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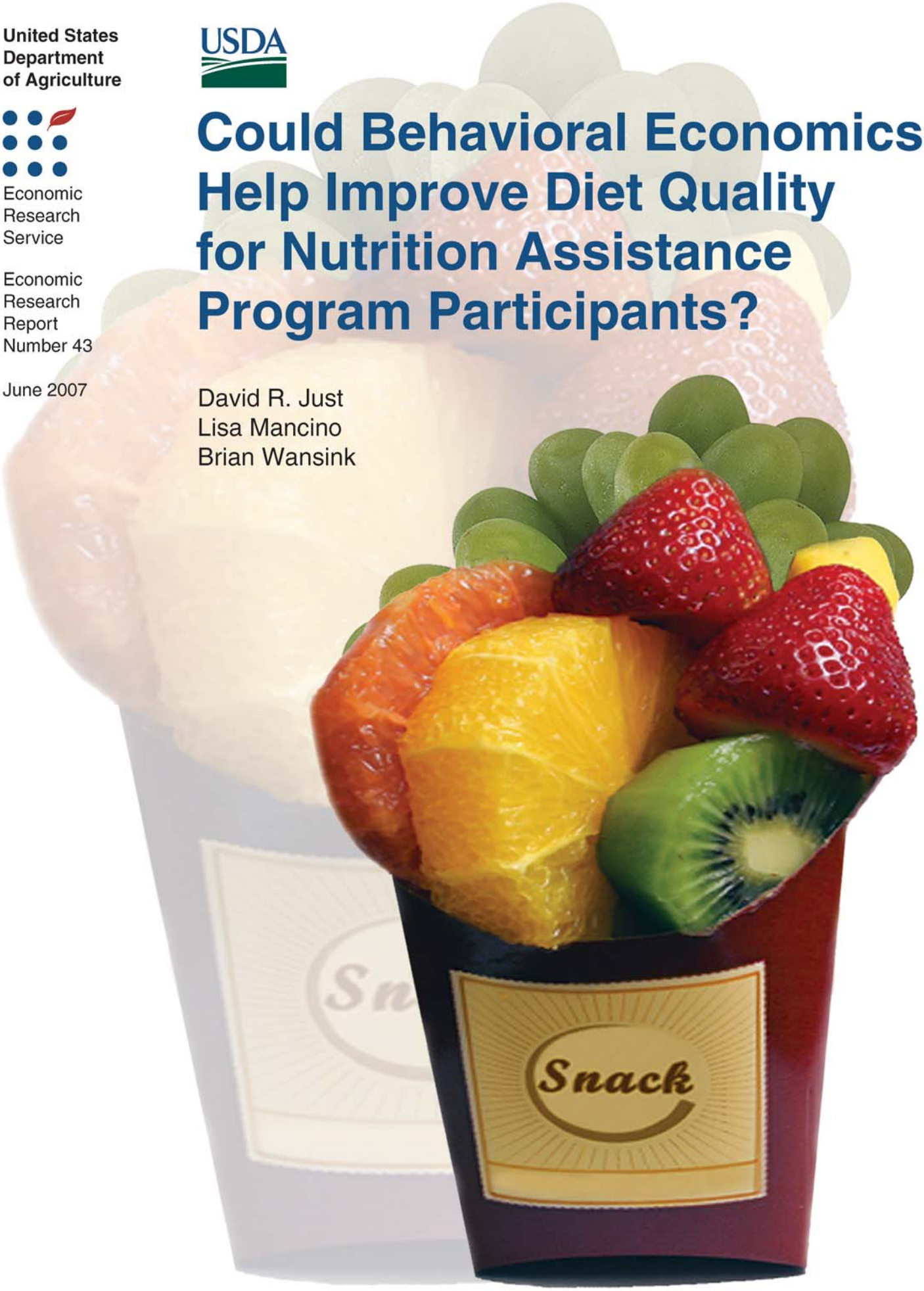

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Could Behavioral Economics Help Improve Diet Quality for Nutrition Assistance Program Participants?

David R. Just, Lisa Mancino, and Brian Wansink

Abstract

Findings from behavioral and psychological studies indicate that people regularly and predictably behave in ways that contradict some standard assumptions of economic analysis. Recognizing that consumption choices are determined by factors other than prices, income, and information illuminates a broad array of strategies to influence consumers' food choices. These strategies expand the list of possible ideas for improving the diet quality and health of participants in the U.S. Department of Agriculture's (USDA) Food Stamp Program; the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); and the National School Lunch and School Breakfast Programs.

Keywords: behavioral economics, food consumption, obesity, food stamps, National School Lunch Program, nutrition assistance, WIC

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Summary

As obesity has come to the forefront of public health concerns, there is growing interest in finding ways to guide consumers' food choices to be more beneficial for their long-term health. About one in five Americans participates in at least one of the nutrition assistance programs sponsored by the U.S. Department of Agriculture. This study uses behavioral economics, food marketing, and psychology to identify possible options for improving the diets and health of participants in the Food Stamp Program; the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC); and the National School Lunch and School Breakfast Programs.

What Is the Issue?

USDA and other public health agencies historically have provided recommendations on how to make food choices that promote health and prevent disease. Food manufacturers and marketers, on the other hand, have discovered that certain psychological cues, such as packaging and presentation, are efficient ways to increase consumption of their products. Could similar marketing approaches be used in public health efforts to improve diet quality and reduce body weight among U.S. food assistance program participants? Insights from behavioral economics shed light on several factors that could help economists and policymakers better understand food choices. In 2005, over half of all nutrition assistance program participants were children. Many notions about what is good or acceptable to eat are determined in childhood. Improving diet quality among these nutrition program participants has the potential to guide food choices at a critical time, when a child's dietary preferences are being defined.

What Did the Study Find?

This study incorporates findings from behavioral economics, food marketing, and psychology to propose insights into how people make food decisions. Recognizing that consumption choices are determined by factors other than prices, income, and information broadens the array of strategies that could influence consumer food choices and improve diet and health. This exploration of new ideas, however, is by no means a recommendation or endorsement of any of them. A thorough analysis of costs, benefits, and potential impacts would be needed before any strategy could be considered as a policy option.

People have problems of self-control when choosing food, either because they prefer immediate gratification or because they are under the influence of a visceral factor, such as feeling hungry. Allowing them to preselect more healthful choices may be effective. For example, letting students preselect menu options in the National School Lunch or School Breakfast Programs or giving food stamp participants the option to preorder groceries by telephone or online may improve the healthfulness of their food choices.

