SEPA Nutrition Exhibit
A Front End Evaluation Report

Prepared for

OMSI
OREGON MUSEUM OF SCIENCE AND INDUSTRY

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SEPA Nutrition Exhibit
Front-end Findings—Final Report

Submitted by Patricia McNamara
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I. Executive Summary

This study was undertaken to inform the development of a new traveling exhibition designed to encourage families to make healthier food choices. Funded by a National Institutes of Health (NIH) Science Education Partnership Award (SEPA), this exhibition is one component of a larger project undertaken by OMSI in collaboration with the Small Museum Research Collaborative (SMRC).[1]

The findings described in this report were generated by interviews with nearly 200 adults and children conducted at OMSI and the five SMRC museum sites. Latinos comprised 33 percent of all interviewees and approximately 30 percent of the interviews were conducted in Spanish by native Spanish speakers. The responses of individuals in these subgroups were more likely to resemble each other than to be strikingly different. Differences that did emerge are specifically identified in this discussion.

The interview protocols prompted visitors to share their knowledge of key nutrition concepts, the strategies they may have developed to promote healthier eating habits (either their own or their families'), and demonstrate skills that might contribute to healthier eating habits (e.g., selecting a snack bar, checking nutritional information provided by product labels, and estimating recommended serving sizes for specified foods).

When confronted with a choice of commonly available snack bars, adults made different choices than did the children, but adults were no more likely to make **informed** choices or to employ good strategies when trying to make those choices. Few interviewees in any subgroup reviewed available nutritional information or based their choice on that data. Instead, all interviewees were most likely to rely on familiarity or perceived ingredients (i.e., those suggested by the bars' names or promotional labeling). One subgroup (adults accompanied by older children) was specifically asked whether or not they had seen or tried any of the snack bars before—two thirds of those adults did, in fact, choose a snack bar during the interview with which they were already familiar.

When interviewees reflected on how they make decisions about what to eat on a day-to-day basis, both adults and children were most likely to highlight personal, family, or household circumstances that influenced their choices (e.g., their individual tastes, what is available in their pantry or neighborhood, etc.). In this respect, adults were more likely to be influenced by family

[1] SMRC includes five museums: Bootheel Youth Museum (Malden, Missouri), KidZone Museum (Truckee, California), Las Cruces Museum of Natural History (Las Cruces, New Mexico), Palouse Discovery Science Center (Pullman, Washington), and ScienceWorks Museum (Ashland, Oregon). Additional information about these sites can be found elsewhere in this report.

member likes/dislikes, while children tended to be swayed by what they felt like eating at the moment (or what was immediately available). When adults described an overall strategy that they typically employ, they were most likely to avoid certain classes or types of foods (e.g., fats). Only one child described an approach that could be considered an "overall strategy."

Differences between children and adults did emerge when they were asked to judge "recommended serving sizes" for five items categorized as "grains" by the United States Department of Agriculture (USDA). When children and adults were estimating for themselves, both were most successful when estimating a serving size for cereal. Overall, however, children were less adept than the adults at judging serving sizes across all categories of grains. Interestingly, adults estimating for small children in their households were also challenged by this task. More than two thirds of these adults either over- or underestimated respective serving sizes for pasta, cereal, and rice.

Both children and adults identified a variety of circumstances that make it more difficult for them to make healthier choices about eating. Children were most likely to be challenged by either cravings for particular foods (e.g., chocolate) or how things taste (e.g., that things that are bad for you often taste good and vice versa). Adults, on the other hand, often reported that "time" was the factor most likely to defeat their attempts to provide healthier meals for their families. This was one of two questions to evoke different responses from Latino and non-Latino adults. Even though "time" was the limiting factor mentioned most often by both groups, other factors assumed varying levels of importance for Latinos and non-Latinos (and Latino adults tended to name fewer barriers overall).

One cluster of interview items gauged visitors' understanding of three key concepts—"calories," "nutrients," and "nutrition." The majority of both adults and children reported negative associations with the word "calorie" (e.g., weight gain, dieting) and relatively few individuals in any subgroup could approximate a scientific definition for "calorie" or describe the practical role that calories play in human health. Children were especially likely to see "calories" in an exclusively negative light, whether they were describing what that word made them think of or trying to define its meaning.

"Nutrient" posed an even greater challenge and no interviewee could provide a definition that reflected more than a rudimentary understanding of that concept. More than 90 percent of children either offered no definition of "nutrient" or formulated one that indicated no understanding of that concept. Although they were not asked to define "nutrition," two thirds of all adults and children associated that word with something that is healthy or "good for you."

As outlined in the Discussion section of this report, these findings have implications for the design of exhibit components and related programming (as well as for the implementation of related evaluation studies planned for the future).

II. Introduction

This report summarizes front-end interviews conducted to support the development of one of two related exhibitions focusing on current research in nutrition and physical activity and its

applications to personal and family wellness. Funded by a National Institutes of Health (NIH) Science Education Partnership Award (SEPA), this project is a collaborative effort partnering OMSI with members of the Small Museum and Research Collaborative:

- Bootheel Youth Museum (Malden, Missouri),
- KidZone Museum (Truckee, California),
- Las Cruces Museum of Natural History (Las Cruces, New Mexico),
- Palouse Discovery Science Center (Pullman, Washington), and
- ScienceWorks Museum (Ashland, Oregon).

The exhibition currently under development addresses nutrition and healthy eating. Its partner exhibition will focus on physical fitness. Each exhibition will occupy approximately 700 square feet and will be accompanied by ancillary materials and educational programs (project website, family take-home materials, teachers' guides, and large group interactive presentations). The project staff have defined this "Big Idea" to express these exhibitions' intended impact on visitors:

The whole family benefits when we make informed healthy choices.

These preliminary interviews were conducted to give project staff a better understanding of visitors' pre-existing ideas, attitudes, and skills and the extent to which those may enhance (or limit) the exhibition's ultimate impact on its target audiences (Latino and non-Latino children and their parents).

III. Method

Interviewers spoke with 131 adults and 65 children at both OMSI and the five partner sites. Three general audiences were targeted for these interviews: adults accompanied by small children (Adults, Small Children), adults accompanied by children six years of age or older (Adults, Older Children) and children eight years or older interviewed by themselves (Children). As tables 1 and 2 indicate, the interview samples were structured to take advantage of the particular audiences available at each site.

Table 1: Target audiences by interview site.

Site	Adults, Small children	Adults, Older children	Children	Total
Bootheel	0	15	15	30
KidZone	30	0	0	30
Las Cruces	0	16	15	31
OMSI	20	20	20	60
PDSC	15	5	5	25
ScienceWorks	7	3	10	20
Total	**72**	**59**	**65**	**196**

Approximately 30 percent of interviews were conducted in Spanish by native Spanish speakers with Latino adults and children. These Spanish-language interviews took place primarily at OMSI and Las Cruces.

Table 2: Interviewee ethnicity by interview site.

Site	Latino	Non-Latino	Not sure	Total
Bootheel	0%	90%	10%	100%
KidZone	40%	60%	0%	100%
Las Cruces	77%	10%	13%	100%
OMSI	47%	48%	2%	100%
PDSC	0%	96%	4%	100%
ScienceWorks	5%	70%	5%	100%

Interviews were structured and generally occurred in each museum with randomly selected visitors.[2] Approximately 30 percent of all interviews were conducted by trained OMSI staff; the balance of interviews were conducted by partner-museum staff with more limited expertise and training. An interview guide was prepared by the external evaluator, but OMSI staff had little or no control over the extent to which partner staff followed the established protocol.

The structured interview prompted visitors to share their knowledge of key nutrition concepts, discuss the strategies they may have developed to promote healthier eating habits (either their own or their families'), and demonstrate skills that might contribute to healthier eating habits (e.g., checking nutritional information provided by product labels and estimating appropriate serving sizes for specified foods). Interview protocols were substantially equivalent across the three target groups. Adults with small children were instructed to make choices for their children; adults with older children were instructed to answer for themselves and their families. Children responded for themselves and interview wording was modified slightly to make it easier for them to understand the questions without adult assistance. Interviewers recorded visitor responses in longhand on the interview form. See Appendix A for copies of all interview forms.

IV. Principle Findings

In the presentation that follows, "verbatim" visitor statements are included to illustrate particular response categories where appropriate.[3] The qualitative nature of much of this data precludes tests of statistical significance; where differences between groups are mentioned, statistical significance should not be assumed.

