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Project Report

USDA/ERS Agreement Number 59-5000-0-0075

Influence of Developmental Differences on Children's Response to Information on Foods

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Abstract: This project was designed as the first step in a larger research agenda to investigate how school children may respond to point-of-purchase interventions on food through experimental methods. There is currently little understanding of how such policies (e.g., labels, price interventions) may impact children's purchasing decisions, nor of what the implications of this may be for child nutrition or childhood obesity. More generally, the process by which children make food purchasing decisions is not well understood, despite evidence that children have considerable autonomous purchasing power, and that much of it is directed toward food. This report provides a summary of relevant research from a variety of disciplines, the findings of focus groups conducted with both children ands school food professionals in Wisconsin, and results of a survey of school food professionals. It includes insights relevant to the design of school food policies, as well as recommendations future research work on children's food choice.

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Section 1: Work Completed under this Grant

This project was designed to study the food attributes that drive schoolchildren's food choices, and is the first step in a larger research agenda to investigate how school children may respond to point-of-purchase interventions on food through experimental methods. The primary contribution area to the larger goals of the Food Assistance and Nutrition Research funding program is therefore in *development and use of methods and measures for future research into children's food purchasing behavior*, but the project also addresses *needs assessment goals* by identifying the product attributes most relevant in decision-making processes.

The deliverables promised by the research team in our initial grant proposal included a presentation to USDA staff at a workshop at ERS in November 2011, a short report to be presented to the ERS in December 2011 (i.e., the current report), and a developed proposal to seek additional future funding from USDA or elsewhere (completed; see below). We also intend to seek publication of up to two papers from this project: one literature review document based on some of the material presented here (that we hope will be suitable for an ERS Research Report series publication or journal article), and a peer-reviewed article reporting on and comparing the findings from schoolchildren and school food professional interviews. We also planned that the work funded from this grant would be the starting point for a larger experimental study, portions of which are slated to begin in early 2012, that will combine developmental measures with economic experiments.

A primary activity under the current grant has been to conduct small-group and individual interviews of elementary, middle, and high-school children in a mid-sized school district in Wisconsin. The focus of these interviews is to identify those attributes that drive product choice, both as an immediate research finding and as an input into the design of choice experiments to be conducted subject to additional funding. We have also conducted analogous interviews with school food professionals from across Wisconsin at a professional conference, and have conducted a statewide survey of school food professionals as well.

These have allowed us to compare school food professional perceptions of students' priorities with the findings of the student focus groups.

We have presented initial results of this work at both a regional conference on obesity prevention in Wisconsin (May 2011) and the most recent meeting of the International Health Economics Association (July 2011, Toronto, Canada), as well as the November 2011 workshop held at USDA.

As per our initial work plan, we submitted an (unsuccessful) application for additional funding to the 2011 FANRP program. We have also submitted successful smaller grant applications to the Wisconsin Alumni Research Foundation and the Canadian Consumer and Market Demand network – these two grants will be funding the initial stages of our experimental work. A larger grant proposal is planned for 2012 as well.

The research personnel who have contributed to the work described in this report include Sean B. Cash, Ph.D., Principal Investigator; Anna R.McAlister, Ph.D., Co-Investigator; Wiktor L. Adamowicz, Ph.D., University of Alberta, Collaborator; Jaclyn Mauer, Jacqueline Schmitt, and Na Zhao, Research Assistants.

Section 2: Background

This project is designed as the first step in a larger research agenda to investigate how school children may respond to point-of-purchase interventions on food through experimental methods. There is currently little understanding of how such policies (e.g., labels, price interventions) may impact children's purchasing decisions, nor what the implications of this may be for child nutrition or childhood obesity. More generally, the process by which children make food purchasing decisions is not well understood, despite evidence that children have considerable autonomous purchasing power, and that much of it is directed toward food. The current research is a starting point for a novel collaborative research direction in economic behavior, developmental psychology, and public health.

Obesity and diet-related diseases have come to be viewed as some of the greatest-ever threats to public health in the United States, and obesity-related diseases are estimated to cost the U.S. economy billions of dollars annually – as much as $147 billion in 2008 (Finkelstein et al., 2009). Both policymakers and the general public have been discussing whether government interventions are warranted and, if so, what measures should be undertaken (Gostin, 2007). The current federal administration has focused on childhood obesity as a key area for intervention, both because of the potential to effect life-long change, and because of existing federal involvement in school food programs.

Some of the ideas being discussed to combat this threat involve proposed interventions that would affect pricing and/or labeling of targeted foods. For example, tax policy has been proposed as a possible instrument for reducing the frequency of obesity and diet-related, non-communicable diseases (Leicester & Windmeijer, 2004). A tax on "energy dense, nutrient poor" (EDNP) foods - colloquially known as a "fat tax" - may discourage people from buying these foods by raising their price relative to the price of healthier substitutes (Brownell & Frieden, 2009; Gortmaker et al., 2011; Jacobson & Brownell, 2000; Marshall, 2000).

These measures, based on studies conducted involving adults rather than children, have not necessarily been proven effective as of yet. In general, fat tax studies based on cross-sectional food purchase data gathered from adult samples have shown that consumer demand is unlikely to shift substantially in response to a price hike. In other words, there are low own-price elasticities for the foods most likely to be targeted in price interventions and this implies limited efficacy of small taxes as tools for achieving public health goals (e.g., Cash et al., 2012; Cash & Lacanilao, 2007; Kuchler, Tegene, & Harris, 2005; Powell, Chriqui, & Chaloupka, 2009; Schroeter, Lusk, & Tyner, 2008). Overall, however, the empirical evidence base for the effect of food price interventions on health outcomes is incomplete and heavily reliant on assumptions that may not be fully defensible. Weaknesses in the quality of existing evidence include incomplete measurement of taxed food items, predictive studies that assume behavioral responses estimated from beyond observed

ranges of data, and estimating health effects from changes in consumption of specific food items without regard for substitutions made across the whole diet (Thow et al., 2010; Cash & Lacanilao, 2007).

There is little reason to assume that results regarding adult response to price and labeling interventions would have the same impact on children, but it is not clear what may differ. One might expect that children, having lower incomes, may be more sensitive to price changes. On the other hand, children have less experience as consumers, fewer outside options for purchases and long-term fiscal responsibilities, and a lower understanding of future consequences, and therefore follow simplified purchase heuristics such as "Does the money in my pocket cover the purchase I would like to make right now?" Similarly, information-based labeling interventions may be ignored by many children, or may be interpreted in simplified manners that distort the desired impact.

Some promising research does exist about the effects of taxes or subsidies on secondary school students' food purchases (French, 2003). Farrell and Shields (2007) report that unhealthy foods and beverages are normal goods for children, which implies that price interventions would have some efficacy. But conflicting evidence argues that these tax and/or subsidy initiatives may backfire and encourage children to purchase more of all sorts of food (Epstein, Handley, et al., 2006). This is an interesting contradiction that likely stems from the lack of research involving children in this area.