People place more weight on "default options." Another idiosyncrasy of consumer choice frequently observed in experimental studies is that individuals exhibit an asymmetry in how they value gains relative to losses. This asymmetry gives rise to anomalous behavior, where individuals are willing to pay much less to acquire an item than they are willing to accept to part

with it. It also makes them much more likely to choose the default options, even when the costs of switching to an alternative are low or even zero. Making the default menu option of school meals more healthful, such as a fruit salad instead of French fries may increase the likelihood that they will choose more healthful foods.

People categorize income into mental accounts. "Mental accounting" helps explain why coupons that can be used only for food purchases have been shown to be more effective at raising food spending among food stamp participants than an equal benefit amount of cash. If funds are earmarked for a specific purpose, recipients spend within a certain category until funds are entirely depleted. Specifying amounts of food stamp allotments that go toward the purchase of healthful foods, such as fruits, dark green vegetables, and whole grains, may be another option for improving diet quality of program participants.

People undervalue fixed costs relative to variable costs. When only certain items can be selected using prepayment (fixed costs), those items will be chosen more often than those that can be purchased only with cash (variable costs). In the school meals programs, for instance, students, in conjunction with parents or guardians, could specify that only more healthful items be purchased with prepaid cards.

Food decisions are often based more on emotion than rational thought. Impulsive behavior, such as choosing less healthy foods over healthier foods, may result from how the food is presented, the presence of stress, or other demands on an individual's "processing" ability. When processing resources are low, it is more likely that an individual will make consumption choices based solely on immediate considerations. Drawing attention to more healthful foods—by making them more accessible or displaying them more prominently in school cafeterias—might mitigate the effects of a distracting environment and increase the likelihood that students choose more healthful menu options.

External cues can have a major effect on the food selected, the amount consumed, and the eater's perception of how much was consumed. Noise levels, lighting, and distractions, as well as the size and shape of foods and food containers, affect how much people eat. Adjusting these factors can have a major impact on how much is eaten for a meal or snack. Reducing the number of students seated at each table or making school cafeterias more brightly lit are possible options that might help students better monitor their actual consumption.

How Was the Study Conducted?

This study incorporates findings from behavioral economics, food marketing, and psychology to explore various methods of improving individuals' diets and health. Within the context of USDA nutrition assistance programs, such as food stamps, WIC, and the school meals programs, these findings provide an opportunity to begin thinking of new ways to encourage program participants to choose diets that are better aligned with their own goals for future health.

Introduction

USDA and other public health agencies have a long history of disseminating information about why and how to make food choices that promote health and prevent disease. Since 1980, recommendations on attaining adequate nutrition also include information about the benefits of maintaining a healthy body weight and limiting consumption of nutrients linked to chronic diseases. On the other side of the table, food manufacturers and marketers have discovered that certain psychological cues, such as packaging and presentation, are efficient ways to increase consumption of their products. These approaches have not been widely used in public health efforts aimed at improving diet quality and reducing body weight.

There are several behavioral and cognitive biases affecting food consumption decisions. The food psychology literature has found that external cues can drastically alter not only consumption volume, but also individual perceptions of how much they should and actually do eat. Wansink (1996) finds that larger packages lead to greater consumption and Diliberti et al. (2004) find that by increasing restaurant portion sizes from 248 grams to 377 grams of pasta, individuals increase caloric intake by an average of 43 percent. Also, more standard elements that are thought to be the main drivers of food choices, such as price, will sometimes prove to have little influence over consumption volume. For example, individuals appear to consume much larger quantities of food when it is stockpiled regardless of the initial cost (Wansink and Deshpande, 1994).

As obesity has come to the forefront of public health concerns, there is growing interest in finding ways to guide consumers' food choices to be more beneficial for their long-term health. One frequently mentioned option, the "snack tax," would raise the relative price of less healthful foods. However, taxes on food would disproportionately burden low-income individuals who spend a greater share of their income on food than wealthier consumers. Also, such measures would impose an additional cost for everyone, not just consumers who need incentives to better balance their own long-term health preferences with current food choices. Thus, a major challenge is to find incentives that can improve the food choices among individuals who behave contrary to their own intentions without limiting the choices of individuals who make optimal choices.

A benefit of incorporating findings from food psychology and behavioral economics into this discussion is that it broadens the policy options. Food psychology research shows that subtle incentives, such as product placement, package size, and fixed-cost pricing (e.g., "all you can eat" buffets) used to increase consumption should be just as effective at reducing consumption. Moreover, review of the literature suggests that these tools may be at least as powerful as the more traditional economics tools used to guide consumers' decisions, such as taxes and credits. And, unlike taxes or credits, behavioral cues can provide benefits to society without imposing a cost to those who currently behave optimally for their own long-term benefit, nor will they necessarily impose additional costs to those who are food insecure or living at the margins. However, a thorough analysis of costs, benefits, and potential impacts—a task outside the scope of this

discussion—would be needed before any strategy proposed in this report could be considered a viable option.

Standard economic analysis relies primarily on large-scale survey data. By contrast, the field of behavioral economics typically tests hypotheses through the use of experiments that isolate behaviors—for example, the effect of larger portion sizes on a person's food consumption. Typically the behavior of a group receiving the treatment of interest is compared with the behavior of a control group not receiving the treatment. In this case, consumption volume would be compared between those who were given the larger portions and those who were not. By randomly assigning individuals to either control or treatment groups, researchers can account for many confounding factors, such as selection biases. In this example, a selection bias may arise if hungry individuals choose both to give themselves larger portions and eat more as well. Without randomly assigning portion sizes, researchers would overestimate the effect of portion size on consumption. These methods can reveal more nuanced information than standard techniques, while also reducing the potential for confounding effects to mislead researchers.

This study's objective is to incorporate the findings from behavioral economics, food marketing, and psychology into a framework that can be used to explore new methods of improving individuals' diets and health. Beyond nutrition guidance and food labeling, few policies influence the food choices of the general population. However, there are mechanisms that directly influence the diets of those Americans who receive nutrition assistance. USDA's domestic nutrition assistance programs affect the daily lives of millions of people. About one in five Americans participates in at least one nutrition assistance program at some point during the year. Many of these programs include nutrition education components and are designed to support healthy food choices. However, these individuals are more at risk than others from changes in the economy or other social conditions, including increased risk of diet-related illness (Fox and Cole, 2004). Finding additional ways to improve the healthfulness of food choices among this population without imposing additional costs or restricting their right to choose the foods they like as part of their nutrition assistance program participation could have broad societal benefits.