Visitor Characteristics

Females predominated among adults interviewed, but males and females were more equally represented among the children. Three quarters of adults were between thirty and fifty years of age. Adults accompanied by older children also tended to be slightly older themselves than those accompanied predominantly by younger children. All but three of the interviewed children were at least eight years of age and approximately 90 percent were between eight and eleven years of

[2] Interviews conducted at OMSI are an exception to this rule. Non-Latino visitors were randomly selected by staff in the OMSI exhibit areas, but self-selected Latino adults and children were interviewed at a variety of community sites (e.g., English as a Second Language classes, free lunch programs).
[3] Since visitor remarks were not tape recorded, these statements are approximations of visitors' actual responses.

age. Thirty-three percent of all interviewees were Latino; 60 percent described themselves as white. No African Americans were included in any interview sample. Table 3 summarizes demographic and other characteristics of adults and children interviewed during this study.

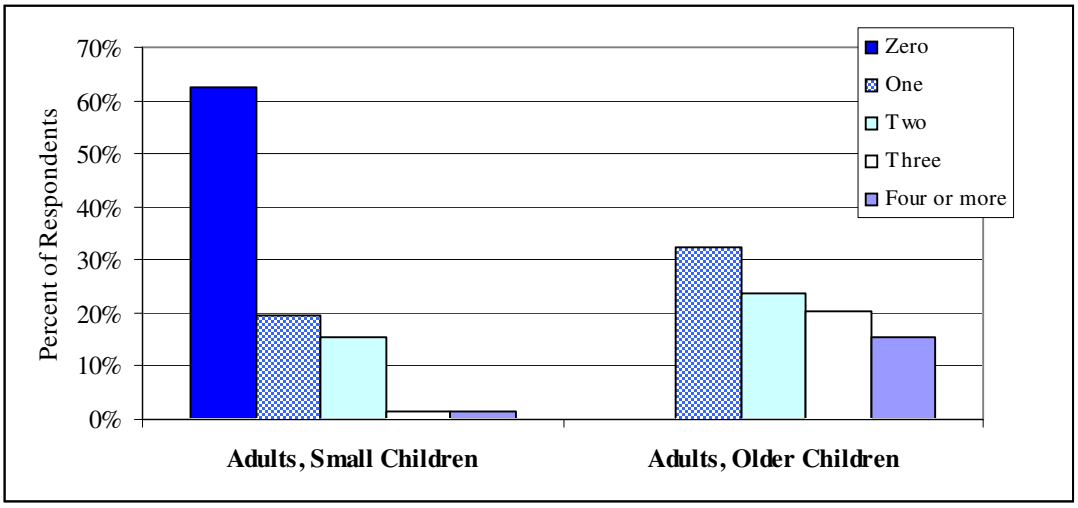
Table 3: Characteristics of adults and children.[4]

		All Adults			Children		All Interviewees	
		N	Percent		N	Percent	N	Percent
Gender	**Female**	**90**	**69%**		**34**	**52%**	**124**	**63%**
	Male	33	25%		29	45%	62	32%
Age	19–29 yrs.	16	12%	6–8 yrs.	23	35%		
	30–39 yrs.	**55**	**42%**	**9–11 yrs**	**33**	**51%**		
	40–49 yrs.	41	31%	12–14 yrs.	7	11%		
	50–59 yrs.	5	4%					
	60–69 yrs.	7	5%					
	70 yrs. or older	1	1%					
Race	Asian	4	3%		0	0%	4	2%
	African-American	0	0%		0	0%	0	0%
	Native American	0	0%		1	2%	1	1%
	Pacific Islander	1	1%				1	1%
	White	**80**	**61%**		**39**	**60%**	**119**	**61%**
	More than one	13	10%		2	3%	15	8%
	Not sure	31	24%		20	31%	51	26%
Ethnicity	**Latino**	**46**	**35%**		**19**	**29%**	**65**	**33%**
	Not Latino	78	60%		37	57%	100	55%
	Not sure	6	5%		4	6%	36	20%
Language at home	English	89	68%		43	66%	132	66%
	Spanish	31	24%		17	26%	48	26%
	Both	9	7%		1	2%	10	2%
Household income	< $15,000	9	7%		4	6%	13	7%
	$15–24,999	20	15%		10	15%	30	15%
	$25–34,999	18	14%		5	8%	23	12%
	$35–49,999	20	15%		8	12%	28	14%
	$50–74,999	18	14%		6	9%	24	12%
	75–99,999	14	11%		7	11%	21	11%
	$100,000 or more	17	13%		9	14%	26	13%
	Rather not say	13	10%		14	22%	27	14%
Related interest/training	Yes	30	27%					

[4] Percentages may not total 100%, since only those respondents who did answer a specific question are included in this summary.

Certain visitor characteristics varied either across samples or sites. For the most part, the two adult samples closely resembled each other demographically. Adults accompanied by young children were, however, more likely to be female than those accompanied by older children (80 percent vs. 54 percent). Not surprisingly, the composition of the groups did differ in terms of the age ranges of accompanying children. All but two of those adults selected for the Adults, Small Children sample did report having at least one child age six or younger in their household. On the other hand, 70 percent of adults selected for the Adults, Older Children sample reported having only children six years or older in their households. These households typically included at least two or more children age six and older (see Figure 1).

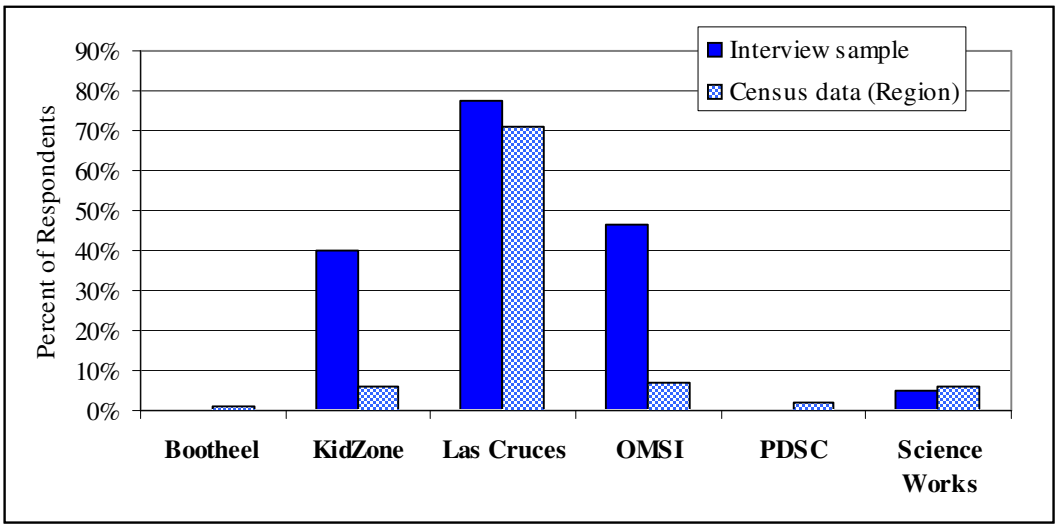
Figure 1: Proportion of adults accompanied by children older than six years of age.



The interview populations also varied across sites—most notably in terms of ethnicity and household income. Latino adults and children comprised 40 percent or more of the interview samples at KidZone and Las Cruces. Figure 2 compares the ethnicity profiles of these interview samples to those of their corresponding regions.[5]

[5] Circumstances at both OMSI and KidZone may have distorted the distribution of Latino vs. non-Latino interviewees at those sites. At OMSI, Latino adults and children were recruited at community sites frequented by the Latino community. KidZone shares its building with a social service agency that draws a Latino clientele.

