

EVALUATION OF MESSAGES TO MOTIVATE PARENTS TO PROMOTE INTAKE OF CALCIUM-RICH FOODS IN
EARLY ADOLESCENTS

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By

Yannica Theda S. Martinez

Thesis Committee:

Jinan C. Banna, Chairperson

Carol J. Boushey

Marie Kainoa Fialkowski

Lynne Wilkens

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cultural relevance, personal relevance, motivators

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Abstract

Parental practices such as role modeling and setting rules and expectations influence intake of calcium-rich foods and beverages (CRFB) in early adolescents. This study aimed to test three posters promoting such parental practices with respect to comprehension, cultural and personal relevance, and ability to motivate parents to encourage CRFB intake. Interviews were conducted with 14 Hispanic and 6 Asian parents from three states to evaluate two posters containing images and taglines tailored to these racial/ethnic groups, entitled “Good play starts with calcium” and “Strong families start with good nutrition.” Responses were reviewed for common themes. For the message, “Good play starts with calcium,” both groups of parents understood the message to provide CRFB to their children for adequate calcium intake. Only Hispanics, however, recognized the connection between calcium intake and strong bones. For the message, “Strong families start with good nutrition,” both groups had difficulty understanding that the foods pictured contained calcium and should be provided to ensure adequate intake. Both posters were considered culturally and personally relevant; however, respondents did not indicate motivation to provide CRFB in response to posters. Given the issues identified regarding comprehension and ability to motivate parents, modifications are needed to emphasize the connection between images and taglines featured in the posters and calcium intake for use in a future intervention to improve CRFB-promoting practices among parents of early adolescents.

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Chapter 1. Review of Literature

Calcium is the fifth-most abundant element and most abundant mineral in the human body (Institute of Medicine, 2011). Almost all of the calcium (99%) in our bodies is found in bones and teeth in the form of hydroxyapatite ($\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_2$), while the rest can be found in the blood, extracellular fluid, muscle, and other tissues (Institute of Medicine, 2011). Dietary calcium is essential for physiological growth and development (Heaney, 2000; Institute of Medicine, 2011; Matkovic, Fontana, Tominac, Goel, & Chesnut, 1990; Matkovic & Heaney, 1992; National Research Council, 2006a; Whiting et al., 2004). The best sources of calcium are milk or milk products, fortified ready-to-eat cereals, fortified orange juice, fortified soymilk, dark green leafy vegetables, legumes, certain fruits, and grain products (Institute of Medicine, 2011; U.S. Department of Agriculture & U.S. Department of Health and Human Services, 2010). In addition to growth and development, calcium is involved with vasoconstriction, vasodilation, blood clotting, nerve transmission, glandular secretions, and muscle function (Institute of Medicine, 2011). Calcium has also been linked to improvements in weight and fat loss and maintenance and with the prevention of bone mineral loss during dieting (Josse, Atkinson, Tarnopolsky, & Phillips, 2011; Novotny, Daida, Acharya, Grove, & Vogt, 2004; Riedt et al., 2007; Shahar et al., 2010; Thorpe et al., 2008), though conclusions have been mixed in this regard (Jones et al., 2013; Lanou & Barnard, 2008; Shapses, Heshka, & Heymsfield, 2004).

In order to derive benefits regarding daily function, growth, and maintenance from intake of calcium, it is recommended that individuals follow the guidelines set for acquisition of adequate calcium from the diet. The Food and Nutrition Board established the Dietary Reference Intakes (DRIs) at the Institute of Medicine to provide recommendations on nutrient intakes for population subgroups based on age, life stage (infants, children, adolescents, adults, pregnancy, lactation) and gender (National Research Council, 2006a). Recommended Dietary Allowance (RDA) values are DRI values that take into account the average daily intake level that is sufficient to meet requirements of most healthy individuals

(National Research Council, 2006a). For calcium, RDA values have been established for individuals in each life stage, with the exception of infants up to 12 months of age. For this group, an Adequate Intake (AI) value has been established due to inadequate epidemiologic and experimental data to establish an RDA (Institute of Medicine, 2011), thus providing a basis for this age group to reach nutritional adequacy. The following table provides DRI values for the general population:

Table 1.1. Dietary Reference Intakes/RDA values for Calcium (mg/day) (Institute of Medicine, 2011)

Age	Male	Female	Pregnant	Lactating
0 through 6 mo*	200	200		
7 through 12 mo*	260	260		
1 through 3 y	700	700		
4 through 8 y	1,000	1,000		
9 through 13 y	1,300	1,300		
14 through 18 y	1,300	1,300	1,300	1,300
19 through 30 y	1,000	1,000	1,000	1,000
31 through 50 y	1,000	1,000		
51 through 70 y	1,000	1,200		
71+ y	1,200	1,200		

*Adequate Intake (AI) values

According to the DRIs, once children reach puberty between the ages of 9 to 13 years, they require a daily calcium intake of 1,300 mg/day, or three servings of dairy foods per day (Institute of Medicine, 2011; National Research Council, 2006a). Adequate calcium intake is important for physiological development during these years of early adolescence and determines bone health later in life. Adolescents are able to absorb and retain calcium more efficiently than children and young adults, but this is dependent on their consumption of adequate amounts from their diet (Matkovic & Ilich, 1993). Studies have shown that adequate calcium intake at this stage is necessary to reach optimum bone mineralization and density (Burrows, Baxter-Jones, Mirwald, Macdonald, & McKay, 2009; Fiorito, Mitchell, Smiciklas-Wright, & Birch, 2006; Fisher, Mitchell, Smiciklas-Wright, Mannino, & Birch, 2004; Huncharek, Muscat, & Kupelnick, 2008; Matkovic et al., 2004, 2005; Vatanparast, Baxter-Jones, Faulkner, Bailey, & Whiting, 2005). Consumption of sufficient amounts of calcium during early

adolescence also prevents fractures throughout life, from early adolescence to post-menopausal years (Goulding et al., 2004; Heaney et al., 2000; Matkovic et al., 2005).