In 2005, more than half of the people who participated in either the Food Stamp Program or the Special Supplemental Nutrition Program for Women, Infants, and Children were children (Barrett, 2006; Oliveira, 2006). On average, over 29 million children participated in the National School Lunch Program each day (USDA, Food and Nutrition Service, 2006). Many of the notions about what is good or acceptable to eat are determined in the first few years of life (Smith, 2004), and people form their diets based on what foods are more familiar (Smith, 2004; Smith and Tasnadi, 2007). Thus, finding ways to improve diet quality among those participating in nutrition assistance programs is also important because these programs have the potential to guide food choices at a critical time—when a child's dietary preferences are being defined.

This study focuses on four of the largest nutrition assistance programs: the Food Stamp Program; the Special Supplemental Nutrition Program for Women, Infants, and Children; and the National School Lunch and Break-

fast Programs, referred to collectively as USDA school meals programs (see the ERS *Food Assistance Landscape* series for details of each program; the most recent *Landscape* is available at http://www.ers.usda.gov/publications/eib6-4). The potential for impact on food choices within the food stamp, WIC, and USDA school meals programs differs significantly depending on the nutrition assistance delivery mechanism. WIC and the FSP provide assistance for individuals to purchase food to be prepared and eaten within the home. The school meals programs offer prepared meals to be eaten within a school-controlled cafeteria. WIC provides for a very narrow set of products, while the FSP performs much like a direct money transfer, barring only nonfood items and prepared foods that are not intended for home consumption.

While the potential to exploit certain idiosyncratic behaviors to encourage healthier diets exists in all of these programs, the potential instruments differ substantially. Which interventions are viable will depend largely on whether a program distributes benefits by providing purchasing power or preparing meals. Bestowing benefits through prepared meals offers a great degree of control over both how the food is presented and the environment where the food is chosen. Manipulation of food to be prepared and eaten at home may be much more invasive or costly and may therefore require exploiting a very different set of behaviors.

Prices, Income, and Information Are Standard Policy Levers That Influence Food Choice

The standard economic framework for evaluating consumer behavior treats food as a good that provides both short- and long-term benefits. While some aspects of food, such as flavor, texture, and relief from hunger provide immediate gratification, the effect of other aspects, such as nutrient content, calories, and the presence of certain bacteria, are not usually realized until some point in the future. In line with the saying, "a moment on the lips, a lifetime on the hips," economic analysis of food choices typically assumes that individuals must make tradeoffs between enjoyment of today's choices and the consequences of those choices at some point in the future. How well individuals are able to translate food choices into future health outcomes is related to how much they know about diet, health, and nutrition.

Typically, this framework is then used to evaluate if and how much food choices will vary with three primary economic variables: income, prices, and information about diet and health. Historically, providing information about diet and health has been the most widely used tool to help consumers make more healthful food choices. For over 100 years, USDA has provided advice on how and why to eat a healthful diet (Welsh, Davis, and Shaw, 1993). Since 1980, USDA and the U.S. Department of Health and Human Services have jointly issued the *Dietary Guidelines for Americans* every 5 years. Although there have been variations over time, the primary focus has been on educating consumers in ways to achieve proper nutrition while consuming reasonable proportions of the various food groups in moderation.

In 1990, Congress passed the Nutrition Labeling and Education Act (NLEA), which requires that all packaged foods have nutrition labeling and use standardized definitions for terms such as serving size, "low fat," and "light." Many of the government-funded food and nutrition programs, such as food stamps, WIC, and the school meals programs, also earmark funds for nutrition education. The evidence is mixed on whether information and labels actually improve the healthfulness of food choices. Several studies have found a positive correlation between nutrition knowledge and diet quality, such as lower fat intake (Gould and Lin, 1994), the probability of being obese (Nayga, 2000b; Variyam and Cawley, 2006), and food label use (Nayga, 2000a). Others, however, have found no significant correlation or one that may be very short-lived (e.g., Chang and Just, 2007).

Rising obesity rates have led some health researchers to advocate raising the price of less healthful foods, such as salty snack chips, soft drinks, and ice cream, relative to more healthful foods, such as fruits, vegetables, and whole grains. Logistical problems aside, economic analysis of consumer's sensitivity to prices shows that such a measure would have limited efficacy because peoples' diets are not very responsive to prices. Using 1999 scanner data on food purchases, Kuchler, Tegene, and Harris (2005) estimate that taxing potato chips by 20 percent would bring about only a quarter-pound loss in body weight per year per potato-chip eater. Changing prices could also have some unintended consequences due to the interdependent nature of food choices. Kinsey and Bowland (1999) found that modest decreases in the price of fruits, meats, and dairy products would lead to small improvements in individuals' diet quality and that the price of fat would have to rise

by as much as 15 percent to bring about a 1-percent reduction in fat consumption. Huang (1999) estimated that changing prices would also lead to some peculiar substitutions—decreasing the price of fruits or vegetables would increase consumption of fat, decreasing the price of vegetables would decrease consumption of vitamin A, and increasing the price of fat would reduce consumption of protein, calcium, iron, and folate. Such research shows that simply manipulating food prices is not likely to induce significant improvements in American consumers' diets.

The full "price" of food also includes the value of time spent acquiring, preparing, cooking, and cleaning up after meals. Many of the market-driven changes to the current U.S. food distribution system have reduced the time required to procure and prepare food by providing convenient, ready-to-eat snack foods, microwavable meals, vending machines at workplaces and schools, and drive-through windows at fast-food restaurants. These changes may have inadvertently made the environment more fat-friendly for consumers. It is extremely easy to access large quantities of food and expend hardly any time or energy doing so.

There is evidence that an increased availability of convenient foods is one underlying cause of increased consumption. This explanation conforms with standard economic theory, which predicts that people will consume more of an item whose total cost (combination of time and money) of production has declined (Cutler, Glaeser and Shapiro, 2003; Variyam, 2005). Cutler, Glaeser, and Shapiro (2003) found that prices, income, calorie expenditures (exercise), and caloric intake at meals all remained relatively stable during the period that obesity rates began increasing. The amount of time spent preparing food dropped by about 50 percent, thus the time cost of a snack declined sharply. Chou, Grossman, and Saffer (2004) also examine the effects of monetary prices and convenience (via an increased availability of fast food and other food sources) on obesity levels. While the relationship between food prices and obesity is statistically significant, it is small in magnitude. Availability of fast food, on the other hand, appears to play a much larger role in obesity. This indicates that while Americans may not be so responsive to monetary costs of food, they may be more sensitive to time costs.