In general, the findings regarding adult consumption habits and those few involving older children, while important information to be aware of for our purposes, may not be sufficient to inform stakeholders concerned with children's food choices. Throughout the following interdisciplinary review of the literature, we draw connections between prior research and also identify the gaps between adults' decision making regarding food and how well these insights generalize to understanding children's food choices, especially as it concerns their development. This review draws from research in economics, marketing, developmental psychology, nutrition and public health.

Section 3: A Brief Review of the Literature

Children's influence in the marketplace

Most traditional research has ignored the economic activity and decisions of children with a few exceptions. Children have remarkable spending power, both potential and actual. McNeal (1992) highlights the fact that marketers view children as a "three-in-one" market. The three markets that a child represents include a primary market (children spending their own money), an "influence" market (children directing their parents' spending), and a future market of potential adult consumers. It is difficult to put an exact figure on the purchasing power of children, especially since some figures account solely for instances of children spending their own money (i.e., their allowance), while others include purchases that are primarily governed by children but actually involve financial outlay from parents.

It is important to single out the studies that relate to children specifically when making predictions about children's choices and the factors that will be of particular influence. In an attempt to answer the question "who are these young consumers?" we explore the studies and theories behind rationality, persuasion, and social and cognitive development.

Children and rationality

A key question is whether children exhibit economic rationality in product choice situations, and how this might develop. Harbaugh and colleagues conducted a series of experiments involving child participants to determine the extent to which children's decisions are rational or not. To examine rationality and choice consistency, these researchers assessed children's likelihood of demonstrating altruism (Harbaugh & Krause, 2000), risk preferences (Harbaugh, Krause, & Vesterlund, 2002), and the endowment effect (Harbaugh, Krause, & Vesterlund, 2001). These studies generally avoided the use of cash payoffs or price mechanisms (in either simulated or actual markets) in order to directly evaluate the phenomenon of interest. In one of the studies in this series, Harbaugh, Krause, and Berry (2001) showed that children generally exhibited rational preferences in an experimental setting that required them to choose between various bundles of snacks (potato chips and

fruit juices), and that the number of violations of rationality was not strongly related to measured math ability. That being said, the sixth graders exhibited far fewer violations of rationality than did the second graders in the study, and indeed performed roughly on par with a comparison set of undergraduate students. From these conclusions, it would appear that age is a better predictor of rational choice among children than are math scores.

Consistency of decision-making is acquired around age 11 (Harbaugh, Krause, & Berry, 2001), and characteristics of child decision-making appear to be developed innately rather than explicitly learned (Currie, 2004). Children also display altruism, a behavior that is economically irrational in many scenarios (Krause, 2008), as well as demonstrating negotiation (Gummerum, Keller, Takezawa, & Mata, 2008). Older children tend to be less altruistic than younger ones (Harbaugh & Krause, 2000). Again, these conclusions suggest that decision-making becomes more "rational" with age.

Children as persuaders

Certainly, children are extensively marketed to, and child-directed advertising is growing much more rapidly than the rate of growth of the child population in the US. Nicholls and Cullen (2004) indicated that the total value of the global children's market (i.e., products targeted specifically to children) for 2005 was estimated to be worth approximately US$452.6b. Of this global market, roughly 18.7% of purchases were primary purchases in which children spent their own money. Although this figure is global, the US is thought to be the primary player, with a market of child-directed products that was estimated to be worth over US$300b in 2001 (McNeal, 1999). In their 2004 report on child-parent purchase relationships, Nicholls and Cullen (2004) indicate that the largest single product category marketed directly to children is food (accounting for US$62b worldwide in 2000). Given that the foods advertised during children's TV viewing time are primarily EDNP foods (Harrison & Marske, 2005; Mink et al. 2010), it is alarming to think that food ads make up the majority of ads targeted to children.

Whether or not children consume the products that are advertised to them is not a simple question. While it is true that many children are “persuaders” rather than actual purchasers (i.e., purchases are usually made by the parent who controls the purse strings), many parents argue that they are relatively powerless in over-riding children’s preferences. If a child views an ad for food on TV, the desire to try the food can be cultivated instantaneously. It is then very difficult for the parent to counter the persuasive advertisement with rational arguments to dissuade the child. The power of children to persuade their parents to purchase advertised products is commonly referred to as “pester power” (Nicholls & Cullen, 2004).

Children as purchasers

According to James McNeal (1969), children are individualized consumers with "presocial, naturalized desires for consumer goods.” Elementary school students in particular are in the process of learning how to consume and purchase, and often buy items in order to satisfy immediate needs rather than to fulfill long-term ones. Additionally, very young children often make purchases solely for the satisfaction of purchasing (McNeal, 1969). More recently, though, researchers have suggested that children are sophisticated and knowledgeable consumers who take utility into account rather than making their purchases arbitrarily. For example, children seek out information in order to adequately gauge the utility of any particular purchase (McNeal, 1987). It is important to examine children as a specific group of consumers, and to gauge how children make their decisions at different ages, if we wish to develop interventions that will effectively influence this market segment.

In an attempt to understand the role of a child as an autonomous consumer, economists have begun to apply behavioral-economic insights to the food choices of children. Just et al. (2008) describe the results of a field experiment regarding the impact of payment options on college students’ food choices, and give implications for how this may be used to encourage healthy eating in school cafeterias. In another report, Just, Mancino,

and Wansink (2007) explain which behavioral insights may be most relevant for food policy formation, including in school cafeterias. Many of these recommendations are being shared with school administrators and other interested parties through an outreach website (http://www.smarterlunchrooms.org/). These initial findings, however, largely involved extrapolation of behavior observed in adults (including the aforementioned college students), rather than direct research with children. While more recent work has shown that some interventions can be wildly successful in influencing food choice within school cafeteria contexts, the mechanisms by which these “lunchroom makeovers” impact choice are still not fully understood.

One recent study has linked children's snack food purchases to their available money. Wang and colleagues (2007) reported that even among families classed as having low socioeconomic status, the majority of children aged 10 to 12 years were receiving daily pocket money. Despite there being no positive relationship in this study between the amount of pocket money a child received and the extent to which they were overweight, the researchers did report that children with more pocket money were more likely to consume more fried foods, more soda, and more snacks than children with less pocket money. More recently, Borradaile and colleagues (2009) conducted a series of intercept studies of fourth- through sixth graders at corner stores in a lower-income urban area, and noted that half of participants reported shopping at a corner store every day. The majority of their purchases were EDNP foods.

This, in turn, ties into a larger pattern of children in certain socioeconomic or ethnic groups being particularly likely to purchase certain types of food. Non-white children have a higher probability of consuming snack foods than white children do (Signorielli & Lears, 1992). Children from single-parent families have higher budget shares for expenditure on sweets (though they spend a lower proportion of their money on soft drinks). Higher parental resources, such as a higher degree of maternal education and the presence of a father in the household, result in less independent decision-making in children (Lundberg, Romich, & Tsang, 2009). Children of employed mothers tend to spend more on food products in

general (Farrel & Shields, 2007).