If the recommended amount of calcium is not consumed during adolescence, there may be health consequences over the long term. Osteomalacia, defined as softening of the bone, originates from impaired mineralization of bone matrix during childhood skeletal growth and occurs after growth plates have fused during adulthood (Whyte & Thakker, 2013). Rickets is a childhood form of osteomalacia marked by impaired bone mineralization during growth, causing softening and deformity of the bones (Whyte & Thakker, 2013). The primary cause of rickets and osteomalacia is vitamin D deficiency or malabsorption, with poor dietary calcium exacerbating vitamin D-deficiency rickets (Whyte & Thakker, 2005, 2013). Weakening of bones from rickets and osteomalacia increases the likelihood of fractures during adulthood (Whyte & Thakker, 2005). Osteopenia, a condition in which bone mineral density is lower than normal, may also result from inadequate calcium intake (World Health Organization, 2003). If osteopenia is not treated appropriately, it may lead to osteoporosis, a more serious systematic skeletal disease characterized by low bone density from deterioration of bone tissue and increase in bone fragility (Andersen, 2007; World Health Organization, 2003). In 2010, more than 53 million people in the U.S. had osteoporosis or signs and symptoms related to osteopenia (National Institutes of Health & National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2014; Wright et al., 2014). Increased fracture risk is also observed for those with osteoporosis, with about 2 million osteoporotic fractures each year in the U.S. and a lifetime risk of 40-50% and 13-22% in women and men, respectively, worldwide (Burge et al., 2007; Johnell & Kanis, 2005; National Research Council, 2006a).

Previous studies have demonstrated that Asian, Hispanic, and non-Hispanic white youth, adolescents, and adults are most at risk of bone degradation and developing osteoporosis (Burrows et al., 2009; Walker, Novotny, Bilezikian, & Weaver, 2008) and have higher risk of hip fractures and lower

bone mineral density compared to African Americans (Bachrach, Hastie, Wang, Narasimhan, & Marcus, 1999; Hochberg, 2007; Walker et al., 2008). Though osteoporosis is not considered a childhood disease, its origins may occur at the age of 10 to 13 years, during the period of peak bone acquisition (Fiorito et al., 2006; Matkovic et al., 2005). Peak bone mass is reached between the age of 20-30 years, bone loss begins between 30-40 years old, and significant bone mass is lost during menopause for women, demonstrating the need for early adolescents to consume and maintain sufficient calcium levels to prevent accelerated losses (Baxter-Jones, Faulkner, Forwood, Mirwald, & Bailey, 2011; Heaney et al., 2000; Khosla & Riggs, 2005; National Institutes of Health & National Institute of Arthritis and Musculoskeletal and Skin Diseases, 2012). There is no cure for osteoporosis, so prevention, particularly during childhood and adolescence, is key to preventing bone loss and degradation later in life. Reaching peak bone mass is correlated with genetics, but is also affected by nutrition and physical activity (Burrows et al., 2009; Fiorito et al., 2006; Fisher et al., 2004; Matkovic et al., 2005; Vatanparast et al., 2005).

In the U.S., intake of calcium-rich food and beverages (CRFB) decreases during early adolescence and continues to decrease with age (Bailey et al., 2010; Larson et al., 2009; Moshfegh, Goldman, Ahuja, Rhodes, & Randy, 2009; Moshfegh, Goldman, & Cleveland, 2005). An analysis of data from the National Health and Nutrition Examination Survey (NHANES) from 2001 to 2008 revealed that early adolescents aged 9 to 18 years had the greatest incidence of not meeting their calcium intake requirement levels compared to other age groups (Wallace, Reider, & Fulgoni, 2013). Similarly, in an analysis of NHANES data from 2003 to 2006, early adolescents aged 9 to 13 years had a mean total calcium intake of $1,093 \pm 32.9$ mg/day and 988 ± 47.1 mg/day for boys and girls, respectively, indicating that they were only consuming between 76-84% of their 1,300 mg/day requirement (Bailey et al., 2010). Various factors contribute to inadequate CRFB intake in adolescents, including availability of unhealthy food during this period (Larson et al., 2009), displacement of milk with soda, juices, sports drinks, and sugar-sweetened

beverages (Frary, Johnson, & Wang, 2004; Hanson, Neumark-Sztainer, Eisenberg, Story, & Wall, 2005; Nielsen & Popkin, 2004), eating away from home (Briefel & Johnson, 2004; Cluskey et al., 2008), lactose intolerance (Heyman, 2006; Larson et al., 2009; Larson, Story, Wall, & Neumark-Sztainer, 2006), TV watching (Larson et al., 2009), taste preference (Larson et al., 2006; Novotny, Han, & Biernacke, 1999), and perceptions, particularly among girls, that milk and other dairy products are unhealthy and fattening (Auld et al., 2002).

Food and nutrient behaviors and intakes among adolescents are strongly influenced by socioenvironmental factors, with parents playing a key role in influencing calcium intake of youth (Auld et al., 2002; Cluskey et al., 2008; Monge-Rojas, Nuñez, Garita, & Chen-Mok, 2002; Nicklas, 2003; Patrick & Nicklas, 2005; Reicks et al., 2011). Factors such as parents' education and mealtime structure, parental attitudes, and encouragement of consumption of CRFB affect the dietary intake of youth (Auld et al., 2002; Cluskey et al., 2008; Larson et al., 2006; Patrick & Nicklas, 2005). Parental knowledge of nutrition information is positively associated with calcium intake and overall health of adolescents (Klohe-Lehman et al., 2006; Parmenter, Waller, & Wardle, 2000; Reicks et al., 2011). Conversely, adolescents' lack of knowledge regarding daily calcium requirements and calcium content of food is a barrier to adequate intake during this period in life (Anderson, Hughes, Fisher, & Nicklas, 2005; Harel, Riggs, Vaz, White, & Menzies, 1998). Thus, interventions designed to enhance nutrition knowledge should focus on promoting awareness of dietary guidelines and risks associated with inadequate nutrient intakes in both parents and children.

Based on the aforementioned findings, dietary intake of youth, including calcium intake, can be linked to practices and behaviors of parents and other family members. A number of previous studies have identified family as one of the key factors that influences adolescent dietary behaviors, particularly in some racial/ethnic groups such as Hispanics and Asians (Bassett, Chapman, & Beagan, 2008; Bernal & Domenech Rodríguez, 2009; Campos, Ullman, Aguilera, & Dunkel Schetter, 2014; Cluskey et al., 2008;