This brief overview illuminates how a fairly standard economic framework can help explain some of the reasons behind food choices, but that the impact of standard economic levers—and the policy options associated with them—are limited. The next sections show that adding more realism into economic models by incorporating the psychological and behavioral aspects of food consumption reveals a broader range of policy options to increase the likelihood that individuals will make more healthful food choices.

How Cognitive Glitches and Psychological Biases Influence What People Eat

Through carefully controlled experiments, psychologists and behavioral researchers have documented widespread observance of behaviors and problem-solving techniques that do not conform with standard assumptions of standard economic theory. For example, experiments where subjects are asked to perform fairly simple reasoning tasks, such as calculating the probability that event A will occur given event B, show that the vast majority of respondents make systematic errors. Psychologists infer that these errors are the result of individuals' using simple decision rules, or heuristics, which lead to seemingly illogical choices or biases (Conlisk, 1996; Kahneman, Slovic, and Tversky, 1982). These errors become more prevalent when decisions are made when there is some element of chance or uncertainty about the results of a choice or when some rewards from a decision are realized after a significant passage of time, rather than immediately. While using simple heuristics may lead to biases, doing so may still be a more efficient approach to problem solving if it provides an adequate solution without the greater time and mental costs of a more deliberative approach. Experimental research findings suggest that the heuristics used to simplify decisionmaking can predictably affect which foods they eat, how much, and their willingness to consume that food again. Experimental and theoretical research also describes how problems of self-control may arise when the benefits from a decision are separated from the costs by a time lag.

Making Changes, by Default

One idiosyncrasy of consumer choice frequently observed in experimental studies is that individuals exhibit an asymmetry in how they value gains relative to losses. Known as loss aversion (Kahneman and Tversky, 1984), this asymmetry gives rise to anomalous behavior, known either as an endowment effect (Thaler, 1980) or a status quo bias (Samuelson and Zeckhauser, 1988). Both anomalies refer to aversions that cause individuals to willingly pay much less to acquire an item than they would accept to part with it (Samuelson and Zeckhauser, 1988; Kahneman, Knetsch, and Thaler, 1990). This aversion also makes individuals much more likely to choose the default options, even when the costs of switching to a different option are low (or even negative). For example, Choi et al. (2003) found that only 26 percent to 69 percent of employees opted to participate in a 401(k) program when they were not automatically enrolled compared with participation rates of 85 percent among employees for whom the default option was to enroll. Similarly, Thaler and Benartzi (2004) found that saving rates increased dramatically when employees were offered a plan where a specified fraction of their future pay increases were automatically diverted into a savings account.

Such findings from behavioral experiments suggest that individuals will be apt to make decisions that are more harmonious with their long-term objectives when those decisions are presented as the default options. Relating this to USDA's nutrition assistance programs, one way to increase the likelihood that program participants make healthier food choices would be to make such choices the default. Within the school cafeteria framework, a healthy meal could be automatically preordered for students each day. Students who

wanted a different, less healthful food choice (such as a la carte offerings) would then have to change their order and pay the cost difference, if any. Among Food Stamp Program participants, the default option could be a more restrictive food stamp package that fulfilled certain nutrition guidelines, such as a minimum percentage of the benefit amount to be allocated to purchase of whole-grain foods, dark green vegetables, or fruits. To opt out of this package, participants would need to specify that they would prefer the current benefit program.

The characteristics of the goods or services in question as utilitarian or hedonic have been found to play a role in how likely individuals are to exhibit status quo biases. Hedonic characteristics are associated with a sensory experience and immediate gratification. Utilitarian attributes, on the other hand, are more functional and typically associated with a longer term goal, such as good health (Hirshman and Holbrook, 1982; Strahilevitz and Myers, 1998). Individuals tend to view goods in terms of moral structure—classifying them as "wants" or "shoulds" (Bazerman, Tenbrunsel, and Wade-Benzoni, 1998). The notion that some goods are virtuous or necessary while others are sinful or extravagant leads to very different choice behavior. Dhar and Wertenbroch (2000) show that utilitarian characteristics are more important when deciding which goods to acquire and hedonic characteristics are more important in determining which to give up. Thus, while individuals appear to be deliberative in determining which products to select, they seem to be more reactionary when choosing which items to forgo.

In the context of food, this suggests that individuals are more likely to add utilitarian foods (which are likely to be healthier) to their diet than they are to eliminate a hedonic (and typically less healthful) food. This odd twist on the status quo bias works against efforts to reduce consumption of foods that are viewed as extravagant, making it much more difficult to reduce caloric intake. These findings also support the concept of considering the healthfulness of default menu items and food packages within the nutrition assistance programs.

Distractions, Cognition, and Eating

Certain situations also affect the likelihood that individuals' decisions will be based more on emotional than on rational factors. Epstein (1993) proposes the Cognitive-Experiential Self Theory (CEST) to describe this conflict. This model supposes that there are two processes used to evaluate every stimulus:

1. An experiential system to make rapid evaluations based on emotions.
2. A cognitive process to make more deliberative evaluations based on rational thinking.

The primary determinant of which process takes over is the availability of processing resources (time, necessity to deal with other decisions, etc.). Impulsive behavior, such as choosing less healthy foods over healthy foods, may result from the presentation of food choices, the presence of stress, or other demands on processing ability. Shiv and Fedorikhin (1999) find that individuals who were given some cognitive task to perform while choosing

between cake or fruit salad were much more likely to choose the cake than those given only the food-choice task. This result held true even if the price of the cake was raised considerably higher than the price of the fruit salad.

The standard economic framework can be adjusted to incorporate the possibility that individuals toggle between using a cognitive process to make decisions and an experiential system to make decisions based primarily on emotions. If it is true that emotions take precedence over reason as processing resources decrease, then another way to improve the healthfulness of individuals' food choices is to manage their processing resources. When processing resources are low, it is more likely that an individual will make consumption choices based solely on immediate considerations. When these resources are higher, the same individual will be more likely to consider the tradeoffs between current consumption and future well-being.