In an attempt to determine factors that influence children's food purchases, Epstein, Dearing, et al. (2006, 2007) investigated mother and child (ages 10 through 12) food purchases expressed as elasticities derived from experiments, and found a significant correlation between parent and child behavior. However, these elasticities were not derived from an economic model of product choice, and the research aggregated many products that would not be directly relevant to most children's autonomous purchasing decisions. Likewise, in a simple purchasing role play, preschoolers selected food items of a comparable healthiness to their parents' self-reported choices, implying heavily that children assimilate their parents' preferences at a young age (Sutherland, Beavers, Kupper, et al., 2008). This stance is reiterated by Anderson (1978), who states that children's perspectives on price are not developed independently at all, but instead imitate those of their parents. Ehmke et al. (2007, 2008) have applied experimental economic approaches, using non-price variables, to investigate parent-child interactions relevant to childhood obesity and food choice. They explicitly argue that these approaches are valuable because children "are not primarily price takers in the market" but instead "receive the food they eat from their parents" (Ehmke et al., 2008) – assumptions that, as noted above, may not hold in many important contexts.

Where advertising is concerned, however, it appears parental influence may decline. In experiments where children watched advertisements and were asked to choose a product, they were more likely to choose the one advertised, despite their parents' preferences otherwise. Ferguson et al. (in press) thus conclude "Although advertising impact on children's food choices is moderate in size, it appears resilient to parental efforts to intervene."

Attempts to Influence Children's Choices

Children seem to be exposed to a large amount of marketing that is aimed directly at them. Many claim that this advertising influences their purchases, creates brand loyalty, and promotes consumption of EDNP foods (Institute of Medicine, 2011). In fact, the United

Kingdom has banned advertisements for unhealthy foods and drinks during children's television programs, and may be moving towards the same ban on internet advertising and regulations to be clearer about the unhealthy nature of foods. The advertisements use characters, cartoons, games, apps, social networking, and videos (British Heart Foundation, 2011). Some research exists on other factors influencing children's food choices, as well as effectiveness of measures to influence them. These take on topics such as price, rewards, information, and convenience.

As noted above, much of the literature on how food price interventions may impact health relies on cross-sectional data; the experimental evidence is far more limited, but promising. Several pricing interventions have been performed by French and colleagues (French et al., 2001; French, Jeffery, et al., 1997; French, Story, et al., 1997; Jeffery et al., 1994) with both older children and adults. French, Story, et al. (1997) attempted to determine the effects of pricing strategies on fruit and vegetable purchases in high school cafeterias. They made fruit, carrots, and salad in each cafeteria about 50 percent less expensive during the intervention period, and advertised these new prices. During the intervention period fruit sales increased approximately fourfold and carrot sales approximately doubled. Salad sales were not significantly different. With the increased sales resulting from lower prices, sales revenue was not significantly reduced. This study suggests that decreasing the price of fruits and vegetables with minimal promotion may be an effective way to increase sales of these items to high school students, while not negatively affecting revenue. Another study by French et al. (2001) gave comparable results, but with regard to decreasing prices of healthy vending machine items. Jeffery et al. (1994) conducted a similar experiment in the cafeteria of a university office building. In addition to reducing the prices of fruits and vegetables, they increased the selection, with positive results. Environmental interventions in a restaurant setting have also proved fruitful (Horgen & Brownell, 2002). These data suggest that increasing selection and decreasing the price of fruits and vegetables may be an effective way to increase the amount of fruits and vegetables adults purchase; it is unknown if these results would translate directly to children.

Evidence from Cooke et al. (2010) shows that it is possible to increase children's enjoyment of vegetable consumption as well as the amount consumed, by offering rewards for vegetable consumption. These researchers used social rewards (praise) and material rewards (stickers) in their study, but did not test the potential effectiveness of financial compensation as a reward. It is, therefore, still unknown what role disincentives (such as increased price) might play in children's decision-making processes.

Child food choices may also be affected by contextual factors such as proximity and product presentation. When Currie et al. (2010) examined child food choices, they reported that convenience of food options may play a significant role in terms of foods chosen. These researchers found that proximity of fast food restaurants to schools was directly correlated with obesity rates in the student population. With regard to product presentation, there exists some evidence that calorie information on foods results in lower-calorie food choices in children (Tandon et al., 2010). However, Stutts et al. (2011) demonstrate preliminary but convincing evidence that using simple icons to indicate the healthiness of a food choice (such as a heart symbol) is more likely to influence children's decisions at fast food restaurants than more detailed nutritional information.

While many studies focus on individual factors in food choice, some researchers are revealing the variety of factors that may be at play at once, or the situational nature of choice. Krolner et al. (2011) reviewed 31 qualitative studies, mainly conducted in the U.S. on children six- to 18-years-old, that identified several determinants for children's fruit and vegetable intake: "Time costs; lack of taste guarantee; satiety value; appropriate time/occasions/settings for eating FV; sensory and physical aspects; variety, visibility, methods of preparation; access to unhealthy food; the symbolic value of food for image, gender identity and social interaction with peers; short term outcome expectancies." The variety and range of these factors suggests that future studies should be broader in nature and should seek to find the relationships between the factors.

Insights from Developmental Psychology

The observations gathered surrounding children's food choices and their unique position as consumers raise more questions that may not be answerable using observation of behavior. So we turn to the discipline of developmental psychology in order to determine how the factors that make children so different from adults can explain or help predict choices. Some researchers (e.g., John, 1999) suggest that children younger than age eight are limited in their cognitive capacity such that they cannot evaluate stimuli (e.g., food products) according to more than one feature. The suggestion is that young children's processing power is so limited that they can only consider one attribute at a time (see Table 1). These conclusions are grounded in Piaget's Theory of Cognitive Development (Piaget, 1971), however, applications of the theory to explain children's behavior as consumers has not been backed by empirical evidence.

Table 1.

Characteristics of cognitive functioning at different age stages (adapted from John, 1999)

Characteristics	**Perceptual 3-7yrs**	**Analytical 7-11yrs**	**Reflective 11-16yrs**
Orientation	Expedient	Thoughtful	Strategic
Focus	Perceptual features Salient features	Functional / underlying features Relevant features	Functional / underlying features Relevant features
Complexity	Single attributes Limited repertoire of strategies	Two+ attributes Expanded repertoire of strategies	Multiple attributes Complete repertoire of strategies
Adaptability	Emerging	Moderate	Fully developed
Perspective	Egocentric	Dual perspectives	Dual perspectives in social context

There are in fact very few studies of children as consumers that report research findings as opposed to conceptual thought pieces. Those that do exist, however, report findings that are not entirely consistent with John's (1999) notion that young children are incapable of simultaneously processing information about multiple product attributes. Recent studies in consumer behavior suggest that, while John's adaptation of Piagetian theory is a useful starting point for understanding general trends across broad age stages, further

insights into children's consumer behavior and their decision-making as consumers can be gleaned from assessment of individual differences in relevant developmental variables (McAlister & Cornwell, 2009, 2010; Moses & Baldwin, 2005). The following sections are used to discuss some of the relevant developmental variables.

Language. While a few of the economic experiments noted above may be interpreted as evidence that consumers react to nutritionally motivated price incentives in controlled situations, none of them takes into account the developmental factors that may affect children's abilities to make specific choices. Among adults, it is assumed that all "normally" functioning individuals have the capacity to process available information to inform their purchases, but this assumption may not be valid when working with young children. Adult consumers may choose whether or not to be influenced by price, or to read or ignore packaging with nutritional information and possible warning labels. Children, however, may be more limited by their abilities. They may, for example, attempt to read a label but may not have the language skills to process the information. Young children whose parents have not engaged them in conversations about nutrition may not know the meaning of terms such as "sodium", "fiber", "calories" and so on, and may have little or no understanding of how these terms fit together to form a conceptualization of a healthy diet.