Edlefsen et al., 2008; Hendrie, Brindal, Baird, & Gardner, 2013; Videon & Manning, 2003). Familism has been defined as “a cultural value that emphasizes warm, close, supportive family relationships and that family be prioritized over self” (Campos et al., 2014). Consumption of CRFB by family members, parental expectation of regular CRFB consumption, and making CRFB available at home are some behaviors associated with improved dietary intake that demonstrate that nurturing family bonds can improve well-being (Edlefsen et al., 2008). Knowledge of CRFB, self-motivation to consume CRFB, and perception of positive health benefits are also considered parental predictors of CRFB intake and parental factors affecting adolescent behaviors (Sharma, Hoelscher, Kelder, Day, & Hergenroeder, 2009). Other feeding practices that have been shown to influence CRFB intake include making CRFB available, role-modeling, and setting rules and expectations (Edlefsen et al., 2008; Olson, Chung, Reckase, & Schoemer, 2009; Reicks et al., 2011). Table 1.2 provides a summary of previously identified parental strategies influencing adolescent intake of CRFB, which have formed the basis for development of messages promoting parental practices influencing intake of calcium in adolescents. Given the findings from previous studies regarding the role of parental behaviors in determining adolescent intake of CRFB, interventions that extend beyond the adolescent may be more effective than those that do not (Contento, Williams, Michela, & Franklin, 2006; Hanson et al., 2005; Hovell et al., 2009). Parents have been identified as gatekeepers to food and are important targets for development of interventions seeking to improve intake of these foods (Hanson et al., 2005; Reicks et al., 2011; Spence, 2013).

Table 1.2. Strategies used by Hispanic, non-Hispanic white, and Asian Parents to Influence Adolescents’ Calcium Intake (Edlefsen et al., 2008)

Role	Parental Activity
Monitor	<ul style="list-style-type: none"> • Purchase and provide calcium-rich foods and beverages according to preferences of children. • Make available breakfast and snack foods that are good sources of calcium. • Set expectations for intake of calcium-rich foods and beverages from meals and snacks, using appropriate parental control.
Mentor	<ul style="list-style-type: none"> • Take advantage of teachable moments to emphasize health benefits from calcium-rich foods and beverages.

	<ul style="list-style-type: none"> • Encourage moderation in the intake of high-fat, high-sugar foods as sources of calcium. • Provide nutrition advice from an individual perspective instead of providing generic advice. • Teach food preparation skills specifically for breakfast, lunch, and snacks.
Model	<ul style="list-style-type: none"> • Consume calcium-rich foods and beverages (dairy and nondairy) at meals and snacks with children. • Continue to model intake of calcium-rich foods and beverages throughout the life stages of children.

CRFB intake also varies according to race and ethnicity and is based on the background and practices of the family, with certain racial/ethnic groups being particularly at risk of low intake (Larsson, Orsini, & Wolk, 2013; Nicklas et al., 2009; Novotny et al., 2003). Previous studies have revealed that Asian and Hispanic children have lower total calcium intake compared to non-Hispanic white children (Cluskey et al., 2015; Novotny et al., 2003; Wallace et al., 2013). In a multistate study that examined the calcium intake and food sources of calcium in Asian, Hispanic, and non-Hispanic white adolescents to inform interventions, Novotny et al. estimated that Asian children had an overall median calcium intake of only 868 mg/day, Hispanic children had an intake of 896 mg/day, and non-Hispanic white children consumed 1,180 mg/day (Novotny et al., 2003).

To address the problem of inadequate calcium intake observed in diverse populations of adolescents, a number of previous studies have described the development of programs and educational materials. Of note, while osteoporosis prevention and calcium promotion campaigns are often aimed at adult and elderly individuals, focusing on children and adolescents as at-risk populations may prove to be just as effective (Holmstrom, 2013; Lee, Lowden, Patmintra, & Stevenson, 2013; Tussing & Chapman-Novakofski, 2005). A recent review describes previous efforts, noting that most interventions targeted children's behavior, with few targeting parents as well (Hendrie et al., 2013). A number of programs that targeted parents or the family as a whole were found to be more effective compared to those that only targeted children (Edlefsen et al., 2008; Novotny et al., 1999; Olson et al.,

2009; Sharma et al., 2010, 2009; Vue & Reicks, 2007). Other reviews support these findings on the efficacy of interventions designed to change children's dietary behavior through parent involvement (Hingle, O'Connor, Dave, & Baranowski, 2010; Van Cauwenberghe et al., 2010).

Among the previous studies seeking to develop educational materials focused on improving calcium intake in adolescents is that of Richards et al. (2014). The work of Richards et al. involved use of the Nominal Group Technique (NGT) to allow parents participants to generate thoughts and ideas about specific parenting practices to promote intake of CRFB in youth (i.e. making CRFB available, role modeling, setting healthful beverage expectations), share their ideas in a group setting, discuss and clarify ideas, and rank them based on what they found most important concerning the specific practices. Responses indicated that emotional rewards and child health promotion were the two factors motivating parents to the greatest degree. Emotional rewards refers to emotions that parents experience when making CRFB available at home, which included pride, confidence, and relief from stress or worry, knowing that their children have access to nutritious food (Richards et al., 2014). Child health promotion involves perception of the benefits that could arise with higher CRFB intake, such as strong bones, prevention of osteoporosis, and generally good health for their children (Richards et al., 2014). The results of Richards et al.'s study provide insight regarding the motivations underlying three parenting practices, making CRFB available, role modeling, and setting rules and expectations for healthy intake. The authors note that intervention messages related to making CRFB available might benefit from focusing on child health or parent emotional rewards, and messages related to setting healthful beverage expectations may need to focus on child health benefits (Richards et al., 2014).

Conclusion

Intake of calcium-rich foods decreases during early adolescence, particularly for Asian and Hispanic children, which puts them at higher risk of bone degradation and loss in adulthood. Food and nutrient intakes among this population are strongly attributed to cultural and parental influences.

Parental practices, such as making CRFB available, role modeling, and setting healthful food and beverage expectations, have an influence on adolescents' intake of CRFB and may be addressed in interventions focused on improving calcium intake of youth.

Chapter 2. Evaluation of Messages to Promote Intake of CRFB

Introduction

Though osteoporosis is not considered a childhood disease, it may originate at the age of 10 to 13 years, during the period of peak bone acquisition (Fiorito et al., 2006; Matkovic et al., 2005). As there is no cure for osteoporosis, preventative measures, particularly during childhood and adolescence, are key to preventing bone loss and degradation later in life. Adequate calcium intake during this time is necessary to reach and maintain optimum bone mineralization and density throughout life (Burrows et al., 2009; Fiorito et al., 2006; Fisher et al., 2004; Huncharek et al., 2008; Matkovic et al., 2004, 2005; Vatanparast et al., 2005).