Within the school meals programs, processing resources could be affected by distractions or time constraints that occur while making meal selections or choosing when to stop eating. Consequently, students may be more likely to make healthful menu selections or more reasonable quantity decisions if afforded more time in which to do so. Alternatively, the nutritional value of foods chosen might improve if individuals were given the opportunity to make selections in a calmer environment—possibly in class, before heading to the cafeteria. Another way to mitigate the effect of a distracting environment would be to draw attention to the more healthful foods by making them more accessible or displaying them more prominently. Within the FSP or WIC, processing resources might again correspond to similar distractions or time constraints. A possible way to mitigate these factors would be to give participants the option of preselection or preordering their grocery items (whether program-provided or not) at times when fewer distractions might be present.

Mental Accounting

Lowering the price of one good, food for example, will have both an income and a substitution effect, according to standard economic predictions. With the income effect, individuals increase food purchases in response to more room in their budget. This change in price may also have a substitution effect, where people change how they allocate expenditures among broad categories. In this case, lowering food prices may lead to only a slight increase in total food purchases while generating a much greater increase in expenditures on other items.

By contrast, mental accounting (Thaler, 1980; Shefrin and Thaler, 2004) supposes that individuals categorize their income by earmarking it for specific purposes or specifying that it be used within a certain timeframe. The idea that money is not fungible but is set aside for a specific purpose is engrained in consumers' vocabularies early on with terms such as "lunch money," "rainy day funds," and "mad money." Income sources seen as one-time events are viewed as more frivolous (such as tax refunds) and are subsequently earmarked for more frivolous consumption (like plasma televisions). Individuals may also categorize a certain amount of income for food consumption based on factors such as the source of income (employment, welfare, food stamps, and gifts).

In contrast to the more standard framework, mental accounting predicts that once money is earmarked for a purpose, one will spend within a certain category until funds are entirely depleted. Thus, if allocating a portion of income to current food spending, and food prices decline, one may overlook the opportunity to shift the surplus "food money" to another purpose. Instead, one will buy more food. In this case, finding a low price on an item may lead to overconsumption rather than substitution.

Another consequence of mental accounting is that individuals tend to exhibit a "flat-rate bias," where they undervalue fixed costs, relative to variable costs (Thaler, 2004). Health club members typically choose to pay for their gym membership on a monthly or annual basis, even when a per-use fee would have lower total costs (DellaVigna and Malmendier, 2002).[1] One implication of a flat-rate bias is that, when only certain items can be selected using prepayment, those items will be chosen with greater frequency compared with those that can be purchased only with cash.

The idea of earmarking funds and mental accounts may partially explain why several studies have found that food stamp coupons that can be used only for food purchases are more effective at raising food expenditures than an equal benefit amount given as cash even when both coupons and cash are used on food (reviewed in Fox, Hamilton, and Lin, 2004). This outcome is contrary to rational economic theory, which predicts that cash and coupons would have the same effect. This concept also lends support to the idea that providing further guidelines on the proportion of food stamp allotments that should go toward the purchase of healthful foods, such as fruits, dark green vegetables, and whole grains, could increase the purchase of more healthful items among program participants.

Foods that are part of the official USDA school meals must meet dietary standards. But, similar standards could also be placed on a la carte foods and foods sold separately from USDA school meals. Through prepaid cards, or point-of-sale (POS) technology, students, possibly in conjunction with parents, could specify what portion of their total bill should be spent on fruits, vegetables, desserts, or high-calorie beverages. Such options have already been tried in several school districts. The finding that individuals undervalue fixed costs relative to variable costs has possible implications for the school meals programs as well. To take advantage of this flat-rate bias, parents or students could prepay for specific, more healthful items. Other, less healthful items, such as soft drinks or high-fat desserts, could be purchased, but only with cash.[2]

Problems of Self-Control and Visceral Influences

Economic models typically assume individuals discount future utility exponentially, meaning that the value people place on future well-being is less than the value of today's well-being and the value of each subsequent time period decreases at a constant rate. However, experimental and empirical studies provide examples showing that actual consumer behavior cannot be reconciled with the assumption of exponential discounting. One frequently observed anomaly is that individuals often change how they rank a less

[1] There are competing explanations for this behavior, flat-rate biases being one of them. Others include the possibility that people underestimate the future utility received from a service and that individuals may choose to overpay upfront as a commitment mechanism to influence future behavior.

[2] Though carbonated soft drinks are not a choice within the actual school meal programs, they are available for purchase at some schools. Some cafeterias do offer other sugary beverages a la carte.

preferable, yet more immediate reward relative to a preferable but delayed reward when the time delay between receiving either reward is changed equally (discussed by Laibson, 2004). A common example cited in the literature on experimental economics describes an individual who prefers one apple right now to two apples 24 hours from now, yet also prefers two apples in 51 days to one apple in 50 days (Thaler, 1981). Such time-inconsistent preferences find expression as a self-control problem, where one places extra value on more immediate rewards within the near term. This behavior has been linked to consistent shortfalls in retirement savings, and the need for penalties on early withdrawals of those savings (Laibson et al., 1998; Angeletos et al., 2001). In the case of food consumption, the would-be dieter may continually commit to cutting back on high-calorie foods after one more doughnut.

Repeated observation of time-inconsistent preferences has led some researchers to change this assumption by using a framework where decisionmakers lack self-control and choose alternatives that are usually less desirable or valuable over some timeframe simply because they are available sooner (see Gul and Pesendorfer, 2004, for a review). This adjustment to the more standard economic framework has been used to show that individuals can improve their longrun well-being through some sort of commitment mechanism that will enforce time consistency and set limits on current consumption levels (e.g., a 401(k) plan). Such curbs on one's ability to choose could never be a valuable tool if individuals had an ability to choose the best option after the fact.

Kivetz and Simonson (2002) found that individuals tended to choose luxury items as program rewards rather than the cash equivalent (or greater) because they feared lack of self-control would cause them to use the money for everyday expenses, and therefore, preclude their ability to afford the luxury item. This framework has also been used to explain a number of seemingly inconsistent preferences including: why individuals choose relatively more expensive annual gym memberships over "pay as you go" options, even though the latter would be less expensive for most users (DellaVigna and Malmendier, 2002); why problems of self-control coupled with decreasing time and monetary costs of food attainment may explain an increasing rise in obesity rates (Culter, Glaeser, and Shapiro, 2003); and why food stamp recipients reduce caloric intake as the days after food stamp receipt increase (Shapiro, 2005).

A limitation of such models, however, is that time-inconsistent behavior is attributed entirely to how soon a choice is available relative to its alternatives (Frederick, Loewenstein, and O'Donoghue, 2004; Loewenstein, 2004). In terms of food consumption, this means an individual will always be expected to choose the more immediately available food, regardless of his or her level of hunger. In reviewing the literature on weight loss, Herman and Polivy (2003) show that simply making some foods immediately available is not sufficient to induce binge eating.