Executive functions. Executive functioning may also play a role in children's ability to evaluate alternatives while purchasing food. Executive functioning encompasses behavior planning, rule adherence, mental flexibility, and impulse control (Frye, Zelazo, & Palfai, 1995). Compared to general cognitive ability, executive functioning is a more specific measure of higher order cognitive functioning. Young children who have not yet developed executive functions show an inferior ability to process information about objects or events, because they cannot switch attention from one information element to another.

In the absence of executive functioning, children attend to only the most prominent information (McAlister & Cornwell, 2010). Children have been noted as frequently having difficulty adapting their decision-making skills to complex environments (Gregan-Paxton &

John, 1997), and the ability to simultaneously consider two or three of these information elements will depend upon a child's level of executive functioning. Impulse control, another aspect of executive functioning, is important to decision making since it can determine a child's ability to take the time to process available information. Some children may want to rush in and grab the first attractive product they see. Moreover, some warnings on products (e.g., "consume in moderation") are likely to be interpreted with more meaning by children whose impulse control functions are better developed. All of this is particularly significant because superior decision-making skills (as well as parents' willingness to give up authority to their children, and children's desire to gain autonomy) result in greater child autonomy in decision-making processes (Lundberg, Romich, & Tsang, 2009).

Children also have been recorded as having some trouble with monetary concepts, which are related to developing abilities of quantitative reasoning as well as emotional and perceptual development and values systems (Ward et al., 1975). Some research implies that children are not swayed by changes in price (McNeal, 1979), or, more specifically, that they are aware of price fluctuations but do not take into account the degree of fluctuation (Saenz, 1979). Children's attitudes toward price have been shown to change dramatically as children mature (Fox & Kehret-Ward, 1985), with qualitative and quantitative differences in information processing existing between older and younger children. Nonetheless, the information-processing abilities of younger children are frequently underestimated (Klees, Olson, & Wilson, 1988).

Cognition. In addition to language and executive functions, general cognitive ability may be relevant to children's capacity to evaluate purchasing alternatives. General cognitive ability has long been heralded as a relevant factor in explaining the consumer behavior of children (John, 1999). Children's abilities to reason have been described as being genuinely different from those of adults, rather than merely underdeveloped (Strauss, 1952; Strauss & Schuessler, 1951), with food preferences differing significantly during different cognitive stages (Bahn, 1986). Quantitative reasoning is also a relevant consideration. Children show

and use the ability to research cost levels and compare them to their benefits (Gregan-Paxton & John, 1995). Nonetheless, this ability develops at different rates. A child whose reasoning in this area is lacking may not appreciate price in the same manner as a child whose reasoning functions are better developed. Moreover, general knowledge (another component measured in tests of general cognitive ability) may help a child to decide whether one product is better than another on the basis of features such as taste, size, and brand. General knowledge can be thought of as indicating a child's "worldly experience;" hence, children with broader knowledge may be better equipped to make judgments on a variety of features. Reading the net weight on a package is the obvious way to determine the amount of content; however, some children may not know to do this and so will rely on their spatial skills to evaluate whether one package is likely to contain more than other packages on offer. Children with better spatial reasoning skills will be better equipped to perform this function.

Risk and impulsivity. Additionally, children have been shown to have a rudimentary understanding of risk (Levin & Hart, 2003). Risk-taking is shown to be influenced by a child's shyness, their impulsivity, and the riskiness of the decisions that their parents make. Levels of risk in parents' and children's decisions tend to be consistent over time (Levin et al., 2007). Researchers have also investigated whether children understand risk, and whether their decisions in risky situations are stable and predictable. Traditionally, young children were not considered to be probabilistic responders (Hoemann & Ross, 1971), however, more recent experiments show that children as young as five understand the procedure of making risky decisions, as well as the repercussions. Children display a rudimentary understanding of probability and risk level; they do not adjust their choices according to probability, but rather consistently select in favor of the largest gain or smallest loss (Levin & Hart, 2003).

Yet research conducted using roulette-type games and prizes shows that even very young children can understand probability and price, and they understand expected value,

which is important in uncertain event reasoning (Schlottmann & Anderson, 1994). Building upon these bases, Harbaugh et al. (2002) showed that children place high importance on high probability events, and low importance upon low probability events. Furthermore, it has been shown that children are more likely to make risky choices when confronted with substantial losses, rather than substantial gains. Younger children tend to make riskier decisions than older children, but older children will even make high-risk decisions in order to avoid losses (Levin & Hart, 2003). An individual child's decisions in risky scenarios are heavily influenced by the child's shyness, their impulsivity, and the risk-taking habits of their parents. Longitudinal research shows that risk-taking patterns of children and their parents remain stable over a three-year period (Levin et al., 2007).

Section 4: Child Study

Our child study involved schoolchildren from elementary-, middle-, and high-schools in a mid-sized Wisconsin school district. Our immediate goal was to conduct focus groups to determine whether decision-making is driven by price, information, taste, peer influence, or other attributes, and whether the importance of various factors differs with age. The larger goal for this work is to use attribute-based stated choice methods ("choice experiments") to determine the importance of various attributes of food and to examine whether individual differences in development explain choice outcomes and price responsiveness. Our work here was therefore also important for determining which attributes might best be examined in these forthcoming choice experiments.

Methods

Participants. Participants in the student focus groups included nine elementary school children (five girls, four boys), 12 middle school students (six girls, six boys), and five high school students (four girls, one boy). The elementary school students were aged six years three months to eight years five months (M = 7.43, SD = 0.76). Middle school students were aged nine years zero months to 14 years one month (M = 12.51, SD = 1.62), and the

high school students were aged 15 years seven months to 18 years zero months (*M* = 16.90, *SD* = 0.97).

These students were recruited from schools and a summer care program within the Columbus, WI school district, following IRB approval for the project. In cooperation with school principals and the summer camp coordinator, recruitment procedures were tailored for each different age group. Elementary school children were recruited from the summer care program by placing an information sheet and consent form in each child's locker. To recruit middle school students, we were permitted access to families' home addresses. Information sheets and consent forms were sent home to families that were selected at random from the list. From among the positive responses, we eventually worked with 12 students. The high school principal allowed us access to students during study hall sessions at the school, which limited our potential pool of participants to those whose schedules allowed for study hall. To motivate participation from these older students, two members of the research team attended study hall sessions to advertise the project. Movie gift cards ($10 value) were offered to students whose parents returned a signed consent form. Approximately 20 students took information packets home, however, only five were returned. Because of the small number of high school students recruited, these students were seen for individual interviews rather than focus groups. In addition to the parental consent we obtained, all students over the age of 11 years signed an assent form to indicate their agreement to participation, and a verbal assent script was read to the younger participants.