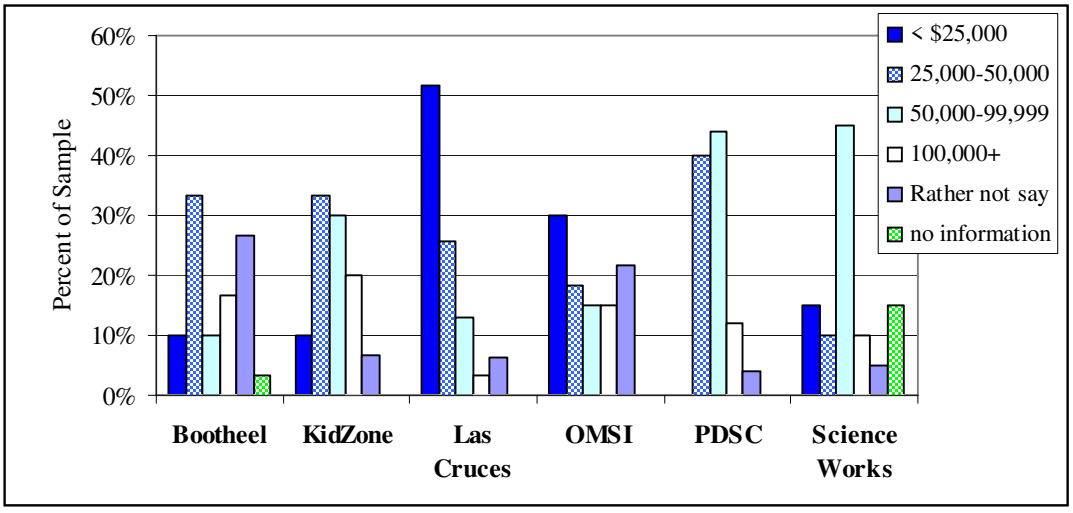
Figure 2: Ethnicity of interviewees by site, compared with corresponding census data for region.



Between 60 and 70 percent of all interviews were conducted in English. Due to variations among interview sites, the Adults, Small Children sample was most likely to include adults who spoke only English at home (76 percent vs. 60 percent of Adults, Older Children and 66 percent of Children). That group also included the largest proportion of non-Latino interviewees.

As Figure 3 illustrates, total household incomes varied dramatically across sites as well. More than 50 percent of families interviewed at Las Cruces and 30 percent of those interviewed by OMSI staff reported household incomes of $25,000 or less.

Figure 3: Interviewees' household income by site.



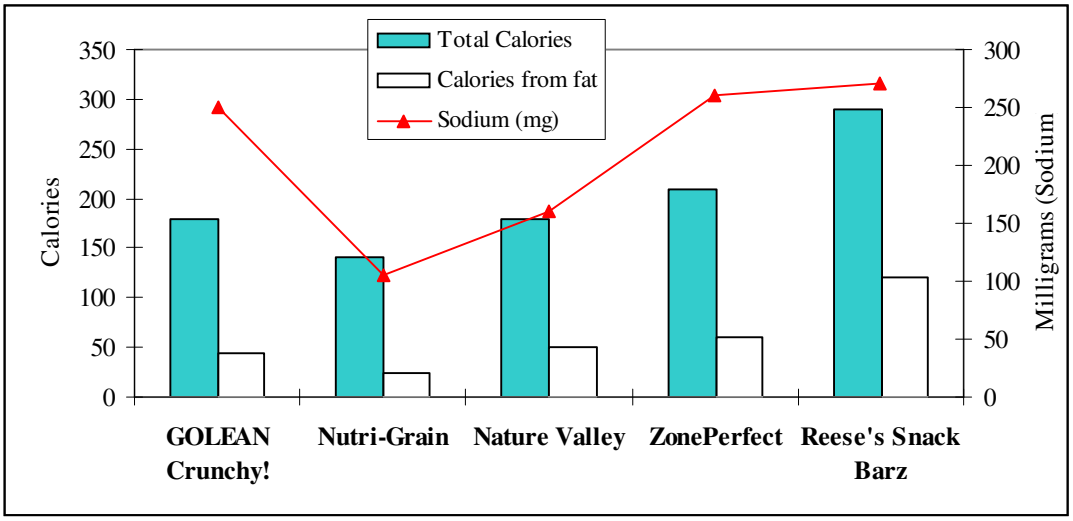
Healthy eating habits and strategies—how do adults and children make healthy choices about what to eat?

Three interview items were designed to shed light on how adults and children approach making decisions about what to eat.

- *Imagine that you want to buy a snack bar for yourself…which one would you choose and what were you thinking about when you made that decision?*

Both adults and children were asked to choose among five snack bars: GOLEAN Crunchy!® (chocolate peanut, 50 grams), Nutri-Grain® (blueberry, 37 grams), Nature Valley® (oats and honey, 42 grams), ZonePerfect® (double chocolate, 50 grams), and Reese's Snack Barz® (59 grams.[6] These bars varied widely in terms of ingredients, total calories, and nutrients. Figure 4 compares these bars in terms of three variables: total calories, total calories from fat, and amount of sodium.

Figure 4: Comparison of "whole bars" in terms of total calories, total calories from fat, and amount of sodium.



Considering just these three variables, the Nutri-Grain® bar might be considered the "best" choice (relatively low sodium and fewer total calories and total calories from fat). The Nature Valley® bar has more calories, calories from fat, and sodium but is probably also a reasonable choice. Both the GOLEAN Crunchy!® and ZonePerfect® bars have relatively high levels of sodium and the Reese's Snack Barz® is obviously the least "nutritious" choice.

The snack bar preferred by visitors varied across the three samples. Not surprisingly, 50 percent of children preferred Reese's Snack Barz®, while both groups of adults were more likely to choose the Nature Valley® bar. Adults with older children were also likely to select the Nutri-Grain® bar, while adults accompanied by younger children were the only ones to also prefer the GOLEAN Crunchy!® .

[6] Interviewees at one site were inadvertently given two additional snack bars to choose from; those choices were not included in this summary.

Table 5: Snack bar choice by sample.

	Children	All Adults	Adults, Older Children	Adults, Small Children
GOLEAN Crunchy!®	6%	21%	10%	29%
Nature Valley®	**14%**	**35%**	**36%**	**35%**
Nutri-Grain®	**17%**	**21%**	**25%**	**18%**
Reese's Snack Barz®	**40%**	**5%**	**15%**	**6%**
ZonePerfect®	17%	7%	5%	4%
more than one	2%	2%	5%	0%
none of them	2%	4$	2%f	6%
Total	100%	100%	100%	100%

How all visitors made their choices is perhaps more informative than which snacks they actually selected. All groups of visitors were most likely to make their choice on the basis of **familiarity** and **perceived ingredients** (typically those featured on the bar's label or implied by its name, such as oats, chocolate, or fruit). Adults accompanied by small children were more likely to mention specific nutrients (e.g., fats).

As Table 6 demonstrates, children and adults tended to provide similar rationales for their choices. Note, however, that adults were more likely to mention specific nutrients (e.g., protein, fats) while children were more likely to consider how something might taste.

Table 6: Interviewees rationale for their choice of snack bar.[7]

	Adults	Children
Familiarity	**29%**	**35%**
Perceived ingredients	**27%**	**15%**
Taste	12%	**23%**
Healthy	18%	14%
Looks good	2%	12%
Nutrients	19%	2%
Other	14%	12%

Only one group of interviewees (adults with older children) was specifically asked whether or not they had ever seen or eaten any of the five snack bars before. These adults were already most familiar with three bars—Nutri-Grain®, Nature Valley®, and Reese's Snack Barz®, and two thirds of that group did choose a snack bar during the interview that they had eaten before. This was particularly true in the case of Nutri-Grain®; 80 percent of adults who made that choice had tried it before. Latino and non-Latino familiarity with these snack bars followed a similar pattern (see Table 7). Non-Latino adults were somewhat more likely to have seen and eaten the Nature Valley® and Nutri-Grain® bars before, while Latino adults were more likely to have seen and eaten the ZonePerfect® bar.

[7] When interviewee responses could be assigned to more than one category, the total percentage exceeds 100 percent. In those cases, the total percentage is not shown.

Table 7: Interviewees' prior experience with individual snack bars (adults with older children only).

Snack Bar Choice	Had Seen Bar Before		Had Eaten Bar Before	
	Latino	Non-Latino	Latino	Non-Latino
GOLEAN Crunchy!®	33%	20%	4%	10%
Nature Valley®	71%	80%	46%	67%
Nutri-Grain®	63%	77%	50%	63%
Reese's Snack Barz®	67%	63%	38%	27%
ZonePerfect®	75%	37%	25%	3%

Even though the adults (for the most part) made more "nutritional" choices than the children, very few interviewers recorded that **either adults or children reviewed the bars' nutritional information or ingredients**. Adults with small children were most likely to seek out that information, but, overall, interview records indicated that only 29 of the 196 adults and children studied either the actual nutritional information or the list of ingredients.[8] It is interesting to note that 30 percent of the adults with small children **did** look at the nutrition information **and** they were more likely to mention "calories," "fat," or "sugar" in their explanations.