In the U.S., intake of calcium-rich food and beverages (CRFB) declines during early adolescence (Larson et al., 2009; Moshfegh et al., 2009, 2005). An analysis of data from 2001-2008 of the National Health and Nutrition Examination Survey (NHANES) found that early adolescents aged 9 to 18 years had the greatest incidence of not meeting their calcium requirements compared to other age groups (Wallace et al., 2013). Various factors lead to the inadequate CRFB intake observed, including displacement of milk with soda, juices, sports drinks, and sugar-sweetened beverages (Frary et al., 2004; Hanson et al., 2005; Nielsen & Popkin, 2004), eating away from home (Briefel & Johnson, 2004; Cluskey et al., 2008), and perceptions, particularly of girls, that milk and other dairy products are unhealthy and fattening (Auld et al., 2002). While osteoporosis prevention and calcium promotion campaigns are often aimed at adult and elderly individuals, focusing on children and adolescents as at-risk populations may prove to be just as effective (Holmstrom, 2013; Lee et al., 2013; Tussing & Chapman-Novakofski, 2005).

Food and nutrient intake among adolescents are strongly influenced by socioenvironmental factors, with parents playing a key role in influencing calcium intake of youth (Auld et al., 2002; Cluskey et al., 2008; Monge-Rojas et al., 2002; Nicklas, 2003; Patrick & Nicklas, 2005; Reicks et al., 2011). Family meal patterns, parental attitudes, and encouragement of consumption of CRFB are among the factors

that influence intake in youth (Cluskey et al., 2008; Larson et al., 2006). Other feeding practices that have been shown to influence CRFB intake include making CRFB available, role-modeling, and setting rules and expectations (Edlefsen et al., 2008; Olson et al., 2009; Reicks et al., 2011). CRFB intake also differs according to race and ethnicity and is based on the background and practices of the family, with certain racial/ethnic groups being particularly at risk of low intake (Larsson et al., 2013; Nicklas et al., 2009; Novotny et al., 2003). Several studies have demonstrated that Asian and Hispanic children, for example, have a lower overall median calcium intake compared to non-Hispanic white children (Cluskey et al., 2015; Novotny et al., 2003; Wallace et al., 2013).

To address the problem of inadequate intake of CRFB in adolescents and inform the development of interventions, a previous study sought to understand the motivations underlying parenting practices to improve intake of CRFB in adolescents (Richards et al., 2014). The authors describe the motivations to perform three parenting practices (making CRFB available, role modeling, and setting rules and expectations for healthy intake), and note that messages focused on these practices and the motivators of child health benefits and parent emotional rewards should be developed (Richards et al., 2014). Based on these findings, a set of messages with accompanying images was created to promote the three aforementioned parental practices among Asian and Hispanic parents. Preliminary testing is needed to confirm whether the parental motivators and benefits for each parenting practice featured are appropriately communicated to encourage CRFB intake of early adolescents. This study aimed to test the receptivity of parents to these messages with respect to comprehension, cultural and personal relevance, and potential to motivate parents to encourage CRFB intake in early adolescents, as well as obtain information on overall impressions of messages and suggestions for improvement.

Methods

This study was conducted in 3 states (Minnesota [MN], Oregon [OR], Utah [UT]) and utilized qualitative methods in conjunction with a United States Department of Agriculture (USDA) multistate project (W-2003), “How to motivate parents to promote intake of calcium rich foods among early adolescents” (USDA National Information Management and Support System, 2008). Eight states participated in project W-2003 (MN, OR, UT, California [CA], Arizona [AZ], Ohio [OH], Washington [WA], Hawaii [HI]), and the current study reports on one component of the project focused on design of messages aiming to motivate parents to increase their children’s CRFB consumption. Only the 3 aforementioned states completed tasks to meet the objectives of this project component. All research activities were approved by the institutional review board of each participating university.

Message/Poster Development

The development of messages tested in the current study has been previously described (Richards et al., 2014). Briefly, one researcher from Washington State University (WSU) created prototypes of each poster based on qualitative data previously collected from parents (Richards et al., 2014). Message/poster development was based on three parental factors (making CRFB available, role modeling, setting healthy expectations for CRFB intake) shown to be associated with intake of CRFB and involved tailoring of messages to attitudes and characteristics of parental subgroups. To cater to those with limited literacy, the posters relied on images and metaphorical representation to present messages. Messages were titled “Good play starts with calcium” and “Strong families start with good nutrition” (Appendix A-C).

Participant Recruitment

A convenience sample of 20 parents (MN [n=5]; OR [n=12]; UT [n=3]) was recruited through fliers, e-mail, word-of-mouth, personal contacts, and presentations at various sites, which included community centers, health departments, nutrition education programs, faith-based groups, after-school

programs, schools, athletic teams, scouting groups, and adult groups. To be eligible for the study, participants had to be parents or guardians of 10-13 year olds, the primary food preparers/buyers of the household, self-report as either Hispanic or Asian, and able to speak and read English. Though the non-Hispanic white population is also an at-risk population for low calcium intake, collaborators in this study shared an interest and expertise in working with health and nutrition issues of underrepresented minority groups, and focused exclusively on Hispanic and Asian populations. Each parent provided consent for participation prior to the interview.

Interviews

The goal of the interviews was to ensure that messages were comprehensible, culturally and personally relevant, and would motivate parents to encourage intake of CRFB in adolescents, as well as to gather information on impressions of the messages and suggestions for improvement. Interviews, which lasted about 15-20 minutes, were conducted with parents and/or caregivers in public and private settings, such as sports complexes, university meeting rooms, parks, community centers, libraries, and homes, dependent on the preferences of the parent.

A standard protocol for message testing was used at each site. Interviewers from each research team were trained on use of procedures to collect the qualitative data. MN and UT research teams interviewed only Hispanic parents, while the OR team recruited both Hispanic and Asian parents. Researchers at each site recruited parents to evaluate 2 out of 3 messages related to calcium availability and intake (Appendix A-C). Both sets of parents were shown the same “Good play” poster (GP1). The “Strong families” posters (SF1 & SF2) catered to either Asian (SF1) or Hispanic (SF2) parents and were presented to parents based on their racial/ethnic background. To maintain consistency with regards to interviews in each state, periodic meetings were held with principal investigators from each site to ensure compliance with the protocol and resolution of any issues that arose during interviews.

The interviews were guided by questions that elicited information on participants' comprehension of the messages, cultural and personal relevance, and motivation to encourage CRFB intake (Table 2.1). Further questions were asked about the overall impression of the poster, including suggestions on how to improve the posters. Individual institutions compensated parents through various means such as cash, gift certificates/cards, or promotional products (e.g. water bottles). All interviews were audio recorded and each site was responsible for compiling interview data and transcribing interviews verbatim.

