Start to release to the key investigator **a)** demographic (ethnicity, marital status, level of education, number in household, etc) **b)** anthropometric information (weight status of my child) and **c)** nutrition assessment information and understand that any information obtained will be kept anonymous and that it will be not shared with any person not involved in the research study.

I agree to allow Head Start to release to the key investigator my contact information and understand that it will be not shared with any person not involved in the research study.

Signed: _____
Date:_____

Name: _____

Witness
Signed: _____
Date:_____

Name: _____

Please keep one copy of this form for future reference. The signed copy will be kept with our study materials.

APPENDIX D: SEVEN STEP DESIGN

People (Who):

Learners: Low income, self-identifying Latina moms with children between 6-30 months old. Moms will vary, demographically (education, marital status, age, etc), besides being low income and Latina. Depending on the center, participants could be teen moms raising their first child to moms in the 40s raising multiple children at home. All participants will be recruited from HeadStart Locations around San Luis Obispo County.

Teacher: Grace Voorheis is a Master's candidate at Cal Poly San Luis Obispo with 7 years of experience with nutrition, culinary arts and food systems education. She is bilingual and has led learning experiences for young children, undergraduate students, and adults both in California and in Latin America. She currently works with Community Action Partnership's HeadStart programs in the Nutrition Department and knows first-hand the food and nutrition joys and challenges faced by families in this program.

Situation (Why): Obesity is a critical health issue in the U.S., especially within the Latino population. Children of Hispanic descent continue to be at much greater risk for obesity, 16% compared 12% for the overall US population (CDC, 2013). In the Community Action Paternship San Luis Obiso's Head Start Program, **36%** of children are overweight or obese. Children who are overweight or obese at this age are 5 times more likely to be overweight or obese as adults, putting them at much greater risk for Diabetes type 2, high blood pressure, and metabolic syndrome (CDC, 2013).

Evidence shows the most effective strategies in the fight against childhood obesity are based on prevention (Horodynski, 2011). Toddlers (aged 9-24 months) are at an especially important time developmentally for developing dietary habits and

preferences (Carruth et al 2004). At this age, children start weaning from breast milk or the bottle and begin self-feeding, establishing their dietary preferences. The family environment can greatly influence a child's dietary habits through parental modeling and values (Skinner et al 2002). According to Patrick & Niklas (2005), by the time a child reaches 3 years, it's possible that their internal cues of hunger and satiety have been overridden by other factors, such as parental attitudes and values towards food or being encouraged to eat more than they need at meal times. Therefore, interventions targeted at this age group may prove effective in obesity prevention.

Focus groups exploring the link between levels of acculturation and maternal perception of child weight show that, among low-income Latinas women participating in Head Start programs in San Luis Obispo County, bi-acculturated groups may experience the unhealthiest lifestyle (Chavoor, 2013). These discussions also highlighted the lack of self-efficacy in knowing what to do in a child is over or under weight, that low acculturated moms may think a fuller baby is a healthy baby, and that low acculturated moms may be less aware of their child's weight status (Chavoor, 2013).

Vision (So What?):

My ultimate vision for this workshop would be to use dialogue education to address the anxiety mom's feel, and to increase their sense of self-efficacy in being able to raise happy, healthy children. As a result of this workshop, moms will be aware of the different roles parent and child have in the feeding relationship and how these different roles connect with raising happy, healthy children (including healthy weights).

Time/ Timing (When): Depending on the availability of participants, two 30 minute workshops will be held during their previously parent meeting.

Location/s (Where): At their Head Start Location, either at a Center or a ChildCare Provider home.

Objectives (What for):

By the end of the first workshop, these participants will have

- *described the role they want **themselves** to have at eating time*
- *described the role they want **their child** to have at eating time*
- *identified one new strategy they want to try at home*

By the end of the second workshop, participants will have

- *described what has worked for them with their new strategy*
- *troubleshot how they can do things differently at home*
- *related how what they've learned connects with maintaining healthy childhood weight*

Priority Content (What):

- Skills
  - Setting limits/boundaries regarding **when** their child eats (keeping a schedule) and **what** their child eats (ie limited sweets, juice, veggies, etc as they would with bed time and tv time)
  - Eating fruits and veggies themselves (model, **what**)
  - How to know when their child is full (child's role, **if/how much**)
- Knowledge
  - division of responsibility:
    -parents are responsible for determining **what** to offer the child and **when** to offer it (meal structure/schedule)
    -children are responsible for **if** they eat and, if so, **how much** to eat (children have an innate sense for hunger/fullness, but it can be overridden by age 3)
  - modeling healthy eating is an important tool in encouraging healthy eating in young children
- Attitude
  - Trust
    - That their child can determine if/how much they need to eat
    - That their child will (eventually) eat new foods, like veggies, on his or her own, without needing to sneak them into other foods
    - It's ok if their child is hungry for a period of time

Learning Tasks (How): 4 As

Workshop One

Intro: Why are we here?