- *What do visitors consider when they're trying to make healthy choices about what to fix for their family dinners (adults) or for a lunch for themselves (children)?*

Interviewees' responses to this question were assigned to one or more of these five categories:

- They described an **overall strategy** (e.g., "fix a variety of foods," "stay away from fried foods," "eat less fast food," "fresh food rather than packaged," "use organic foods," "eat less red meat").
- They said that they **include specific foods or food groups** (such as protein, meat, fish, vegetables, fruit, whole grains, starch, salads, etc.).
- They described **personal/family/household issues** that influence their decision making (such as what's available at the moment, what they or their families like to eat, how much time they have, etc.). Note that many of these echo barriers that visitors described (see below).
- They **mentioned relevant concepts or terms but provided no additional detail** (e.g., make it "nutritious," "balanced," "healthy," etc.).
- They mentioned **other** considerations, including more idiosyncratic factors (ranging from "food allergies" to "easy to digest") and others that were simply hard to interpret/categorize, like "preparation," "something big."

Both adults and children were very likely to describe **personal, family, or household circumstances** that influence how they tend to approach meal making—nearly one half of both groups made such statements. Adults were more likely to be influenced by family members'

[8] Because of the way that responses were recorded, it is not clear whether interviewees were not looking at the nutritional information or whether interviewers may have neglected to note this behavior at all, whether or not it occurred.

general likes/dislikes, while children's decision making often depended more on what they felt like eating at the moment or what was immediately available.

Adult responses tended to reflect a wider variety of considerations than did children's. Forty-four percent of adults mentioned trying to **include specific foods** (especially vegetables and meat/poultry/fish) and 40 percent described an **overall strategy** that they employ to improve their families' diets. Most commonly, that strategy involved avoiding particular ingredients or classes of food (e.g., fat, sugar, fried foods)—a strategy mentioned by 25 percent of all adults. Other strategies included using particular cooking methods (8 percent), offering variety and color (6 percent), and eating organic foods (5 percent). Children rarely described such considerations. Adults were also more likely than children to **mention concepts or terms** without providing any additional detail (especially following a "balanced" diet or the "food pyramid").

Table 8 includes representative comments (made by both adults and children) assigned to these broad categories.

Table 8: How adults and children decide what to fix for meals.

	Adults	Children	Representative Responses
Use an overall strategy	40%	2%	*We try to stay away from fast food. We try to stay away from fatty foods. We grill a lot …* [ID# L-7, adult]. *… organic ….* [ID# SW-5, child]
Include specific foods	44%	17%	*… [We] almost always have meat products, salad.* [ID# P-18, adult] *Peanut butter sandwich.* [ID# L-13, child]
Mentioned concepts—no detail	40%	18%	*Food has to be along the food pyramid guidelines. Find things from each group.* [ID# O-12, adult] *I choose the most nutritious [food].* [ID# O-16, child]
Consider family/household issues	46%	66%	*How much time I have and whether or not my children will eat it.* [ID# B-14, adult] *See what's the best and what I'm hungry for.* [ID# B-12, child]
Other	20%	12%	*…When I cook it's something simple.* [ID# B-11, adult] *I like things that are good.* [ID# O-12, child]
Don't think about it	1%	0%	
Don't know	0%	5%	

- *What do adults and children understand about "recommended serving sizes"?*

Both adults and children were asked to decide the appropriate serving size for at least one of five items in the "grains" group: rice, pasta, cereal, bread, and tortillas.[9] Children interviewed by themselves and adults with older children were instructed to answer for themselves, while adults accompanied by small children were asked to estimate a serving size for a small child. Since interviewees' estimates for bread and tortillas were very similar, responses for those two items

[9] At some sites, visitors were asked to estimate serving size for just one item with which they were familiar; at other sites, they answered for more than one item. All estimates were included.

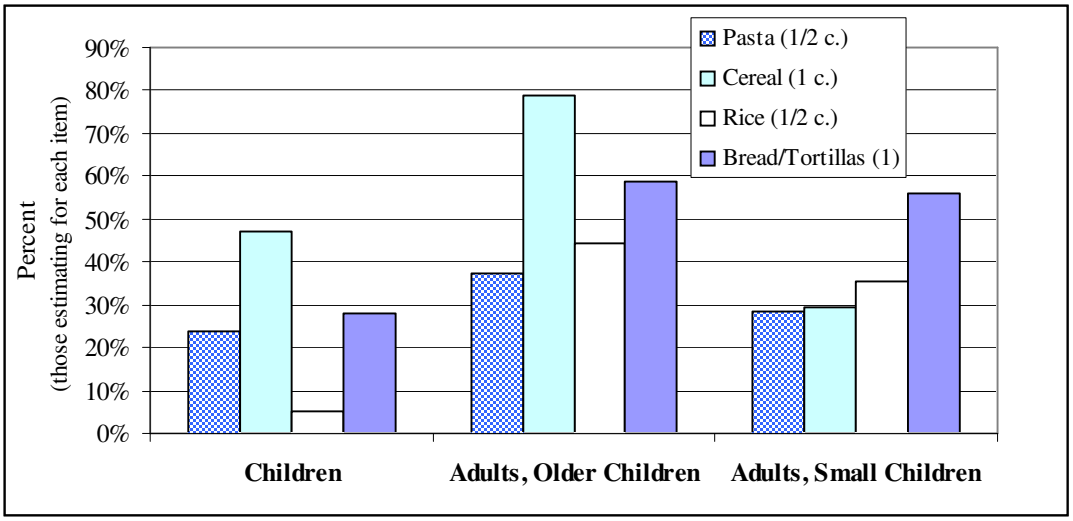
are combined here. Table 9 compares the number of individuals in each group who attempted estimates for each item in the "grains" category.

Table 9: Sample sizes for "grains" estimates.

Item selected for estimate:	**Children**	**Adults, Older children**	**Adults, Small children**
Pasta	25	24	35
Cereal	36	19	34
Rice	20	27	31
Bread/Tortillas	32	29	52

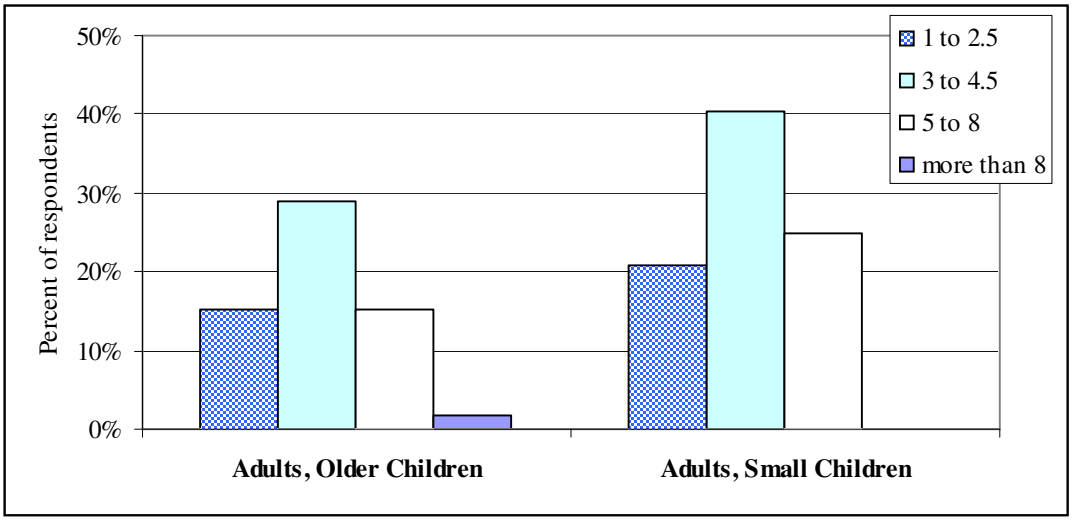
As Figure 5 indicates, children, adults with older children (estimating for themselves), and adults with small children (estimating for their young children) differed with respect to their ability to correctly estimate serving sizes. Both children and adults estimating for themselves were most accurate when estimating portion sizes for cereal. Fewer than 30 percent of children could gauge an appropriate serving size for bread/tortillas, pasta, or rice. Fifty percent or more of all adults could estimate the recommended serving size for bread/tortillas (whether for themselves or for young children), but it was more difficult for them to judge appropriate serving sizes for pasta or rice. In fact, more than two thirds of adults estimating for small children either under- or overestimated appropriate servings for pasta, cereal, and rice.