Qualitative Data Analysis

Results from all sites were compiled and two researchers (Martinez and Banna) used the thematic analysis approach (Braun & Clarke, 2006; Miles, 1994) to code the transcripts. Responses pertaining to the three topic areas (comprehension, cultural and personal relevance, and ability to motivate parents to encourage CRFB intake) were open coded independently by parental race/ethnicity and poster. The two researchers then compared and discussed codes to determine recurring ideas and concepts and resolve any discrepancies. Ideas on which researchers collectively agreed were identified as common themes by poster and ethnic group with respect to the topic areas.

Table 2.1. All questions posed in interviews with parents (n=20) of adolescents*

Topic Area	Items on Interview Guide
Comprehension	What is this poster telling you to do?
Cultural Relevance	Is this poster culturally acceptable to you? Why or why not?
Personal Relevance	Is the information in this poster important to you personally, as a parent? Why or why not?
Motivation to encourage CRFB intake	Would seeing this poster move/get you to do ___[fill in this blank by referring to "Comprehension"-what they say it's telling them to do]? (Probe: Are you already doing this?)
Impression/Improvement	What do you like or dislike about this poster? (Probe: How could we make this poster better? What about the pictures? What about the words?)

*Full interview guide is provided in Appendix D

Results

Participant Demographics

Of the 20 parents who participated in the study, 6 self-reported as having an Asian background, while 14 classified themselves as Hispanic. Parents were between 31-40 years of age. The majority had completed some college degree or technical school, were not born in the U.S., and had lived in the U.S. for more than 10 years.

Interview Findings

Themes and exemplifying quotations from interviews for each poster are shown in Tables 2.2 and 2.3.

Good play starts with calcium (GP1)

Comprehension

While this poster aimed to convey the message that CRFB are important to allow children to be active, and that activity also promotes strong bones, most Asian parents did not note the connection between intake of CRFB and building strong bones and calcium, or the importance of physical activity. Several Hispanic parents, however, were able to make the connection between calcium intake and being active in sports. Most Asian and Hispanic parents noted that calcium-containing foods were necessary in their children's diets, but those who did not make the connection between calcium and sports made more general statements about the need to eat healthy and add physical activity to their children's daily lives. A few Hispanic parents found that the poster reminded them of foods that have calcium and the importance of consuming CRFBs.

Cultural and personal relevance

The majority of the Asian parents stated that the poster was culturally acceptable, particularly because the sport, soccer, is culturally relevant and universal. It was also educational to them in terms of what foods contain calcium. Hispanic parents reported that because soccer is a popular pastime among Latino and Hispanic families, it was culturally relevant for this group. These parents said that the

foods pictured represented foods that everyone ate, so the message was not specific to one ethnic group. The poster was personally relevant because it was important to them for their children to be more active. Several Hispanic parents mentioned that they themselves are active and eat healthy so they would encourage the same type of lifestyle for their children. They stated that the poster contained information related to the goals that they would like to achieve for their family. Both Asian and Hispanic parents mentioned that the poster was personally relevant because it was a reminder to buy CRFB.

Motivation to encourage CRFB intake

Asian parents reported that the poster would motivate them to buy CRFB, including dairy products and vegetables. Hispanic parents were also motivated to increase their children's calcium intake, especially if their child was physically active. Hispanic parents were once again reminded which foods contain calcium and to provide them to their families. Both sets of parents stated that they were motivated to cook and eat healthy in general, and mentioned that they already encouraged CRFB intake by purchasing CRFB so they were readily available at home.

Impression/Suggestions for Improvement

Asian parents had few suggestions for improvements to the poster. A few parents stated that the image of the soccer ball connected the message to sports and the food images showed foods that contain calcium, so it was easy to relate calcium to being active in sports. Some parents mentioned that some text was needed to indicate that the foods pictured contained calcium. Hispanic parents stated that the images of calcium-rich foods were appropriate and reminded them to eat these foods. A few parents suggested including images of other good sources of calcium, such as soymilk, as well as translating the poster into Spanish.

Strong families start with good nutrition (SF1 & SF2)

Comprehension

Asian parents felt that the poster was encouraging them to consume healthy food, particularly vegetables. It presented foods to be included in family meals, and emphasized the importance of eating together. Hispanic parents also stated that the message was to provide their families with healthy, well-balanced meals, but did not mention the importance of CRFB specifically. They also noted that people should eat together as a family and that food was the way to create stronger familial bonds. Hispanic parents better understood the poster's message that calcium was good for their whole family, but there was generally little mention among both Asian and Hispanic parents that the foods pictured contained calcium and should be provided to ensure adequate intake.

Cultural and personal relevance

Both groups stated that the message was culturally and personally acceptable. The poster portrayed the Asian cultural values of having balanced food intake and including lots of vegetables in their dishes, though participants noted that salad is usually not part of Asian food preparation. All Hispanic parents also reported that the poster was culturally relevant. The family in the poster looked Hispanic, and participants stated that it was fitting to include some foods, such as beans, related to Hispanic cuisine. More ethnic-appropriate foods were suggested to make the poster more relatable. Like the "Good play" poster, it reminded Hispanic parents to provide healthy food, especially CRFB, to their children. Both Asian and Hispanic parents said that the poster was personally relevant because it was family-oriented.

Motivation to encourage CRFB intake

Parents' responses in both groups were similar in that the majority did not specify that the posters would motivate them to encourage CRFB intake in their children. Most parents indicated motivation to provide healthy food in general, though some Hispanic parents did mention encouraging

intake of CRFB specifically. Both groups of parents stated that families should prepare and eat meals together. Meals should be healthy, have a variety of options, and contain a balance of nutrients.

Impression/Suggestions for Improvement

Most Asian parents stated that they liked the images in the poster, but some, such as the salad, were not so relevant to the Asian culture. They also suggested that the images be made clearer, as they had trouble distinguishing what the foods pictured were. They stated that the image did not relate to the phrase at the top of the poster; the image is of a family enjoying the meal together, but it was unclear what the relationship was to CRFB intake. Due to this, parents stated that the text was crucial to understand the message of the poster. Hispanic parents thought that it was beneficial to include food images showing a variety of CRFB and that the Latino/Hispanic family made it more relatable. They did, however, suggest translating the poster into Spanish. They also suggested including more images of culturally-sensitive foods, such as tortillas or tamales.