Materials. A semi-structured interview script was developed for use during data collection sessions. This script was inspired by the existing literature on adults' food choice. It was specifically designed to touch on any factors that might possibly play a role in children's food choices both in the school lunchroom and in other settings where snack foods are purchased (e.g., concession stands at sporting events, corner stores, mall food courts, vending machines). Hence, we consulted interdisciplinary research in fields including

economics, marketing, cognitive and developmental psychology, and nutrition when designing this tool.

The semi-structured interview script was three pages in length. It contained questions that were designed to be used with children of all age groups, with minimal changes to language for each age group. The script included questions under specific section headings, as well as suggested prompts to encourage participation. The sections included a discussion of each child's favorite food and drink (as an ice-breaker), a section on food attributes (including discussion of children's access to money or allowance), a section on advertising and promotion, a section on monetary habits (i.e., saving vs spending), a section on health, and finally a section on nutrition information. Overall, the script was designed to cover questions related to taste, experience, aversions, allergies, convenience, price, branding, nutrition information, social considerations, peer pressure, and any other factors that students might spontaneously mention as being possibly relevant to their decisions regarding food.

Two other tasks were undertaken during the focus group sessions. The first was a pen and paper survey that was filled in by each middle school and high school participant individually. The same survey was read to the elementary school participants, who then responded verbally. This survey was administered after the section in the interview where children were asked about food attributes. At this point, students had already had the opportunity to discuss attributes relevant to food choice that were top of mind. However, we administered the survey to check if there were other attributes that were important in each child's decision making, even if they had not been spontaneously generated by the child, and to generate a ranking for use in the design of later experimental studies; the ranking results are not shown here.

The remaining task was administered at the end of each focus group. This task involved four color pictures (nachos loaded with toppings including sour cream and beef, a hamburger and fries, carrot and celery sticks with ranch dipping sauce, and a bowl of yogurt with berries that was accompanied by a glass of plain milk). Participants were shown these

images one at a time and asked whether the food was healthy or unhealthy and also how much they would be willing to pay for each item. Following this, the experimenter asked each participant if they would be willing to consume their least favorite option instead of their preferred option if it was cheaper. This information was used to determine the role of price in food choice. The task, as a whole, was also used to assess the extent to which children understood concepts of "healthy" and "unhealthy."

Procedure. Elementary and middle school students were interviewed in small focus groups of three to four children. High school students were interviewed individually. All sessions were conducted between April and October, 2011.

Two members of the research team were present for each data collection session. One researcher administered the semi-structured script, the attribute survey, and the final picture task. The other researcher sat away from the table, took an audio transcript of each session, and took written notes as well. Following each data collection session, the audio recordings were transcribed and combined with the handwritten notes to give a "full picture" of children's responses in every session.

The transcripts were then coded by three research assistants who had been briefed on the general nature of the research project and who had been trained in qualitative coding. These coders were asked to use highlighting to identify all instances of text that related to food choice. Different color codes were used for different themes. The different themes that were identified were intrinsic product attributes, environmental factors, personal state, social factors, and informational factors.

Results

Each of the different themes was found to encompass a variety of attributes. These attributes are summarized in Table 2. We assessed inter-rater reliability to check for agreement in coding and found that there was high initial agreement across coders. Any discrepancies were resolved following discussion. Table 1 provides a condensed summary of observations from the coded transcripts.

Table 2.

Themes and attributes identified, along with a condensed summary of findings across school age groups (elementary (ES), middle (MS), and high (HS) school students).

Themes and underlying attributes	Observations across age groups
Intrinsic	
Healthiness and function	Allergies were only mentioned by ES students. MS and HS students mentioned energy/calorie content. Caffeine was mentioned by HS students only. MS and HS students were more likely to discuss seeking or avoiding specific nutrients. They were also the only students to mention eating something even though they know it to be unhealthy.
Sensory attributes (e.g., taste)	MS and HS students avoid foods that smell bad. All groups discussed "good" and "bad" tasting foods. Only HS students mentioned fruit and vegetable as good foods. Only ES students mentioned meat, "juicy," "greasy," "tangy" and "weird" foods as being good. Students of all ages like cheesy foods.
Convenience	MS students like foods that can be saved or stored. HS students expressed desire for convenient foods (e.g., fastest moving lunch line). ES students care about food being neat and not messy.
Appearance	MS and HS students want "quality" food. HS students avoid foods that look fake. ES and MS students avoid "gross" foods. MS students avoid dry or mushy foods.
Brand	Only HS students mentioned buying a particular brand out of habit, but then some HS and MS students said that brand doesn't matter. Some ES and MS students said that brand does matter.
Price / value	Price and value mattered mostly to MS students and somewhat to ES and HS students.
Other intrinsic attributes (e.g., familiarity, novelty)	MS students like foods that "go together." Students of all ages like foods that are familiar, but also those that have novelty value.
Environmental	
Availability	Students of all ages will "eat it if it's there." MS students like the availability of samples, ability to see food first, and foods that are in close proximity.
Package	ES students seemed most susceptible to promotions.
Personal State	
Emotional state	MS students mentioned eating when bored.
Exercise (before or after)	HS students mentioned pre-exercise eating. MS students mentioned post-exercise eating.
Hunger or thirst	All ages mentioned eating when hungry.
Weather	Heat influences ES and MS students to consume cool foods (e.g., ice cream).
Weight	Only HS students mentioned recent weight gain as being relevant.

Social	
Parents / family	ES students ignore parental advice about food but also mentioned that they are introduced to new foods by family members. All ages mentioned that parent restrict certain foods. ES and MS students reported being punished for spending too much on food.
Trust or distrust of authority figures (e.g., lunch staff)	Students of all ages mentioned trusting authority figures to inform them about food. Some MS students mentioned a distrust of lunch staff.
Peer influences	Students of all ages reported liking foods that they eat with friends, however, there was also a denial of peer influence among all age groups. ES students reported that food was sometimes a reward from others. MS and HS students said that their friends sometimes introduce them to new foods.
Sharing	Only ES students like foods that they can share with family members or friends. MS and HS students like foods that their friends share with them.
Informational	
Trust or distrust of advertisements	After prompting, some ES students expressed concern that ads do not provide reliable information, while other ES students stated that ads are reliable sources of information.
Heeding or ignoring labels	MS and HS students mentioned both ignoring and heeding labels. These groups also mentioned that they are skeptical of label claims.
Misuse of labels	Some MS students had a simplistic belief that higher numbers on nutrition panels are better. The opposite was found among some HS students.

Though some themes were common across all age groups, we also noticed some distinct differences at different age points. These "highlights" are summarized below, and are accompanied by direct quotes from the transcripts, to help illustrate the findings:

- Elementary school students are generally **trusting** of packaging and ad claims, unless they have been directed to think more deeply:

  "[Ads are on TV] so you can see what they put in stores and stuff."

  "Sometimes it's healthy and sometimes they'll tell you it's healthy but it's not. On the commercial they don't tell you all the facts. My nana told me that."

- Middle school students **distrust** school-offered foods:

  "Since I know how school food is here I'd be hesitant to try [something new]. Trust me, I've had better... Space food is better."