Figure 5: Percentage of interviewees correctly estimating recommended serving sizes for specific grains. USDA recommendations appear in parentheses.



Only adults were asked to estimate the **total number of servings** of grains per day that the USDA recommends (see Figure 6). When adults were estimating for themselves, 45 percent underestimated the total number of servings recommended for grains and 22 percent declined to attempt an estimate. Adults were better able to estimate total servings recommended for small children, but, even then, 60 percent either under- or overestimated (e.g., 21 percent estimated that fewer than 2.5 servings per day would be adequate for a small child).

Figure 6: Percentage of adults correctly estimating total number of recommended servings for grains.[10]



What barriers to making healthier choices do visitors identify?

Children were more likely than adults to single out either **likes/cravings** for particular foods (e.g., desserts, chocolate) or **how things taste** (often that things that are bad for you taste good and vice versa). Among adults, **time** was mentioned most often; nearly 20 percent also cited ease/convenience, their families' **personal tastes,** and **food options and availability**. Twenty-one percent of adults accompanied by small children were also likely to describe being limited by their food options/availability (e.g., what was available in their own pantries, in the stores where they shop). Table 10 provides additional detail as well as representative responses for each of these categories.

Table 10: Interviewee reports of barriers to making healthier choices about what to eat.

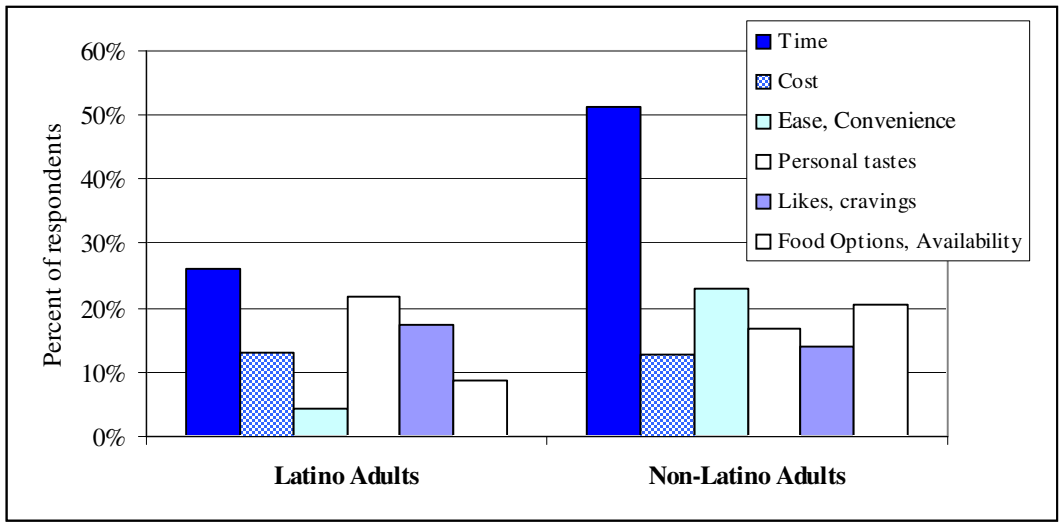
	Adults	Children	Representative responses
Time	**40%**	0%	*Some things are more complicated to fix than others. Preparation time.* [ID# O-13, adult]
Cost	12%	0%	*Lack of money. Good food is more expensive.* [ID# O-38, adult]
Ease/convenience	17%	0%	*Some items are easier to make, or just to grab, as opposed to fixing.* [ID# O-22, adult]
Personal tastes	18%	9%	*Kids don't like eating healthy.* [ID# K-30, adult] *I hate rice, squash, cucumbers…I hate all of these.* [ID# P-4, child]
Likes, cravings	15%	**26%**	*Cravings, when one is on a diet we want to eat what we shouldn't.* [ID# L-12, adult] *Because sometimes you want pizza.* [ID# L-3, child]

[10] The USDA recommends that adults consume from five to eight servings of grains per day and that children (age two to four) consume three to four servings per day.

How it tastes	8%	**31%**	*…We have every intention to eat healthy, but it has to be tasty, too.* [ID# O-12, adult] *The foods that don't taste best are the foods that are good for us.* [ID# L-7, child]
Food options, availability	17%	8%	*Preponderance of "treated food." Hormones, pesticides, coloring foods, etc.* [ID# P-1, adult] *When it's at your house and tempting.* [ID# SW-10, child]
Other	22%	9%	*Grew up eating what was wanted.* [ID# B-4, adult] *Friends that don't like to eat healthy talk you into it.* [ID# B-10, child]
No barriers	2%	0%	
Don't know	1%	17%	

This is one of only two areas in which differences emerged between Latino and non-Latino adults (responses of Latino and non-Latino children to this question were indistinguishable). As Figure 7 indicates, Latino and non-Latino adults differed with respect to both the frequency with which specific barriers were identified and the proportion of respondents citing particular kinds of barriers. Even though both groups were most likely to single out "time" as their greatest challenge to healthier eating, other barriers assumed varying degrees of importance (e.g., ease/convenience was the second most frequently mentioned factor by non-Latinos, but it was least likely to be mentioned by Latinos). The average number of different barriers mentioned also varied markedly with ethnicity (1.3 for Latinos vs. 1.9 for non-Latinos), and, as a result, the proportions of respondents describing particular barriers also differed. "Time," for example, was mentioned by approximately 50 percent of non-Latino adults but by only 25 percent of Latino adults.

Figure 7: Barriers cited by adults (Latinos vs. non-Latinos)



What do visitors understand about *calories*, *nutrition,* and *nutrients?*

Three interview items addressed adults' and children's understanding of three key concepts—calories, nutrition, and nutrient.

- *When you hear the word "calorie," what's the first thing that you think of? What does the word "calorie" actually mean?*

Approximately 25 percent of adults associate the word "calorie" with "energy" or "heat." Perhaps not surprisingly, however, the majority of interviewees reacted more negatively. Nearly 30 percent were reminded of weight or weight gain, counting calories (or "too many"), and dieting. An additional 30 percent associated "calorie" with fat or fats in food, and 6 percent of adults responded that calories were not healthy or good for you.

Children's responses were much more variable and for the most part negative in tone. While 13 percent associated "calorie" with energy or food, they were also likely to be reminded that calories are "not good for you" (11 percent), associate them with fat or fats (9 percent), or think of weight/weight gain (8 percent). Thirteen percent of children reported no particular reaction to hearing "calorie" and nearly one quarter of children's responses were difficult to fit into this framework. Table 11 provides additional detail and representative responses assigned to each overall category.

Table 11: Adults' and children's associations with the word "calorie."

	Adults	Children	Representative Response
Energy/heat	24%	5%	*Energy to power body.* [ID# P-16, adult] *Energy.* [ID# L-2, child]
Weight/weight gain	10%	8%	*I'm going to get fat; fat.* [ID# K-24, adult] *How fattening it is.* [ID# B-14, child]
Calorie counting, "too many," or dieting	17%	8%	*You should be careful how many calories you consume each day.* [ID# O-16, adult] *How many calories my body is taking in.* [ID# L-11, child]
Not healthy or good for you	5%	12%	*All that's not nutritious.* [ID# O-29, adult] *That I shouldn't eat that.* [ID# O-11, child]
Food in general	5%	8%	*Food consumption.* [ID# P-7, adult] *Good food.* [ID# SW-4, child]
Specific food	10%	5%	*Starch food—food with no nutritional value like chips.* [ID# K-4, adult] *Candy bars.* [ID# B-3, child]
Fat/fats	30%	9%	*High fat.* [ID# P-18, adult] *How much fat in foods.* [ID# L-9, child]
Other nutrient	4%	11%	*Fats, proteins, carbs.* [ID# SW-1, adult] *Cholesterol.* [ID# P-2, child]
Other	5%	28%	*Chemistry.* [ID# S-3, adult] *Cows.* [ID# L-6, child]
Don't know	15%	20%	

When asked to describe what "calorie" actually means, relatively few adults or children could either approximate calorie's "scientific" definition[11] or describe the practical role that calories play in human well being (i.e., that calories are a measure of the energy contained in food and that energy consumed must be balanced with energy expended). These responses were among those judged to demonstrate that deeper level of understanding (offered by 5 percent of adults and 2 percent of children):

> *Measurement of heat that measures the amount of energy in food.* [ID# O-7, child]
> *Amount of energy it takes to heat water to 1 degree C.* [ID# P-15, adult]

Nearly 40 percent of adults (but only 8 percent of children) provided definitions that did, however, meet the criterion for "basic understanding" of this concept (i.e., they mentioned energy, heat, or fuel). Fifteen percent of adults and 6 percent of children offered definitions that were judged to indicate at least a limited understanding of "calorie."