To account for this, researchers have developed an alternate framework that allows a broader range of situations to trigger present biased behaviors (such as a self-control problem) by adding the assumption that certain visceral influences, such as feeling hunger, thirst, or pain, can add to or

detract from how much enjoyment an individual gets from current consumption (Loewenstein, 2004). For example, a plate of nachos is not terribly enjoyable after a full meal. But these same nachos may seem extremely palatable to a hungry person. Also, a hungry person is likely to make shortsighted tradeoffs between immediate and delayed food, even if that person will be feeling just as hungry tomorrow.

This visceral factors framework differs from Cognitive-Experiential Self Theory (described earlier) which assumes that the availability of processing resources—related to factors such as the amount of time afforded to make a decision, level of stress, or presence of other distraction—dictates whether an individual takes a rational approach to decisionmaking or makes evaluations based on emotions. In comparison, the visceral factors framework assumes that while an individual uses rational thinking to evaluate decisions, the amount of utility derived from consuming a specific amount of some good—say, food—will change depending on the intensity of relevant visceral influences, such as feeling hungry, nervous, or nauseous.

For explaining food choices, the visceral factors framework can illuminate how and why certain situations give rise to time-inconsistent choices. In a more neutral state, an individual may choose to consume the types and quantities of foods that are consistent with his or her long-term health objectives. As visceral factors intensify, however, the perceived value of one's current well-being increases relative to the value of one's future well-being. Thus, consumption of goods that provide immediate gratification will be consumed in greater amounts compared with situations when visceral factors are less intense.

Using this framework, Mancino (2003) and Mancino and Kinsey (2004) show that hunger can lead to unhealthy choices, especially when combined with time constraints. As individuals become busier (and time constraints begin to tighten), more convenient food becomes a substitute for leisure time. Also, as individuals become busier, they may eat less often, allowing their feeling of hunger to get out of control, leading to overconsumption. This research suggests that busier lifestyles may have created an atmosphere where increasing the interval between meals leads individuals to periodically ignore health information, causing an increase in obesity.

The empirical evidence that individuals tend to lack self-control, either because they simply prefer immediate gratification or because they are under the influence of a visceral factor, suggests that allowing them to preselect or commit to more healthful choices would be an effective means to counteract their tendency to make shortsighted, less healthful choices. Within the school meals programs, students will be more likely to choose foods that promote better health over those that simply provide immediate gratification if they choose their foods well before meal time. Alternatively, parents or children could devise a commitment mechanism, such as making certain foods off-limits. Through point-of-sale technologies, such mechanisms are currently increasing in popularity. Some schools employ POS systems through which parents can track what menu items their children purchase at school and even specify that their POS card preclude the purchase of specific items, such as soft drinks or high-fat desserts.

Similarly, within the Food Stamp Program (FSP), participants may be more likely to choose foods that are in sync with their long-term health objectives if they make their purchasing decisions before going to the store and finding themselves tempted with less healthful food options, such as salty snack chips, high-fat dessert products, and soft drinks. One way to do this would be through preordering. Another option would be to allow FSP participants to specify that certain less healthful foods be ineligible for purchase with their electronic benefit transfer (EBT) cards. A simpler, less costly alternative currently used by some States as part of their Food Stamp and Nutrition Education programs would be to design curriculum that highlights the importance of planning meals, preparing shopping lists, and not shopping for groceries on an empty stomach or accompanied by children (Philips et al., 2000).

The monthly schedule for distributing food stamps has been cited as a potential cause of weight gain among participants. Because benefits are distributed only once a month, there is evidence of a period of overconsumption shortly after benefits are distributed, followed by a period of rationing, or under-consumption later in the cycle (Wilde and Ranney, 2000). This cycle may be even more pronounced among individuals with self-control problems—they will likely spend too much for current consumption at the expense of future consumption. Increasing the frequency of benefit disbursements could also function as another commitment mechanism. Thus, decreasing the amount available for current consumption at each decision period, while leaving total payment amount unchanged, should also boost one's ability to make time-consistent decisions.

Avoiding Temptation

A fundamental tenet of rational behavior is the axiom of the independence of irrelevant alternatives. The axiom asserts that if a person prefers option A to option B, then he or she will continue to prefer A to B even if a third, irrelevant option C is available. Frequent observation of behavior that violates this principle suggests that modeling choices under an assumption of complete rationality will be too restrictive and result in erroneous predictions about behavior. Instead, individuals seem to exhibit a "context effect" where the rankings of alternatives depend on other options offered in a choice set, even when those options are never chosen (Camerer and Loewenstein, 2004). Gul and Pesendorfer (2001) propose that individuals have preferences over the presence of temptations: The value of choosing a salad rather than a hamburger will be lower when tempting items like chocolate cake also appear on the menu, even if the cake is not chosen. Because cognitively better choices may lose their appeal when more hedonic choices are presented, Gul and Pesendorfer argue that removing tempting options that are typically considered less desirable will unambiguously improve individual well-being.

Presenting individuals with tempting alternatives may also be problematic if their willpower (ability to self-regulate) is a depletable resource (Ozdenoren, Salant, and Silverman, 2006). Experiments show that an individual's ability to exercise willpower is lower if he or she has recently engaged in prior acts of self-restraint (Baumeister and Vohs, 2003). While individuals who have honed their skills at self-regulation may find effective ways to stick with

their long-term objectives (Fishbach and Shah, 2006), less effective regulators will be better able to avert temptation by imposing additional costs (or benefits) on giving in to temptation (Fishbach and Trope, 2005).

Within the school meals setting, these findings suggest that simply presenting students with a broader array of unhealthful but flavorful foods can decrease the enjoyment they get from choosing more healthful foods. The findings also suggest that the likelihood of choosing healthful menu options decreases as the number of tempting, less healthful options increases. Another finding from this research is that giving individuals the option of precommitting to the more healthful option may improve well-being. As such, offering students the option to preselect healthful menu options could be another way to improve their food choices. Through preordering their groceries, either by phone or possibly online, FSP participants could also be given the option to preselect their foods directly through FSP.