- Children's consideration of nutrition is secondary to their consideration of taste and can be described as "rudimentary" at best. Most students instinctively know the difference between "good" and "bad" foods but give no consideration to related considerations such as frequency of consumption or consumption in moderation.
- Very little serious attention is paid to labels. Vague attention may be paid to impressive-looking information or neat labels. Among middle-school students, attention paid to cartoon branding is seen as being juvenile.
- When prompted with questions about convenience, this is identified as a major factor. Most students opt to avoid longer lines in the school lunchroom and at sporting events (i.e., when purchasing snacks at concession stands).
- Foods are consistently identified by brand names, despite students' insistence that brand is not important.
- When prompted about their willingness to pay more for a product that is "better" (e.g., healthier, a preferred brand, or better tasting), students generally indicated a willingness to pay up to $1 more for a "better" food item. Price difference of more than $1 was considered to be an unjustifiable expense.
- Price matters more when students are spending their own (as opposed to their parents') money.

  "If it's my money… I don't want to spend a lot on something that'll be gone really soon. If it's my parents' money… it's more flavor or how it tastes."

    - A potential risk of "fat taxes" is that the resulting higher price might be misinterpreted as a signal of quality.

  "I think that the cheaper it is, the more poorly it's made."

    - High school students are likely to make **independent judgments**:

  "My mom started Weight Watchers a while ago... When it first happened I'm like, really mom? … my friends would come over and be like 'you don't even have regular food in this house, it's just light!' and I'd be like 'it's okay, just give it a chance!'"

"I'd probably say some [nutritional information is] still confusing. …You can go for the lower number. I know you should have the calories lower, and I don't think you should have all of them, the calcium and the vitamins should probably be higher, but I think everyone goes for the low numbers. At least I do."

Discussion and Implications for Further Research

The purpose of the focus group interviews was to determine what factors influence food choice among children, and whether the answer is different across different age groups. From the data, we can infer that price is not the most important factor in student food choice. Price is more relevant, in more ways, for older respondents. Overall, there was a greater variation in responses from high school students, as well as a greater number of responses. Social, environmental, and intrinsic attributes were mentioned by participants of all ages. Factors related to information were spontaneously mentioned by middle- and high school students. Elementary school students did not spontaneously report consideration of product information; however, when prompted they did discuss advertisements as a source of information about food products. Most elementary school students reported that ads are trustworthy. Those who reported a distrust of advertisements always mentioned a person having directed them to be skeptical.

Section 5: Study with School Food Professionals

In addition to the child focus groups, we surveyed school food professionals to determine whether there are additional attributes that are perceived as being relevant to children's food choices. We used focus groups with school food professionals to gain insights into whether or not there was any social desirability bias in the responses we had already received from children. Moreover, input received from the small number of adult focus groups was used to develop specific questions for use in an online survey to be distributed to a larger number of school food professionals from across the state.

Methods for focus groups with food service professionals

Participants. Participants in the school professional focus groups included 16 respondents interviewed in three groups. These professionals were recruited among attendees at the annual meeting of the School Nutrition Association of Wisconsin (SNA-WI), following IRB approval for the project. Attendees were contacted prior to the conference and invited to schedule a time to meet with the research team at the conference. Additional recruitment took place at a small display booth during breaks in the conference program. Participants were offered a $25 gift certificate to Amazon.com as compensation for their involvement. In order to provide an incentive for participation from professionals who were not allowed to receive personal compensation by their employers, participants were given the option of using the gift cards to make purchases for their schools. Participants represented a mix of rural, suburban, and urban districts from across Wisconsin, and included lunchroom line staff, professional nutritionists, and school food administrators.

Materials. A semi-structured interview script was developed for use during data collection sessions. This script was a modified version of the tool developed for the student study described in the previous section, with the primary difference being that it requested the professionals to comment on their impressions of student's preferences. The semi-structured interview script was three pages in length. As in the student study, the script was designed to cover questions related to taste, experience, aversions, allergies, convenience, price, branding, nutrition information, social considerations, peer pressure, and any other factors that the professionals might regard as being relevant to students' decisions regarding food. The school food professionals were also asked to complete the same attribute ranking exercise conducted with the students (results not shown here).

Procedure. The participants were interviewed in focus groups of three to six participants in a separate room at the conference site in Green Bay, WI in June 2011. Two members of the research team were present for each data collection session. One researcher administered the semi-structured script and the attribute survey. The other

researcher sat away from the table, took an audio transcript of each session, and took written notes as well. Following each data collection session, the audio recordings were transcribed and combined with the handwritten notes. Three research assistants then coded these transcripts in the same manner as described for the student survey above.

Results

Table 3 outlines some of the major findings from the focus groups with school food professionals. Here we summarize these findings with a focus on results that either directly match or conflict with results from the child focus groups.

Table 3.
Summary of observations from school food professional ("adult") focus groups

Themes and underlying attributes	Observations from adults
Intrinsic	
Healthiness and function	Though MS and HS students reported seeking or avoiding specific nutrients (e.g. sugar, salt, fat), adults seemed to think students were more likely to avoid things like whole grain.
Sensory attributes (e.g., taste)	Adults likewise report that taste and smell are important for students.
Convenience / Appearance	Adults (but not students) reported that children avoid "dirty" foods or those that are difficult to eat.
Brand	Brands were not included in discussions with school food professionals.
Price / value	Price and value were mentioned by adults and students. Adults mentioned high price as a positive (e.g. expensive foods are preferred) and a negative (e.g. child can't afford some foods).
Other intrinsic attributes (e.g., familiarity, novelty)	Adults agree that students like novelty (e.g., color of food), and that familiar foods are sometimes preferred.
Environmental	
Availability	Adults did not report that students eat food because "it's there" but they did agree that students avoid long wait times in the lunchroom.
Package	Adults agree that students may be persuaded by advertising. They also note (though students did not note this) that the "adultness" of foods can be appealing.
Personal State	
Emotional state	Adults did not mention this.
Exercise (before or after)	Adults agreed that girls in particular seek healthier foods during sporting season.
Hunger or thirst	Adults did not mention this.
Weather	Adults did not mention this.
Weight	Adults did not mention this.