Table 2.2. Responses to the “Good play starts with calcium” message

Topic Area (By ethnicity)	Themes	Exemplifying Quotations
Comprehension		
Asian	Foods pictured contain calcium	‘It shows the milk, orange juice, beans, and yogurt. I can see that they are rich in calcium.’
Hispanic	Foods pictured contain calcium Calcium needed for activity	‘I need to include milk, juice with calcium.’ ‘I think it’s more toward if you are active then you need calcium.’
Cultural Relevance		
Asian	Soccer is culturally relevant	‘Yes, it’s acceptable. My son is playing in a soccer team.’
Hispanic	Soccer is culturally relevant	‘Yeah. Soccer. It’s very Latino, it’s very common.’
Personal Relevance		
Asian	Reminder to buy CRFB Informative to know sources of calcium	‘Yes, it reminds me to buy those food to my children.’ ‘The ball directly tells me that it is about sports and those food tell me about calcium.’
Hispanic	Reminder to buy CRFB Goal setting for the family for healthy eating and exercise	‘If I saw it at the market, it would remind me that I do need to include those foods...they still need the calcium.’ ‘One of my goals every year is to have healthy food and being active.’
Motivation to encourage CRFB intake		
Asian	Already providing CRFB to family Motivation to buy/consume healthy food and CRFB	‘I usually buy a lot of fruit and vegetables for my child, also calcium-rich juice, but not milk.’ ‘The calcium is a big front...there’s also a clue about ‘calcium is an essential part of your healthy child’s everyday diet.’’
Hispanic	Already providing CRFB to family Motivation to be active and to buy/ consume healthy food and CRFB Reminder of what foods have calcium	‘...that my kids will be able to play sports and if they fall...I’ll be calmer because I know I already gave my son a glass of milk.’ ‘We have to make sure our kids are active. Also, we need to feed them well. So it’s balanced.’ ‘It’s a reminder that there’s calcium in these foods.’

Table 2.3. Responses to the “Strong families start with good nutrition” message

Topic Area (By ethnicity)	Themes	Exemplifying Quotations
Comprehension		
Asian	Eat healthy, well-balanced meals Eat together as a family	‘Again, healthy eating. A lot of vegetables.’ ‘It is family get-together, at least at mealtime.’
Hispanic	Eat healthy, well-balanced meals Eat together as a family	‘There are fruits, veggies, protein in the meat, their juices, and I think their alimmentation is very well-balanced.’ ‘And to me is very important that they are showing how they are spending time together as a family.’
Cultural Relevance		
Asian	Poster/foods pictured are culturally relevant	‘Yes, it is [culturally acceptable]. Because the Chinese culture, we try to balance the food and include lots of vegetables in the dishes.’
Hispanic	Ethnicity of models is culturally relevant	‘As a Hispanic, when I see the people there, I feel like it’s part of my culture.’
Personal Relevance		
Asian	Family’s happiness and health are personally relevant	‘I like it, the vegetables, health juice, fruits...and the children are happy.’
Hispanic	Eating together as a family is important	‘...it reinforces the fact that eating together is important, which we don’t always do.’
Motivation to encourage CRFB intake		
Asian	No motivation to encourage CRFB: Encouragement to cook and eat healthy as a family	‘Yes [the poster is telling me to have balanced food and motivates me to buy fruits and vegetables for my family].’
Hispanic	Majority did not indicate motivation to encourage CRFB: Encouragement to have family meals	‘It would encourage me that family meals are important and eating together is just as important.’

Discussion

Information gleaned from interviews related to parental practices and motivations in this study expands on previous findings regarding motivating parents to promote intake of CRFB among early adolescents (Reicks et al., 2011; Richards et al., 2014). Findings of the current study indicated that while messages performed well in terms of cultural and personal relevance, modifications may be needed to improve comprehension and ability of messages to motivate parents to encourage CRFB intake.

Feedback from parents in this study generally indicated that messages tested may promote intake of CRFB in this population, as most parents found that the posters reminded them to provide CRFB to their children and lead healthy lifestyles. Selection of parental feeding practices to be featured on the posters was based on previous findings suggesting that availability, role modeling, and setting rules and expectations are practices that parents perceived to yield benefits, such as child health promotion and parental emotional rewards (Richards et al., 2014). Other studies have also demonstrated that the feeding practices featured in the posters may improve CRFB intake and produce positive outcomes in adolescents. With regards to making CRFB available, for example, cross-sectional studies examining beverage choices and intakes of mothers and children have shown that calcium intakes are higher among youth whose mothers take and provide calcium supplements and/or drink milk compared to those who rarely or are never served calcium-rich foods and supplements (Fisher, Mitchell, Smiciklas-Wright, & Birch, 2001; Ulrich, Georgiou, Snow-Harter, & Gillis, 1996). Similarly, a longitudinal study of mother-daughter beverage choices reported that children whose mothers served and drank milk more frequently were more likely to meet the recommendations for calcium (Fisher et al., 2004).

In terms of role-modeling, a study from Project EAT (Eating Among Teens) found that parental intake of dairy products was positively associated with dairy intake of their children (Hanson et al., 2005). Similarly, in a randomized controlled trial seeking to evaluate an osteoporosis prevention

program, mothers who increased their own calcium intakes reported an increase in their children's calcium intakes as well (Winzenberg, Oldenburg, Frendin, De Wit, & Jones, 2006). A study of 366 adolescents in northeast Georgia also demonstrated that parental fruit and vegetable intake promoted adolescents' fruit and vegetable intake as well (Young, Fors, & Hayes, 2004).

Parental expectations have also been shown to be important, with findings from another study from Project EAT demonstrating that maternal households with high expectations and structure as well as emotional responsiveness had children and early adolescents with lower BMIs (Berge, Wall, Loth, & Neumark-Sztainer, 2010). Further, setting rules and expectations for the household has been found to be positively associated with dairy availability and higher dairy consumption among children (Vollmer & Mobley, 2013). Based on the findings of previous studies and parental responses to messages tested in the current study, it is anticipated that posters may prove to be effective in promoting the featured behaviors and increasing intake of CRFB in early adolescents as part of a nutrition education intervention.