How Cognitive Glitches and Psychological Biases Influence How Much People Eat

In addition to choosing the wrong mix of foods, many Americans simply eat too much food as well. According to ERS data on food consumption, the average daily calories available in the U.S. food supply increased by more than 500 calories per person between 1970 and 2004. Surprisingly, experimental studies find that choosing what to eat and choosing how much to eat may be controlled by separate psychological mechanisms. Environmental factors seem to have a stronger effect on the amount people eat than tastes and preferences (Wansink and Kim, 2004). In particular, the eating environment (atmosphere, effort, social facilitation, and distractions) and the food environment (salience, structure, size, stockpiling, and shape) affect consumption volume by setting consumption norms (an indication of how much people should consume) and inhibiting monitoring accuracy. These subtle cues can have large impacts on consumption volume, often without the individual's being aware of their effect (see Wansink, 2004, for definitions of terms and complete review of the consumption volume literature).

Where We Eat and With Whom

The eating environment is defined as all factors external to the presentation of the food itself. Social situations may encourage individuals to eat more than they would normally. When eating in groups or social situations, individuals tend to eat quantities that are similar to others (Birch and Fisher, 2000; de Castro, 1994). Individuals may alter what they eat due to the distraction of conversation and increase consumption volume as the size of the gathering increases (de Castro and Brewer, 1992) or as the length of meal is extended (Bell and Pliner, 2003). When wanting to impress others at the table, as in a job interview, individuals will often eat less (Chaiken and Pliner, 1990; Mori, Chaiken, and Pliner, 1987, Stroebele and de Castro, 2004). Social gatherings also tend to decrease the variance of consumption; those who normally eat large amounts eat less, while those who normally eat little will eat more (Clendennen, Herman, and Polivy, 1994; Pliner et al., 2003).

Other aspects of the eating environment, such as lighting, odor, and temperature, can influence consumption volume (Wansink, 2006; Wansink, 2004). People tend to shorten the duration of meals in brightly lit environments compared with places that are more dimly lit. People also tend to be less self-conscious when the lighting is low, thus increasing the likelihood of eating more than they would normally.

Beyond mentioning their impact as part of nutrition education, it is difficult to imagine how controlling where people eat, with whom, or the atmosphere within a dining area could be feasible within either FSP or WIC. However, these findings do have implications within the school meals programs. It may be that simply decreasing the number of students seated at each table could have a significant impact on the amount of food consumed at school meals. Making school cafeterias more brightly lit could be another way to help students better monitor their actual consumption volume.

How Food Is Presented—Salience and Stockpiling

The primary factor in managing consumption volume is the accuracy with which individuals gauge how much they eat (Arkes, 1991; Polivy et al., 1986). Rules of thumb, such as eating one package or one bowlful of food or choosing products that are lower in fat or calories, are often used to monitor consumption volume. Such rules of thumb can have unintended effects on dieters. For example, Wansink and Linder (2003) found that while diners correctly believed that dipping bread in olive oil would increase the fat content relative to spreading butter on the bread, their total consumption volume may have negated this difference. These same diners tended to eat 23 percent more bread during the course of the meal when choosing butter over olive oil (Wansink and Linder, 2003).

Increasing the salience of food may increase consumption volume because it serves as a reminder of a pleasurable experience. Simply seeing a food can also lead to unplanned consumption (Boon et al., 1998; Cornell, Rodin, and Weingarten, 1989). Salience may be generated internally, leading to greater consumption volume than externally generated salience. Scientists were able to manipulate the salience of soup by simply asking individuals to write a description of the last time they ate soup. Those asked to describe their experience consumed more than twice as much soup in the next 2 weeks as did a control group that was not asked (Wansink and Deshpande, 1994).

Similarly, individuals who happened by a cookie dish, and impulsively decided to eat, ate fewer cookies than those who deliberately sought out the cookies (Wansink, 1994). Conversely, placing candies just 3 feet away from one's desk, as opposed to directly on one's desk, can significantly reduce the volume of consumption (by five to six chocolates a day, see Painter, Wansink and Heiggelke, 2002).

Stockpiling food can also increase consumption (Chandon and Wansink, 2002). In an experiment where homes were stocked with large quantities of ready-to-eat food, the foods were consumed at greater than twice the rate of consumption than in homes given more normal amounts of the food within the first week (Chandon and Wansink, 2002). After the first week, consumption rates were similar between the two treatments. Some have speculated that stockpiled foods may increase visibility and salience of the food. However, experiments attempting to isolate this phenomenon have been inconclusive (Terry and Beck, 1985; Wansink and Deshpande, 1994).

Devising ways to directly manipulate the salience of foods within the WIC or food stamp program is difficult to imagine. However, nutrition education within these programs could highlight ways to increase the salience of certain foods, such as fruits and vegetables, relative to other less healthful foods by changing where they are stored within the home. The school meals programs, on the other hand, have the ability to work with cafeterias and lunchrooms to change the placement of specific food items to adjust their relative prominence. Salads, fruit and vegetable servings, or other more healthful foods could be displayed more prominently, such as at the beginning of the cafeteria lines or on a level that is easily accessible. By contrast,

desserts, soft drinks, or other less nutrient-dense foods could be offered so they are harder to reach and harder to see.

The finding that stockpiled foods are consumed in greater quantity may have implications for how benefits are distributed within the Food Stamp Program. There is speculation that the monthly food stamp benefit disbursement contributes to sporadic consumption of food. Shortly after benefits are issued, food expenditures spike and thus foods are more plentiful within the home compared with the end of the month.[3] If recently stockpiled foods are consumed in greater quantity, program participants, especially among those who have problems of self-control, would be more likely to experience binge-eating at the beginning of the food stamp cycle. Therefore, allowing FSP participants to choose to have benefits distributed more frequently could reduce the variation in the quantity (and possibly quality) of food intake throughout the month.

[3] Evidence that stockpiling food leads to increased consumption in the short run may offer another explanation for the finding by Shapiro (2005)—that consumption patterns among food stamp recipients challenge the assumption of exponential discounting.

How Food Is Presented—Variety, Shape of Container, and Packaging

The structure or variety of food can also lead to increased consumption volume. In particular, offering a greater variety of foods increases the consumption volume of that food (Miller et al., 2000; Rolls, 1986; Rolls et al., 1981). Recent work has found that even increasing aspects of variety not associated with taste or nutrition significantly increases consumption volume. For example, subjects presented with 10 versus 7 colors of M&M candies consumed 43 percent more candy (Kahn and Wansink, 2004). Another experiment presented one set of subjects with identical numbers and variety of colors of jelly beans. However, while one treatment group received the jelly beans sorted by color, the other received the assortment mixed. Those who received the mixed assortment ate 69 percent more on average (Kahn and Wansink, 2004).