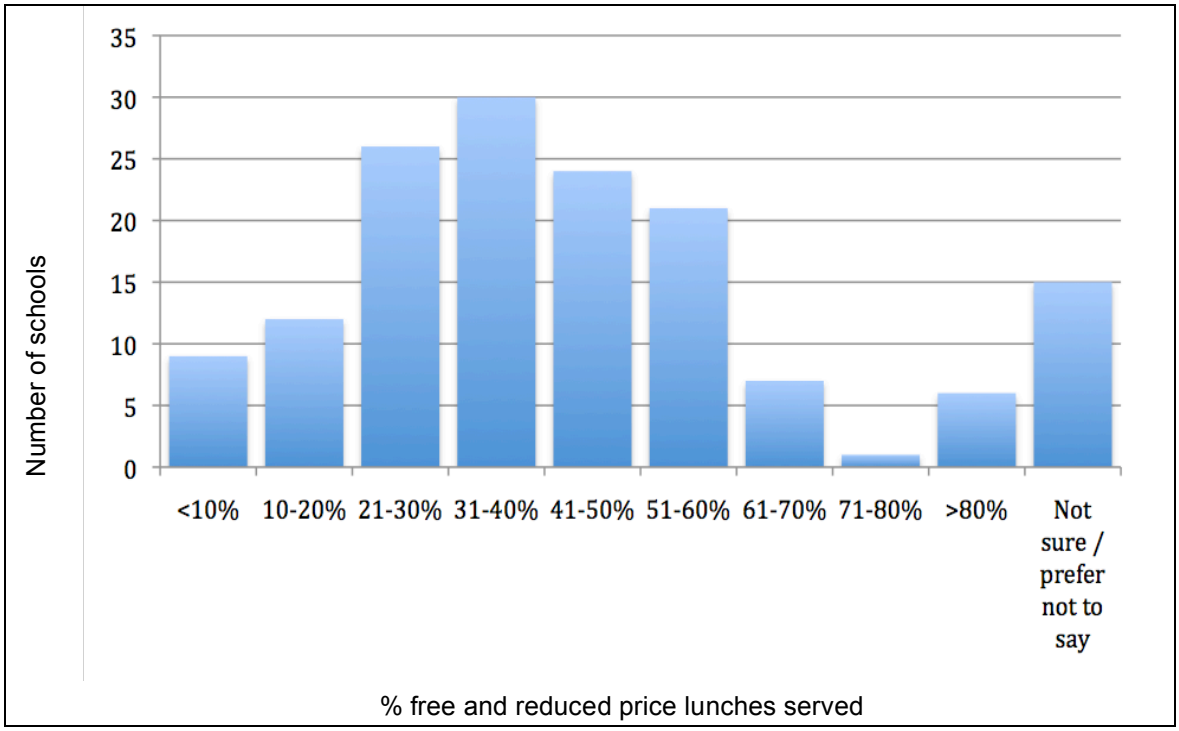
Social	
Parents / family	Adults report that students turn to parents for information about food.
Trust or distrust of authority figures (e.g., lunch staff)	Adults report that teachers are trusted sources of information about food.
Peer influences	Adults (but not students) report that the "trendiness" of foods is appealing. Unlike the student reports, adults did not think students consider their friends' input into choices. They do believe that students choose certain foods to "look cool."
Sharing	Unlike the student reports, adults did not mention that students considered whether or not foods are easy to share with friends.
Informational	
Trust or distrust of advertisements	Adults report that students are influenced by packaging and usual visuals (e.g. pictures on a package) to understand what food is on offer.
Heeding or ignoring labels	Adults only mentioned labels as a mechanism for avoiding whole grain.
Misuse of labels	Adults did not mention this other than to say that some students read health claims and others don't.

Method for online survey with school food professionals

Participants. Participants were 151 school food professionals. Together this sample represented all 12 of the cooperative educational service agency (CESA) districts for Wisconsin. The majority of respondents worked with students from more than one school level. Fifty percent served preschool children, 80% served K-5 students, 79% served middle schools, and 73% served high school students. The sample represented rural (53%), suburban (30%), and urban (17%) settings. As detailed in Figure 1, the sample provided a relatively normal distribution in terms of representation of free and reduced lunches served within these districts.

Figure 1.

Percentage of free and reduced lunches served across participant's schools



Materials. This study was conducted as an online survey. Survey questions were developed on the basis of responses received from adults and students in the aforementioned focus groups. The online survey was designed with the intention of keeping it as short as possible (to maximize the response rate), while also ensuring that a sufficient number of questions would be asked to facilitate meaningful responses.

The survey consisted of two sections. The first section was used to gather basic information to describe the sample (e.g., CESA district representation). Section two was used to gain insights into students' food choices, as reported by the adult respondents. Section two comprised 16 questions. These questions asked about a variety of topics, some of which included foods that are most popular within the respondent's district, as well as foods that are avoided by students; how many times a child typically has to try a school lunch menu item before being used to it; whether advertising or promotions are used in lunch lines; and how rebellious children are with respect to eating (e.g., choosing to consume foods or beverages that their parents or teachers discourage).

The survey items were presented with Qualtrics, an online survey construction and distribution tool. The “cover page” included information about the purpose of the research, and a checkbox for participants to indicate their consent to participate in the study. This page also informed potential participants that the research team agreed to donate $300 to SNA-WI upon the study completion. The remaining pages consisted of one item per page. Participants were prevented from moving backwards in the survey, hence, it was impossible to change an earlier response after viewing a later question.

Procedure. Following IRB approval for the online survey, the SNA-WI director emailed the survey link to all SNA-WI members. These potential participants were invited to click on the link to read more about the study. Responses were received from 195 of the approximately 750 SNA-WI school-based members; however, data from 44 respondents were removed because they were missing or incomplete. A reminder was sent after two weeks and the survey remained open for a total of six weeks in October / November, 2011. After the survey was closed, a check was mailed to SNA-WI to thank and compensate members for their participation.

Results

Favorite foods. The first item in section two of the online survey asked food professionals to indicate which foods are most popular in their school lunch lines. Seventeen suggestions were provided, along with an “other, please specify” option. Multiple responses were permitted. The 17 suggested food items were generated on the basis of foods that were repeatedly mentioned by students in their focus groups as being either their most or least favorite school foods. We included both least favorites in addition to favorites, since we wanted to determine whether there was consistency between child and adult responses.

Responses to this question are summarized in Table 4. Here we see that pizza was a “favorite” in almost all schools, followed closely by tacos. This finding is consistent with student reports, where pizza was frequently reported to be a favorite food item at school. Though many students reported disliking “messy” foods, 10% of food professionals indicated

messy foods as a favorite. This inconsistency is perhaps explained by the fact that the item was not tied to one specific food.

In terms of the "other" responses, "anything on a bun" and "whole grain rolls" were the two most consistent answers. Several others responded with comments about foods that students refuse to eat. These shared a common theme, indicating that students prefer the kinds of foods they receive at home. There was also a suggestion that the foods served at home are typically processed. Examples of these responses include "When we offer 'real' foods (chicken on a bone) the kids don't know what it is and won't take it" and "Most children are used to 'fast food items.' Many don't know what is dark or white meat on a chicken… what fresh vegs. (i.e. broccoli) are. Has to start at home at an early age not wait until 6, 7th grade." One respondent noted "ranch is dressing of choice for everything." This was not unlike reports from students across all age groups that ranch dressing "rules."

Table 4.

Students' favorite foods, according to school food professionals (frequency of response)

Pizza	93%
Tacos	83%
Finger food	68%
Fruits (raw)	60%
Vegetables (raw)	40%
Fruits (canned)	38%
Meat	36%
Sweet food	32%
Spicy food	26%
Other	23%
Healthy food (when NOT explicitly marked as healthy)	17%
Whole-grain food	17%
"Home-style" meals (meatloaf, etc)	16%
Vegetables (cooked)	15%
Messy meals	10%
Neat meals	9%
Exotic foods	4%
Healthy food (when explicitly marked as healthy)	4%

Avoided foods. When asked which foods students avoid, “exotic foods” was checked most often. This finding is consistent with reports from ES and MS students. Among HS students, though, we had found that some reported such foods to be appealing because of their novelty value.