> *How much energy it has.* [ID# B-14, BASIC, child]
> *I think it's an amount of energy or fat that helps the body have energy. One needs to have calories, but it's bad if you have too many.* [ID# O-19, BASIC, adult]
> *Unit of energy, connected to water.* [ID# S-2, BASIC, adult]
> *Amount of energy needs to be burned in a day.* [ID# P-20, LIMITED, adult]
> *Things that food has.* [ID# O-17, LIMITED, child]

Approximately one half of children and one quarter of all adults did not attempt any definition and approximately one third of all those interviewed offered definitions that were either incorrect or too vague to evaluate.

> *It means you have to be healthy.* [ID# L-2, child]
> *Amount of fat in food.* [ID# SW-3, adult,]

Specific ideas that visitors mentioned in their definitions are tabulated below (Table 12). Adults who did attempt a definition were more likely to mention "energy" (without any additional elaboration) or "unit of energy." Children were most likely to define calories in terms of the amount of fat or sugar that food includes. Ideas assigned to the "other" category included ones like these:

> *I can't recall; some amount per exercise used….* [ID# K-10, adult]
> *All of your body parts.* [ID# L-1, child]

Table 12: Specific ideas included in interviewee definitions of "calorie."

	Adults	**Children**
Energy/unit of energy	**31%**	14%
Heat/unit of heat	4%	3%
Energy for body or in food	16%	5%
Energy to heat water or to burn something	11%	0%
Energy/other	7%	0%

[11] A "calorie" (or more accurately, a kilocalorie) is the unit of heat equal to the amount of heat required to raise the temperature of 1 kilogram of water by 1°C at sea level.

	Adults	Children
Amount of fat or sugar	11%	**43%**
Other	29%	27%

- *When you hear the word nutrient, what does that mean to you?*

Both adults and children found it much more difficult to explain what a "nutrient" is. For example, none of the definitions offered by children or adults met the criterion for "deeper understanding" of this concept.[12] Table 13 compares visitors' definitions of calorie and nutrient.

Table 13: Comparison of the completeness of visitors' definitions of calorie and nutrient.

	Definition of Calorie		Definition of Nutrient	
	Adults	Children	Adults	Children[13]
Deeper understanding	5%	2%	0%	0%
Basic understanding	38%	8%	31%	0%
Limited understanding	15%	6%	13%	8%
Too vague/no understanding	15%	28%	53%	72%
Don't know	26%	45%	3%	20%

Although approximately 30 percent of adult definitions for "nutrient" did meet the criterion for "basic understanding" (i.e., they included mentions of vitamins and minerals, building blocks, or something that the body needs from food to function), the majority of definitions provided by adults demonstrated only limited understanding or were either incorrect or too vague to evaluate.

> *The things in food our body uses—beneficial.* [ID# S-2, BASIC, adult]
> *Vitamins, minerals in food we eat.* [ID# P-17, BASIC, adult]
>
> *Nutritious things contained in food.* [ID# O-36, LIMITED, adult]
>
> *How healthy that is for us to put inside our bodies*. [ID# O-10, NO UNDERSTANDING, adult]

Sixty percent of children recalled having heard this word before, but none of them could provide a basic definition and only 8 percent offered a definition that demonstrated even a limited understanding. Seventy-two percent of children who recalled having heard the word "nutrient" before provided responses that were either incorrect or too vague.

> *What our body needs to stay healthy.* [ID# L-11, LIMITED, child]
> *Food like grains.* [ID# O-1, NO UNDERSTANDING, child]

Specific terms that visitors used in their discussion of "nutrient" are displayed below (Table 14). Approximately 50 percent of children and one third of adults mentioned that nutrients are "healthy" or "good for you," while nearly one quarter of the adults also associated this term with "vitamins."

[12] They named at least four of the six classes of nutrients (vitamins, minerals, carbohydrates, proteins, fats/oils, and water) and described those as essential to support the body's functioning and growth.
[13] Percentage of children who recognized the word "nutrient."

Table 14: Specific ideas included in interviewee definitions of "nutrient."

	Adults	Children[14]
Healthy, good, useful	**37%**	**49%**
Vitamins	24%	5%
Minerals	18%	3%
Part of food	17%	0%
Nutritious/related to nutrition	10%	10%
Something that you absorb/get from food	4%	0%
Something your body needs	9%	8%
Other	43%	31%
Don't know	3%	18%

- *When you hear the word "nutrition," what does that make you think of?*

Approximately two thirds of all adults and children associated the word "nutrition" with health or something that is healthy or "good for you." For approximately 20 percent of adults and 10 percent of children, this word evoked specific foods or nutrients, most commonly vegetables or fruits. Nearly 10 percent of adults were reminded of balanced diets, food groups in general, or the food pyramid. Table 15 offers examples of responses assigned to these broad categories.

Table 15: Visitors' associations with the word "nutrition."

	Adults	Children	Representative Responses
Healthy/good for you	**61%**	**66%**	*Something good to eat, that's healthy.* [ID# O-22, adult] *Healthy foods and not junk food.* [ID# B-1, child]
Specific foods, nutrients	22%	8%	*Salads.* [ID# L-9, adult] *Apples, bananas, wheat bread, vegetables, broccoli, cheese.* [ID# O-4, child]
"Food" or "nutrients"	8%	8%	*What we eat, nutrients that we receive from our food.* [ID# S-2, adult] *Sounds like food.* [ID# L-2, child]
Balanced diet, food groups, food pyramid	13%	3%	*Balanced diet. Different food groups.* [ID# O-27, adult] *Whole grains, fruit, meat, dairy products. The whole food triangle.* [ID# O-8, child]
Other	30%	17%	*Organic.* [ID# K-2, adult] *Something that I could eat.* [ID# O-14, child]
Don't know	0%	11%	

What questions do visitors have about healthy eating? Where do they go for answers?

Perhaps because they had just been thinking about barriers to making more healthy choices, adults and children who did have questions were particularly likely to focus on the "nuts and bolts" of healthy eating—finding or fixing healthier food, what makes a good, healthy diet, and

[14] Percentage of children who recognized the word "nutrient."

recommended serving sizes. Nine percent of adults also questioned how to ensure a healthier diet for their children. Note that 65 percent of children and nearly 50 percent of adults could not formulate any questions (at least on such short notice).

Table 16: Visitors' questions about "healthy eating."

	Adults	Children	Representative Responses
Good, healthy diets	14%	11%	*How to completely meet nutritional needs and be vegetarian.* [ID# P-20, adult] *What are healthy foods and what not?* [ID# O-16, child]
Finding/fixing healthier food	11%	3%	*I'd like to know more about … healthier ways to prepare food that my family will actually eat.* [ID# P-7, adult] *If you don't like certain healthy food, how can you make it easier to eat?* [ID# L-2, child]
Appropriate serving sizes	10%	2%	*About pastas, how much is enough? How much is a healthy serving?* [ID# L-9, adult]
Good nutrition for children	9%	0%	*None precisely, but I always wonder if I'm feeding my children right. My kids are different. One of them is fat, but the other one is extremely thin.* [ID# O-19, adult]
Other	27%	18%	*I wish labels were more specific in describing how certain elements break down (e.g., carbohydrates break down into sugars).* [ID# B-1, adult] *Why are vegetables so bad in taste but healthy?* [ID# L-8, child]
No questions	47%	65%	

- *When you want to learn more … where do you go for that information? (adults only)*

As might be expected, the Internet is a popular source of information for slightly more than 50 percent of all adults interviewed. Other sources mentioned by at least 10 percent of adults included books, a doctor/clinic, another knowledgeable person, friends or family, and television.