A key component of the interviews performed in the current study were the assessment of comprehension of messages. Hispanic parents were able to comprehend that the "Good play" poster was advising them to provide CRFB to their children to build strong bones for physical activity and that the "Strong families" poster was informing them of the importance of CRFB for the whole family. Conversely, several Asian parents had difficulty understanding the messages in both the "Good play" and "Strong families" posters, and neither set of parents comprehended that the foods pictured in "Strong families" contained calcium. Previous studies have revealed a lack of knowledge of calcium food sources in diverse population groups, which should be noted in the development of educational message. A survey administered to 90 African-American mothers in Louisiana to determine knowledge concerning calcium intake and diseases, for example, indicated that 16% of the women did not correctly identify any food sources of calcium, even stating meat and poultry as calcium food sources and

incorrectly associating diabetes with calcium intake (Zablah, Reed, Hegsted, & Keenan, 1999). In another study that evaluated factors that influence dietary calcium intake, 104 Canadian women with low bone mineral density reported that their lack of knowledge regarding calcium food sources and supplements affected their calcium intake (French, Vernace-Inserra, & Hawker, 2008). Parental education is positively associated with calcium intake and overall health, so interventions designed to enhance nutrition knowledge should focus on promoting awareness and clarification of dietary guidelines, calcium-rich food sources, and risks associated with inadequate calcium intakes (Klohe-Lehman et al., 2006; Parmenter et al., 2000; Reicks et al., 2011). Though parents in the current study understood the need to provide healthy food to their families, modifications to posters may be needed to clarify that the food images on the posters contain calcium and increase awareness of how their children can meet their calcium requirements.

Parents in the current study found both posters to be culturally relevant. With regards to the “Good play” poster, for example, both sets of parents found that soccer was a universal sport, and Hispanic parents noted that soccer was part of their culture. Previous studies have indicated that members of nutritionally vulnerable groups recognize the connection between intake of CRFB and physical activity, providing further support for the content of the poster. According to a multistate study of 200 multiethnic girls on the sociocultural variables that influence CRFB consumption, for example, Hispanic adolescent girls were able to positively link milk intake with playing sports (Auld et al., 2002). With regards to foods pictured, both groups provided suggestions on the “Strong families” posters, which aimed to incorporate culturally relevant values and foods in two separate posters. Both groups expressed the desire for more ethnic-specific foods in addition to the foods pictured. These suggestions reflect the need to further examine the surface structure of the messages, which encompasses the observable behaviors of the target population, such as food choice, to increase the likelihood that members of the group targeted will attend to the messages (Resnicow, Baranowski, Ahluwalia, &

Braithwaite, 1999). Both attention to observable behaviors, as well as the values of the target population known as “deep structure,” are crucial in designing effective educational messages (Resnicow et al., 2002).

In further addressing the cultural relevance of messages, it is important to acknowledge the diversity of the Asian and Hispanic populations and to identify the subgroups targeted within these populations. Previous studies have shown that the preferred vocabulary and food choices may differ within these broad groups depending on country of origin and other factors (Kaiser, 2008; Maskarinec et al., 2015; National Research Council, 2006b; Nguyen, 2008; Rahman, Khattak, & Mansor, 2013). The Mexican diet, for example, differs substantially from that of Hispanic groups in the Caribbean (Kaiser, 2008; National Research Council, 2006b). Food preferences may be influenced by factors such as religion, risk perception, and sensory appeal, as indicated in a study of Asian adults of Malay, Chinese, and Indian origin (Rahman et al., 2013). Differences in food preference and practices demonstrate that accounting for cultural diversity is important when designing messages, as some ethnic minorities may not find messages tailored to broader populations relevant to their lifestyles.

Level of acculturation should also be considered in designing messages for minority populations in the U.S. (Barrera, Toobert, Strycker, & Osuna, 2012; Martínez, 2013; Satia et al., 2000; Serafica, 2014). While level of acculturation was not assessed in the current study, most parents were not born in the U.S. but had resided in the U.S. for more than 10 years. As first generation immigrants must balance their cultural heritage with “mainstream” American culture, beliefs and practices related to promotion of CRFB in adolescents in this group may differ compared to other segments of the Asian and Hispanic populations in the U.S (Schwartz & Unger, 2010). Calcium intake of some Asian and Hispanic populations outside of the U.S. have been shown to be lower than those of Western populations (dos Santos, Araújo Martini, Pádua Cintra, & Fisberg, 2005; Kim et al., 2014; Ponce, Campos-Nonato, Hernández-Barrera, &

Flores-Aldana, 2013; Tanaka, Uenishi, Yamazaki, Kuroda, & Shiraki, 2013), and it is likely that participants in the current study had retained some of the dietary habits of the country of origin.

In addition to generally finding both posters to be culturally relevant, parents generally found both posters to be personally relevant. Parents found messages to be particularly relevant because importance was placed on their children's physical activity, which they encouraged. In addition, both sets of parents were able to relate the theme of "family" in the "Strong families" poster, and noted the personal relevance of the image of the family. Previous studies have demonstrated that high importance is placed on familism and familial relationships, including those fostered through family meals, in both Asian and Hispanic families (Auld et al., 2002; Campos et al., 2014; Fulkerson, Story, et al., 2006; Fulkerson, Neumark-Sztainer, & Story, 2006; Larson et al., 2009, 2006; Marquis & Shatenstein, 2005; Melbye, Øgaard, Øverby, & Hansen, 2013; Videon & Manning, 2003). Eating as a family has been shown to be associated with cultural, psychological, and physical health, impacting adolescent eating habits and CRFB intake (Auld et al., 2002; Campos et al., 2014; Larson et al., 2009, 2006; Marquis & Shatenstein, 2005; Melbye et al., 2013; Videon & Manning, 2003). Parents in the current study were able to relate to the incorporation of family meals, indicating the appropriateness of this content for the target audiences.

While both posters generally performed well with regards to comprehension and cultural and personal relevance, several changes may be made in response to parents' comments. Interviews revealed that a number of parents perceived posters to be promoting healthy food in general, rather than CRFB specifically. As not all foods pictured are calcium-rich foods, such as the fruit included on the "Strong families" poster, it is possible that the images were not the most appropriate to convey the intended message. Messages should further emphasize the connection between the foods pictured and calcium, as some parents had difficulty understanding that these foods contained calcium. Parents suggested using text or words to more clearly indicate calcium-containing foods. Simple phrases could