ANCHOR: Sylvia is a young mother with her first child, Juan, who's almost 2 years old. Recently, she's been worried about his eating. It seems like he hasn't been as interested in finishing his meals as he used to be when he was a baby. Sylvia is worried that her son isn't getting enough nutrients, and is glad when he will just eat something. She knows he should be eating more vegetables, but when she forces him to eat the veggies before other foods, meals often ends in tantrums. Sylvia's husband makes Juan sit there until he's finished his plate. She took him to the pediatrician and was surprised to find out he's at the 60% for his weight for height. She thought he was surely underweight!

- How do you relate to this story? What mealtime challenges do you experience at your home? With the partner on your right, discuss the ways in which Sylvia is similar or different to your experience with feeding your young children.
    - Share with the group what you came up
- Introduce flip chart with a list of common parent complaints regarding meal time challenges.

  → Does this look familiar? Right now, what are you struggling with? Are there any challenges that are missing from your life?

Parent Feeding Struggles

- Picky eaters
- Doesn't want to eat
- Won't sit at the table to eat, won't sit still
- Always seems to be hungry, wants 2nd and 3rds
- Cries, whines, tantrums if he doesn't get what he wants
- Grazing all day
- Won't eat what the rest of the family is eating
- Will only eat sweets, or drink juice, or just milk
- Won't eat veggies or healthy foods

- Sneaks foods
- Eats lots of junk food when not at home
- Mealtimes are usually stressful

Thank you all for sharing. Mealtimes can be really challenging for lots of families. One really useful tool parents can use to help encourage healthy eating habits is called the "Division of Responsibility". This tool helps us understand the difference jobs we have during mealtimes, and helps explain what's going on with Sylvia and Juan.

ADD: Introduce Division of Responsibility Flip Chart with "Parents decide…" on one side and "Child decides…" on the other

- This model helps us understand the different responsibilities Sylvia and Juan have in this situation.
    - Have cut outs of Where, What, When, How much and If.
      Ask participants "who should decide eat of these questions?"
        - Parents decide what, where, when the family or the child eats.
          What would be an example of this?
        - A child decides if/how much. What would be an example of this?

Parent decides… **What, When & Where**	**Child decides…** **If & How much**
Examples of parents' feeding jobs: **• Choose and prepare the food** **• Provide regular meals and snacks** **• Make eating times pleasant** **• Show children what they have to learn about food and mealtime behavior**	**Examples of children's eating jobs:** **• Children will eat** **• They will eat the amount they need** **• They will learn to eat the food their parents eat** **• They will grow predictably**

• **Be considerate of children's food inexperience without catering to likes and dislikes** • **Not let children have food or beverages (except for water)between meal and snack times** • **Let children grow up to get bodies that are right for them**	• **They will learn to behave well at mealtime**

Maybe…start evaluating here:

With this in mind, what would you say Sylvia and Juan are doing well and what do they need to work on? What suggestions would you make for them, based on this chart? ("yes, many people think that way. We're going to look at some other ideas that research shows might be more helpful in the long term")

APPLY: So, how do you do this? Let's review the tips on how parents can implement this model

- Review WHAT, WHEN/WHERE; IF/HOW MUCH charts
  - Groups:
    - With this in mind, what would you say Sylvia and Juan are doing well and what do they need to work on? What suggestions would you make for them, based on this chart?
    - What are you doing well, and what could you work on?

AWAY: Think about what we learned today regarding the different roles of parents and

children during meal times.

Flipchart: modeling eating healthy foods, not being a short order cook, family style dining (what), sticking to a schedule (when), making rules for where the family can eat (where), letting your child decide when she's full (if/how much)

Which do you think you can try at home in the next 4 weeks?

-being a good model for trying and liking healthy foods (what)

-deciding what my child is going to eat when they're with me, not being a short order cook (what)

-making a rule for where the family can eat (where)

-trying family style dining (what)

-keeping a stricter schedule with meals and snacks (when)

-allowing my child to decide when he or she has had enough to eat (how much)

-allowing my child to decide if he or she wants to eat at all (if)

Research shows that by writing down our goals, we're better at keeping them. Use the space below to write out how you plan to try this out. Be specific, talk about when (tomorrow night at dinner) and how (I will….) you can try this new strategy.