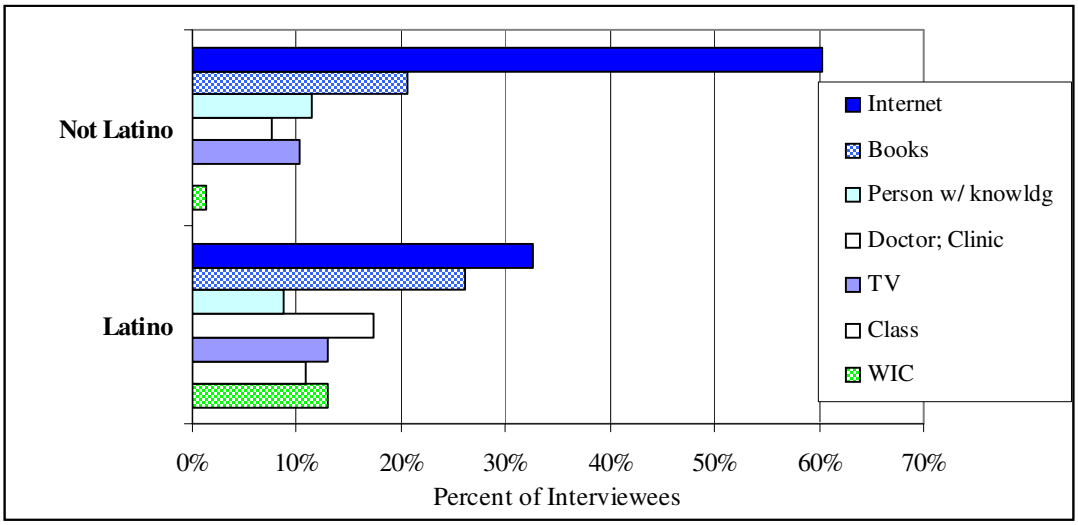
Table 17: Interviewees' sources for information about "healthy eating."

	Adults
Internet	50%
Books (including cookbooks)	26%
Doctor or clinic	11%
Television	11%
Other knowledgeable person	10%
Friends, family	7%
Magazines	7%
WIC	5%
Food packaging	4%
Library	4%

	Adults
Class	4%
Other	13%
Don't go anywhere in particular	3%

Information sources cited did vary by interview site and respondents' ethnicity. Non-Latino adults were twice as likely as Latinos to mention the Internet, and, as a result, at sites with a higher proportion of non-Latino interviewees (PDSC and Bootheel), that source was mentioned more often than was the case at OMSI and Las Cruces. Reliance on television on the other hand, **did not vary with ethnicity** but **did vary across sites**—it was the second most popular source for information at both PDSC and Las Cruces but was rarely mentioned at either OMSI or Bootheel. Latino adults were more likely to cite doctors/clinic, a class or the Women, Infants and Children program (WIC), sources rarely (or never) included by non-Latino adults.

Figure 8: Information sources mentioned by adults (Latino vs. non-Latino)



- *Have you discussed healthy eating in school? What did you talk about? (children only)*

Seventy percent of children did recall talking about "healthy eating" in school and approximately one third of those described discussions of "healthy food choices," e.g.,

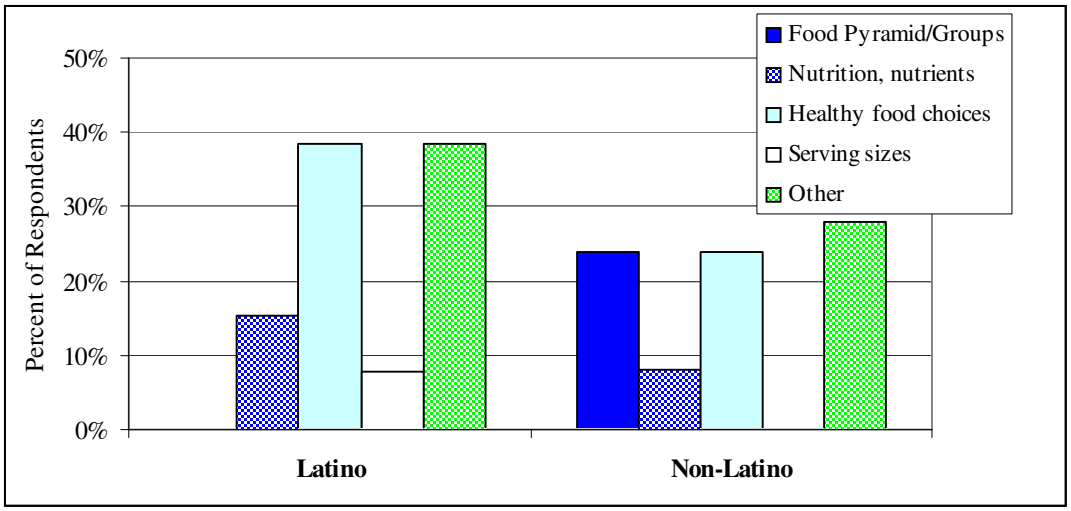
> *Talked about healthy food and having food when the dentist came.* [ID# O-5, child]
> *In the morning, I have breakfast at school and they tell us what's healthy.* [ID# L-2, child]
> *A person came and talked about eating healthy and talked about how much sugar.* [ID# B-1, child]

Sixteen percent mentioned either the food pyramid or food groups and one third described topics that were assigned to the "other" category, e.g.,

> *In science class. How to stay healthy, how to support your body.* [ID# L-1, child]
> *About how bad school lunches are.* [ID# P-1, child]

Latino children were more likely to have discussed "healthy food choices" and nutrition/nutrients in school, while non-Latino children were more likely to recall talking about the food pyramid or food groups.

Figure 9: "Healthy Eating" topics discussed in school by Latino and non-Latino children.



Discussion

This study highlights a number of considerations that staff might keep in mind as they develop specific exhibit components and educational programs designed to influence families' decision making about food.

• **This project's target audiences (Latino and non-Latino children and their parents) seem more similar than different**, at least with respect to their demonstrating "healthy eating" habits and their understanding of key concepts (calories, nutrition, and nutrients).

Both children and adults (regardless of ethnicity) would benefit from the opportunity to develop and practice strategies that promote healthier eating in situations where they are likely to be especially challenged. Children could be encouraged to seek out healthier alternatives that might actually taste good and to participate in family decision making about what kinds of food to keep on hand in the family pantry. Time-pressured adults, on the other hand, might be offered easy and convenient ways to prepare healthier meals and strategies for both food shopping and meal preparation that would make healthy eating a more likely, and even more attractive, alternative to less healthy "fast food." Both adults and children would gain from learning about healthier food options that also taste good, effective strategies for changing habits over time, and ideas to help them satisfy cravings while also maintaining healthy eating patterns.

Neither children nor adults have developed a very complete understanding of the concepts "calorie" and "nutrient." Even though many children and adults were somewhat less confused about the former than the latter, the word "calorie" also evokes a range of negative associations. Children are even more likely than adults to associate "calories" with **undesirable** behavior (e.g., consuming too many, gaining weight) or ingredients (e.g., fats, sugar). Learning more about

calories and the essential (and useful) role they play might also counter the widespread notion that (whatever calories are) they aren't good for you.

• **Very few differences were found between responses of Latino and non-Latino** participants in this study. One difference is worth noting, however. It was obvious that the **Latino adults** interviewed during the course of this study **tend to rely on different sources for nutritional/"healthy eating" information** than do their non-Latino counterparts. The exhibition components and ancillary materials should identify a wide range of credible information sources and offer strategies for distinguishing between reliable and unreliable information (whether the medium is the Internet, a conversation with one's doctor, or the latest book promoting a new weight-loss method).

• **The interviewees' demographic profile (exclusively white and predominantly female)** raises a concern about the extent to which these findings adequately represent the experiences of African Americans and males. Since few differences were observed among the subgroups included in this study, this situation might not affect the project's overall impact. Nevertheless, future front-end, formative, and summative evaluations should be designed to address this potential demographic imbalance.