be added to posters to further clarify the messages, while avoiding presenting complicated messages that the audience may misinterpret (Snyder, 2007; Wilson, 2007). In addition, translation of phrases presented into the language of the target population may further increase the relevance of messages to parents, as previous studies have also demonstrated (Bernal & Domenech Rodríguez, 2009; Parra Cardona et al., 2012; Snyder, 2007; Wilson, 2007). The need to match materials and messages to the observable, “superficial” characteristics of the target population has been well documented, highlighting the importance of using the language of the group in question in designing audiovisual materials (Resnicow et al., 1999). Such a consideration is of importance in demonstrating cultural sensitivity in design of materials, which encompasses the ethnic/cultural characteristics, experiences, norms, values, behavioral patterns and beliefs of a target population (Resnicow et al., 2002). Calcium-rich foods pictured must also be evaluated for cultural relevance and may include items such as maize-based products (e.g. corn tortillas, tamales) or beans for Hispanic audiences and soy-based products (tofu, edamame) or nori (dried seaweed) for Asian audiences. Previous studies have demonstrated that messages targeted towards a specific ethnic group are more likely to be impactful than messages designed to target a diverse population with different risks, practices, barriers, motivators, beliefs, and concerns (Snyder, 2007). Adaptation of messages to increase cultural and personal relevance has had a profound impact on previous interventions (Bernal & Domenech Rodríguez, 2009; Parra Cardona et al., 2012). Of note, while it is necessary to ensure cultural relevance of images and taglines for multiethnic groups, certain parenting practices, such as discipline and encouragement, have been found to be equally relevant across different cultures (Kaminski, Valle, Filene, & Boyle, 2008; Parra Cardona et al., 2012). A future study might examine additional parenting practices displayed on posters, with culturally relevant images and taglines.

Final versions of the posters may be used to develop an osteoporosis prevention program, and may also be incorporated into existing programs promoting intake of CRFB presented via diverse

channels. Previous studies have indicated that use of various forms of media may be an effective way to reach both parents and children. The Center for Disease Control and Prevention's (CDC) VERB campaign for promotion of youth physical activity, for example, used paid advertisements directed toward adolescents through television, radio, print, Internet, and schools, while parents were targeted through print and radio (Huhman et al., 2008; Price, Huhman, & Potter, 2008). Messages on print, radio, television, and at events were translated into Spanish, Korean, Mandarin, Cantonese, and Vietnamese. Exposure to the campaign was positively associated with positive attitudes towards physical activity for children and increased physical activity in parents (Huhman et al., 2008; Price et al., 2008). Targeting parents via some of the aforementioned mediums using the tested posters may be effective ways to promote intake of CRFB in youth.

In addition to targeting parents, it may also be useful to examine the effectiveness of messages solely targeting adolescents. In a randomized-controlled trial of 133 adolescent girls in Canada testing the effectiveness of targeted osteoporosis education materials, targeted messages were found to significantly increase calcium consumption compared to control materials, providing evidence that positive outcomes may arise in children who are exposed to these messages (Jung, Martin Ginis, Phillips, & Lordon, 2011). Clueless in the Mall, a website-based campaign focused on increasing awareness, knowledge, and positive attitudes towards calcium consumption in youth, was also directed at children rather than parents (Reed, Bielowicz, Frantz, & Rodriguez, 2002). Calcium intake increased in the target population, and, as in the VERB campaign, parents became aware of the importance of calcium through viewing messages aimed at their children and were more motivated to increase availability and promotion of CRFB (Reed et al., 2002).

Strengths/Limitations

The study has several strengths. First, study participants consisted of Asian and Hispanic parents from various states, two groups that have been found to be at risk of inadequate calcium intake.

Preliminary testing allowed for evaluation of relevance of the posters for the two target populations to inform further tailoring of images and taglines. Secondly, several different parenting practices shown to be associated with intake of CRFB in early adolescents were targeted in the posters, incorporating findings of previous studies. Lastly, parents provided feedback on how to improve posters, which could increase posters' ability to improve CRFB intake in the target audiences.

This study also had various limitations. First, convenience sampling was utilized, and parents were recruited from areas close to the universities where research teams were located, limiting generalizability. Secondly, comprehensive demographic information was not collected. Although the Asian and Hispanic populations are ethnically and racially diverse, no information was collected regarding identification with more specific segments of the population (i.e. Vietnamese, Chinese, Mexican, Puerto Rican). This information would allow for further tailoring of messages to meet the needs of these heterogeneous populations. Third, no information on dietary intake of the family was collected, so effectiveness of messages in impacting practices and behaviors of families is unknown. Lastly, a number of parents reported in interviews that they already provided and encouraged CRFB and healthy food to their families, indicating that the parents may already be motivated to perform the behaviors pictured.

To overcome these limitations, modifications of images and taglines are needed, and additional testing should be performed. As different racial/ethnic groups may not find certain foods pictured appropriate, it is important to include a variety of CRFB in the posters. It may be necessary to adapt messages to suit audiences with different needs, knowledge, and practices. Classifying audiences into various groups may be useful in reaching people at different stages of change with regards to fostering intake of CRFB in adolescents.

Conclusion

This study evaluated three messages designed to motivate parents to encourage adolescent intake of CRFB. Though parents reported that the posters would motivate them to provide healthy foods and beverages to their families, messages should more clearly indicate the importance of providing CRFB specifically. Modifications are needed to emphasize the connection between messages and calcium intake. Additional testing should be conducted on revised messages. Tailored messages may then be used in development of osteoporosis prevention programs, and may also be incorporated into existing programs promoting intake of CRFB. Such programs will seek to improve feeding practices of parents of early adolescents and promote parental behavior changes that could help early adolescents meet their calcium requirements to prevent osteoporosis in later life.







For all Parental Behaviors (Availability, Rules/Expectations, and Role Modeling)

Step 1: Screen

1. Hi, I am _____, a [student] at [University name], doing research on calcium messaging to improve calcium intake in kids.
2. Do you have a child between the ages of 10 and 13?
3. Do you self-identify as Asian or Asian American?
4. In your household, are you the primary food preparer and person who shops for food?
5. Are you comfortable answering questions and completing a written survey in English?
6. Would you be willing to answer several questions about calcium?

Step 2: Briefing [Give participant Consent form for Research] and review/read through the consent form with them.

Step 3: Evaluate each poster.

Only show 1 poster at a time. Administer these 5 questions for all 2 posters (2 WSU) to assess parental responses to the calcium messages.

1. What is this poster telling you to do?
2. Would seeing this poster move/get you to do ___ [fill in this blank by referring to #1 – what they say it's telling them to do]? (Probe: Are you already doing ___ [fill in this blank by referring to #1 – what they say it's telling them to do]?)
3. Is the information in this poster important to you personally, as a parent? Why or why not?
4. Is this poster culturally acceptable to you? Why or why not?
5. What do you like or dislike about this poster? (Probe: How could we make this poster better? What about the pictures? What about the words?)

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