- In the group, discuss:
  - Imagine how trying this strategy at home could lower your stress at feeding
  - How do you think using these ideas could contribute to your child having a healthy weight?
  - Think of a way you can remind yourself in the coming weeks of continue this commitment.

Handouts: how to work with a picky eater, ways parents help vs. ways parents can make things worse, helping phrases vs. hindering phrases

10 mins Closing

-tangent questions

Workshop Two

Anchor: Share experiences, what has worked and what hasn't

- APPLY: Ellyn Satter video showing parents 1) trying to bargain with their child to eat her veggies when the child is clearly not interested 2) encouraging child to eat "just a few more bites" or 3) schedule? Structure to meals? 4) being a good role model.
    - Have moms choose which video, A, B, C they want to watch (that most fits with their situation at home, and answer X Y Z question in their workbook). Go to one other video. Come back and share.
      (questions to come when I see the videos…)
        -In your experience, why does this happen?
        -What signs is this child giving that he is hungry/full?
        -What could these parents be doing differently?
        -What could this mom do differently to ensure her child has a bit more of an appetite for dinner?
        -How could you improve this situation, based on what we learned from the different jobs of parents and children?
    - Share with the group the responses. What did you learn from this video? What is one thing you didn't know before? That you think is really important for you as a parent, or for other moms?

Other open-ended questions:

How can you set limits on when your child eats?

Name 3 ways you can create and stick to a schedule for meals and snacks

What are some ways you can ensure your child eats healthy foods (vegetables, fruit, dairy, less sugar)?

How can you model eating healthy foods in your home?

What signs does your child give you when he or she is full? Why is it so hard to listen to those signs sometimes?

Once responses are shared, review TRUST flipchart (use to transition)

Remember…

- **Children are internally regulated**
- **Children require trust to regulate**
- **Ignoring children's needs interferes with regulation**
- **Ignoring children's needs undermines their self-esteem**

This division of responsibility is based on trust. I recognize it can be really hard to let go of the urges you have as a mom to make sure your child has everything he needs to grow. Research shows that children have an innate sense of hunger and fullness, but even by age 3 this can be overridden by offering too much food or by forcing a child to finish their plate.

- Materials: handouts "how to read growth charts"

- (Me: This age is tricky because we're used to our babies being hungry and wanting to eat all the time! At around 2 years, children's growth starts to slow down, which means their appetite slows down too. This is totally normal and healthy. Research shows that children have an innate sense of hunger and fullness, but even by age 3 this can be overridden by offering too much food or by forcing a child to finish their plate.)

APPENDIX E: INDEX OF QUESTIONNAIRE ITEMS

Index of toddler feeding constructs	
Self-Regulation	
Behavior	How often do you allow your child to eat less than you think he or she should?
	How often to you allow your child to eat more than you think he or she should?
	How often do you do or say something to make your child eat more?†
	During meals or snacks, I let my child leave food on his or her plate
	I encourage or demand my child to eat more when he or she said he or she is full†
Self-Efficacy	At meals and snack times, I can allow my child to decide if he or she wants to eat or not.
	When my child says he or she is full, I can allow my child to decide when he or she has had enough to eat.
Intent	In the next 3 months, I intent to allow my child to decide if he or she wants to eat
	In the next 3 months, I intent to allow my child to decide how much he or she wants to eat
Maintain a schedule	
Behavior	How often does your child eat on and off throughout the day?†
	I let my child have something to eat whenever he or she asks*†
	I keep a regular snack schedule for my child *
	I keep a regular meal schedule for my child *
Self-Efficacy	I can keep a regular schedule for meals and snacks.
Intent	In the next 3 months, I intent to keep a schedule for meals and snacks for my child
Role Model Healthy Eating	
Behavior	My child eats the same foods prepared for the family*
	If my child does not want what is prepared, I give him/her something else*†
	When I eat meals or snacks with my child, I eat vegetables
	When I eat meals or snacks with my child, I eat fruit
	When I eat meals or snacks with my child, I eat or drink milk, cheese and yogurt
Self-Efficacy	I can model healthy eating habits with my child
Intent	In the next 3 months, I intent to make the same foods for everyone in my family
*Items excerpted from Chaidez et al Toddler Feeding Questionnaire †Items were reverse coded when entered into database.	

APPENDIX F: HEALTHY BODY SIZE VISUAL