We had found that some students (typically older students) report liking “healthy foods,” while others avoid them because they assume they will lack flavor. The adult survey was designed to tease out avoidance of healthy foods according to whether or not they were labeled as such. We were not surprised to find a higher percentage of adults agreeing that explicitly labeled healthy foods are avoided, as opposed to healthy foods that are not labeled as such. Responses to this question are summarized in Table 5.

Table 5.

Foods avoided by students, according to school food professionals (frequency of response)

Exotic foods	63%
Vegetables (cooked)	54%
"Homestyle" meals (meatloaf, etc)	46%
Healthy foods (explicitly marked as healthy)	38%
Spicy food	32%
Whole grain foods	24%
Vegetables (raw)	22%
Messy meals	18%
Healthy foods (NOT explicitly marked as healthy)	17%
Fruits (raw)	9%
Other, please specify:	9%
Fruits (canned)	8%
Neat meals	4%
Sweet food	3%
Pizza	1%
Pasta	1%
Tacos	1%
Meat	0%
Finger foods	0%

Student capacity for buying "outside" foods. Because we were interested in students' familiarity with marketplace prices, and their level of independence in food purchasing, adults were asked whether they thought students had "substantial opportunities to buy food without their parents around, in a setting that isn't school lunch." From the student focus groups, we had learned that the answer was yes for the vast majority of students. All students had access to money in some form (birthday cash, in return for chores, or from part time jobs including "real" jobs for HS students and jobs such as babysitting or dog walking for younger students) and all but one of the students reported having opportunities to buy from vending machines, gas stations, concession stands at sporting events, or mall food courts. The adults gave mixed responses, with 55% saying yes and 45% saying no.

In a free response section, three adults responded that it is mostly high school students who make autonomous decisions regarding food purchases. Others indicated that students like to make their own decisions (e.g., "We try to provide healthy breakfast / snack type options in the morning for 6-12 grade (we have breakfast for K-5) and they do not eat it. They bring in donuts and coffee from Kwik Trip or energy drinks and chips for breakfast. They do not buy our healthy options").

Trying new foods. When asked how many times a child needs to try a school lunch menu item before s/he is used to it, responses ranged anywhere between one time and more than 10 times. The most common response was three times (35% of respondents). Few adults agreed with one (3% of respondents) or two trials (9% of respondents), and few thought more than 10 trials would be needed (7% of respondents). Both the students and the school food professionals agree that appearance of an unfamiliar food item is key to whether or not a child is likely to try it.

Nutrition information. The online survey asked if parents are provided with information about the nutrition content of the school foods, whether parents are interested in this information, and whether the information is provided to students. Responses to these

questions were very mixed. Several respondents indicated that providing information to parents is difficult and raises “issues.” There were also reports that schools are increasingly getting enquiries thanks to the negatively image of the school lunch that is portrayed through popular media, for example, “Jamie Oliver’s Food Revolution.” Regarding students, a common theme was that the staff plan to provide information in future; however, several concerns and barriers were also mentioned. For example, “Students bordering on or already diagnosed with eating disorders are important, and this information could act as a trigger for them” and “Who has the time to do all this and also the money for the software.”

Food advertising. When asked whether children pay attention to food advertising, 92% of adults said yes. This is consistent with what we heard from most ES students; however, older students had generally denied any role of food advertising in their food choices. This suggests that there may have been some social desirability bias present in older students’ responses, though it is also possible that the adults’ perceptions are simply inaccurate. When asked whether they think that children recognize the persuasive intent of advertising, adults were divided (58% said no, while 42% said yes). Again, it appears that students may have underestimated the extent to which they are subject to advertising influences.

Fifty-three percent of adults reported using advertising or promotions in their lunch lines. These were typically in the form of posters or free samples. However, these reports were frequently accompanied by comments that students are too busy to peruse the promotional materials or simply not interested in them. This seemed to be especially true of HS students. It is interesting that not a single student in any focus group mentioned any form of advertising or promotion in the lunchroom influencing their food choices. Perhaps these work subconsciously, or perhaps students actively filter them out. Possibly we may have had a different response had we explicitly asked students about posters or flyers used in their lunchrooms.

Sources of nutrition information. Adults were asked to check which of the following are sources of nutrition information for their students: parents, siblings, friends, teachers / class, lunch staff, books, internet, and television. The top responses were teachers / class (72%), television (64%), and parents (63%). Books (20%) and siblings (24%) were thought to be the least frequently used sources of nutrition information. When asked whether children understand nutrition, 59% of adults said no. Only 3% of food professionals reported that students are not at all rebellious regarding food choice, whereas 4% reported very rebellious behavior from students (e.g., choosing to consume foods or beverages that their parents or teachers discourage) and the remaining 93% indicated some level of rebellion among the students. When we had asked similar questions of the students, many reported that their parents set boundaries only with regard to the amount of money spent on food. The vast majority of students reported having no restrictions in terms of what they are or aren't permitted to eat.

Finally, school food professionals were asked if they think students would intentionally avoid or followed suggested choices, if they were given food information or suggestions. The majority (65%) reported that students would be likely to follow the suggestions.

Section 6: Future and Synergistic Work

As mentioned above, the work performed under the current grant was explicitly intended to inform the design of future experimental study components involving incentive-compatible attribute-based stated choice methods (e.g., "choice experiments") to be conducted with schoolchildren. To assess the extent to which children (a) spend available money on snack foods and (b) consider price in their decision making, a choice experiment will be developed allowing for price and other factors (e.g., packaging, nutrition information) to vary among products which will be made available to children for purchase. Choice experiment methods present respondents with a set of alternatives ("choice set") which are defined by attributes, including price. Current methods of design and analysis of choice

experiments are consistent with economic theory as they are based on random utility theory.

The results presented in this report provide information regarding the most salient attributes and levels to be used in these tasks. Of particular interest here is the incorporation of incentive compatibility to the choice experiment to reduce the biases that may otherwise result from hypothetical choices (Lusk & Schroeder, 2006; Volinsky, et al. 2009). Student respondents in our future work will be given a cash budget and will be told that one of their choices will be binding. Their stated choices will then allow the researchers to estimate own-price elasticities, as well as assess how important price is in influencing choice compared to label information and other presented attributes. We also intend to include measures of cognitive ability, language ability, nutrition knowledge, and BMI to test hypotheses regarding how own-price elasticity and information responsiveness vary with these measures. This research will develop new conceptual and methodological tools for conducting economic experiments with children, and will provide insight into children's purchasing decisions in both school lunch programs and community settings. The results will be valuable in guiding the development of future environmental and educational approaches to improving child nutrition.

The initial school-based portions of the experimental studies will be conducted in 2012 with financial support from the Wisconsin Alumni Research Foundation and the Agriculture and Agri-Food Canada Agricultural Policy Research Network on Consumer and Market Demand. Additional funding is being sought for future components of this work, to be conducted in both community- and school-based settings.

The work conducted under the current grant has also lead the investigators into related school-based research collaborations that otherwise would not have taken place. The principal investigator is completing a project on influencing the nutritional quality of parental classroom snack food donations in a Madison, WI elementary school, and both investigators are involved (with another FANRP planning grant recipient) in a pending proposal for work on student's awareness of behavioral economic interventions in school lunchrooms in South Carolina.

Section 7: Acknowledgements

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