Appendix A: Interview Forms

NIH SEPA Front-end Interview for <u>Children 8 – 12 years old</u>

Log # _____ Date: _____ Museum: _____ Data collector initials: _____

Randomly arrange the snack bars on the table. Imagine that want to buy a snack bar for yourself …which of these would you choose? *Check their choice:* □ Go Lean □ Nutri-Grain □ Reese's Snack Barz □ Nature Valley Oats & Honey □ Zone Perfect	*Notes – Describe what they were doing and/or saying out loud:* □ looked at nutrition information

Tell me what you were thinking about when you decided which to pick.

When you're making lunch for yourself, how do you decide what to eat?

If they don't mention "healthy" Do you ever think about what foods are healthy and not healthy? Yes No Not sure	*If YES …* How do you decide which foods would be healthy choices for you?

Randomly arrange "cereal & grain" pictures on the table.

A healthy diet should include grains and cereal. Here are some of the things in that food group. Pick out one that you sometimes eat. [check mark]

[for rice, pasta, cereal] I'd like you to use these measuring cups to show me how much ___ equals <u>one serving size</u>, according to the USDA.

[for bread, tortilla] How many [pieces/tortillas] equals <u>one serving size</u>, according to the USDA?

	Eat?	Serving size	Comments here:
Rice	___	_____	
Pasta	___	_____	
Cereal	___	_____	
Bread	___	_____ **[pieces]**	
Tortilla	___	_____ **[pieces]**	

We're making an exhibit about nutrition – when you hear the word "nutrition," what does that make you think of?	
When you hear the word "calorie," what's the first thing that you think of?	
What do you think the word "calorie" means?	
Have you heard of the word nutrient? Yes No Not sure	***If yes,*** What do you think the word "nutrient" means?
Ok, we all know we're supposed to eat healthier food, but a lot of times, we just don't. What are some of the things that make it hard for you to make healthy choices about food?	
What questions do <u>you</u> have about eating healthy?	
Have you ever talked about nutrition or "healthy eating" in school? Yes No Not sure	***If yes,*** Tell me more about that.

There are a few questions on this sheet about you --- I appreciate your answering those for me. [Hand questionnaire to accompanying adult]

To be completed by an accompanying adult

Child's Age: _____

Child's Gender: Female Male

Child's zip code: _____

What language(s) does your child speak at home <u>most often</u>? _____

What is your child's ethnicity?

Hispanic	Not Hispanic	Not sure

What is your child's race?

American Indian or Alaskan Native	Asian	Pacific Islander or Native Hawaiian	Black	White	More than one race	Not sure

What is your total household income?

- ☐ less than $15,000
- ☐ $15,000 - $24,999
- ☐ $25,000 - $34, 999
- ☐ $35,000 – $49,999
- ☐ $50,000 – $74,999
- ☐ $75,000 - $99,999
- ☐ $100,000 or more
- ☐ I'd rather not say

NIH SEPA Front-end Interview for <u>ADULTS</u> <u>with kids <= 6</u>

Log # _____ Date: _____ Museum: _____ Data collector initials: _____

Randomly arrange the snack bars on the table. Imagine that want to buy a snack bar for yourself …which of these would you choose? *Check their choice:* □ Go Lean □ Nutri-Grain □ Reese's Snack Barz □ Nature Valley Oats & Honey □ Zone Perfect	*Notes – Describe what they were doing and/or saying out loud:* □ looked at nutrition information

Tell me what you were thinking about when you made that decision. [Anything else?]

Now I'd like you to imagine that you are cooking dinner for your children and you want to make healthy choices about what to eat. What do you think about when you're deciding what to fix for them? [Anything else?]

Randomly arrange "cereal & grain" pictures on the table.

A healthy diet for children should include grains and cereal. Here are some of the things in that food group. Pick out one that your child sometimes eats. [check mark]

[for rice, pasta, cereal] I'd like you to use these measuring cups to show me how much ___ equals <u>one serving size</u> for a small child, according to the USDA.

[for bread, tortilla] How many [pieces/tortillas] equals <u>one serving size</u> for a small child, according to the USDA?

	Eat?	Serving size	Comments here:
Rice	___	_____	
Pasta	___	_____	
Cereal	___	_____	
Bread	___	_____ **[pieces]**	
Tortilla	___	_____ **[pieces]**	

How <u>many</u> servings of grains and cereals does the USDA recommend that young children eat each day?

We're doing an exhibit about nutrition – when you hear the word "nutrition," what does that make you think of?	
When you hear the word "calorie," what's the first thing that you think of?	
What does the word "calorie" actually mean?	
When you hear the word <u>nutrient</u>, what does that mean to you?	
Ok, we all know we're supposed to make healthy choices about what we eat, but let's get real, our choices aren't always that great. What are some of the things that make it hard for you to make healthy choices what you and your family eat?	
What questions do you have about eating healthy?	
When you want to learn more about nutrition and healthy eating (or get your questions answered), where do you go for that information?	
Do you have any particular background in health, nutrition or fitness? Yes No Not sure	***If yes,*** Tell me more about that.

There are a few questions on this sheet about you --- I appreciate your answering those for me. [Hand questionnaire to visitor]

To be completed by the visitor

Your Age *(circle one):*

19 – 29 30 – 39 40 – 49 50 – 59 60 – 69 70 or older

How many children in your household are … younger than 2 years: _____

2 to 6 years old: _____

older than 6 years: _____

Your Gender:

Female Male

Zip code: _____

What language(s) do you speak at home <u>most often</u>? _____

What is your ethnicity?

Hispanic	Not Hispanic	Not sure

What is your race?

American Indian or Alaskan Native	Asian	Pacific Islander or Native Hawaiian	Black	White	More than one race	Not sure

What is your total household income?

- ☐ less than $15,000
- ☐ $15,000 - $24,999
- ☐ $25,000 - $34, 999
- ☐ $35,000 – $49,999
- ☐ $50,000 – $74,999
- ☐ $75,000 - $99,999
- ☐ $100,000 or more
- ☐ I'd rather not say

NIH SEPA Front-end Interview for <u>ADULTS</u> <u>with kids 8 - 12</u>

Log # _____ Date: _____ Museum: _____ Data collector initials: _____

Randomly arrange the snack bars on the table. Imagine that want to buy a snack bar for yourself …which of these would you choose? *Check their choice:* □ Go Lean □ Nutri-Grain □ Reese's Snack Barz □ Nature Valley Oats & Honey □ Zone Perfect	*Notes – Describe what they were doing and/or saying out loud:* □ looked at nutrition information

Tell me what you were thinking about when you made that decision. [Anything else?]

Are there any bars here that you've <u>never</u> seen before? □ No □ Yes – Which ones?

Have you eaten any of these bars before? □ No □ Yes – Which ones?

Now I'd like you to imagine that you are cooking dinner for yourself and your family and you want to make healthy choices about what to eat. What do you think about when you're deciding what to fix or eat? [Anything else?]

Randomly arrange "cereal & grain" pictures on the table.

A healthy diet should include grains and cereal. Here are some of the things in that food group. Pick out one that you sometimes eat. [check mark]

[for rice, pasta, cereal] I'd like you to use these measuring cups to show me how much ___ equals <u>one serving size</u>, according to the USDA.

[for bread, tortilla] How many [pieces/tortillas] equals <u>one serving size</u>, according to the USDA?

	Eat?	Serving size	Comments here:
Rice	___	_____	
Pasta	___	_____	
Cereal	___	_____	
Bread	___	_____ **[pieces]**	
Tortilla	___	_____ **[pieces]**	

How <u>many</u> servings of grains and cereals does the USDA recommend that you eat each day?

We're doing an exhibit about nutrition – when you hear the word "nutrition," what does that make you think of?	
When you hear the word "calorie," what's the first thing that you think of?	
What does the word "calorie" actually mean?	
When you hear the word nutrient, what does that mean to you?	
Ok, we all know we're supposed to make healthy choices about what we eat, but let's get real, our choices aren't always that great. What are some of the things that make it hard for you to make healthy choices about food?	
What questions do you have about eating healthy?	
When you want to learn more about nutrition and healthy eating (or get your questions answered), where do you go for that information?	
Do you have any particular background in health, nutrition or fitness? Yes No Not sure	***If yes,*** Tell me more about that.

There are a few questions on this sheet about you --- I appreciate your answering those for me. [Hand questionnaire to visitor][15]

[15] See demographic items on form for **adults accompanied by children age 6 or younger**.