Larger portion sizes are frequently cited as contributors to increased obesity rates in the United States (Rolls, 2003; Young and Nestle, 2002). Experimental research does show that people eat more when presented with larger packages or portions of food (Diliberti et al., 2004; Rolls et al., 2004; Wansink, 1996; Nisbett, 1968; Rolls, Morris, and Roe, 2002; Edelman et al., 1986). Doubling the portion size increases consumption anywhere from 18 percent to 25 percent for meal-related foods and by up to 45 percent for snack foods (Wansink, 1996). Surprisingly, this result is robust to any number of different treatments. Larger portions lead to greater consumption even if the food is reported to be repulsive by the subjects (Wansink and Kim, 2004). Moreover, eating from larger packages causes less accuracy in monitoring consumption volume; when eating from larger packages, people underestimate their own consumption to a larger extent compared with when they eat from smaller packages (Wansink, 1996). Alternatively, increasing the calorie density appears to have little effect on consumption volume (Rolls, Bell, and Waugh, 2000; Rolls et al., 1998; Rolls, Morris, and Roe, 2002).

The shape of serving containers, such as bowls, plates and glasses, can also significantly affect the volume of consumption. Individuals tend to focus on the height of a glass rather than its width (Krider, Raghubir, and Krishna,

2001; Piaget, 1969; Raghubir and Krishna, 1999). Teenagers were found to pour 88 percent more juice into short, wide glasses than into tall, thin glasses, when both types of glasses held the same volume. Similarly, bartenders asked to pour 1.5 ounces of gin poured 26 percent more into tumbler-style glasses than into tall, thin glasses (Wansink and van Ittersum, 2003).

Lastly, there is evidence that other alterations in food packaging or presentation may make it easier to assess consumption volume. Introducing more intermediate packaging in containers of chips or other items, such as individually wrapped sets of cookies within a bag, seems to draw attention to consumption volume and make it easier for individuals to determine an appropriate stopping point (Wansink, 2004).

Compared with the FSP or WIC, it is more straightforward to apply implications from these findings to the school meals programs. Increasing the number of different vegetables or fruits offered within a single salad may lead students to consume a greater amount. Changing the shape of containers that are used could also promote consumption of certain foods and beverages relative to less healthful foods. Tall, thin glasses could be used for less healthful beverages while shorter, wider glasses could be used for beverages such as low-fat milk, water, and fruit juices. Similarly, larger bowls could be used for servings of fruits and vegetables, while small plates and dishes could be used for desserts or other less nutritious foods. Finally, placing packaging restrictions, such as 100-calorie packs, in vending machines and prepackaged foods a la carte is another way to help individuals monitor their own consumption volume within the schools.

In addition to highlighting the effects of variety, container shape, and product packaging on consumption volume in nutrition education for food stamp and WIC participants, there may be opportunities to apply some of the findings more directly. Interested program participants could be given a set of glasses, dishes, and/or bowls that contain some sort of visual graphic to indicate appropriate portion sizes. Promoting single-serving packaging for whole-grain cereals or low-fat cheese slices may also be feasible within the WIC package.

Psychological Biases Can Also Make People More Receptive to New Information

For some, improving diet quality may require eating different foods or changing methods of preparation. Experimental research finds that specific cues can significantly influence individuals' expectations of how a new product will taste and, thus, how likely individuals are to try new foods and recipes. These cues may include appearance, name, price, brand, or information and descriptions given by others (Tuorila et al., 1998; Cardello and Sawyer, 1992). Subsequently, expectations can bias an individual's actual postconsumption opinion of taste and overall experience. Experiments show that individuals who think an item will taste good give higher post-trial evaluations compared with those who expected the same item to taste bad (Tuorilla et al., 1998; Cardello and Sawyer, 1992).

Cardello and Sawyer (1992) told groups of subjects that they would be sampling a brand of juice from a new tropical fruit. Each group except one was told that the juice had been taste-tested previously and subjects had either "liked it very much," "disliked it very much," or "neither liked nor disliked it," depending on treatment group. Subjects' expectations about the juice correlated very closely with the information provided by the researchers. Groups whose members had expected a bad experience reported a lower level of acceptance than groups whose members had expected a good experience. This is a phenomenon called "confirmation." In fact, subjects' expectations about the overall experience tended to bias their post-trial analysis of taste sensations (like sweetness) that had not been mentioned in the pre-taste information. Despite biasing evaluations, it appears that discovering that food is not what was described reduces one's willingness to try the food again (Tuorila et al., 1998).

Individuals have been found to be significantly influenced by who gave them information about a product. Manufacturers and retailers have long known the power of word-of-mouth advertising. Smith (2004) also argues that many notions as to what is good or acceptable are determined in the first few years of life. This leads marketers of foods to frequently show images of young children who are happy presumably because they have consumed the marketers' food products.

People seek social validation by trying to fit in and are more likely to be persuaded by people they consider to be likable (Cialdini, 2001). Not surprisingly, that is why people who are considered popular and trustworthy figures are often used to tout the virtues of a product, rather than more infamous people. Promoters have now taken this one step further. It is now becoming increasingly popular among product promoters to actually seek out young adults or teenagers to act as "trend setters" who will be able to spread the word about a product among their peers (Walker, 2004).

In terms of providing nutrition education with school meals programs, FSP, and WIC, this suggests that who delivers the message and how satisfied he or she appears to be while doing so may have more of an impact than simply providing information about how and why to make more healthful food choices.

Conclusions

The previous sections summarized how the use of simple rules of thumb and heuristics may influence what individuals choose to eat, how much they eat, and how they evaluate these decisions after the fact. Incorporating these findings into the study of consumer behavior expands the array of possible ideas that may be considered for food policy, nutrition education, and social marketing.

With small adjustments, standard economic frameworks can incorporate more realism by recognizing that individuals often use simple heuristics, such as placing more weight on default options or using package size to determine quantity, when making food choices. The practical implications of this would be that altering elements of the product, such as package size and shape, the amount of variety, the number of calories, or the default options on a menu, can significantly affect diet quality and consumption volume.

Altering the food environment by increasing the convenience of healthful foods relative to less healthful foods, reducing distractions, or altering the lighting may also make it easier to make choices that are more harmonious with an individual's long-term health objectives.

Recognizing that situational cues, like hunger, stress, or distractions, can increase tendencies to focus on current well-being also expands possible policy and education techniques. Commitment devices, such as allowing individuals to preselect more healthful foods, may be another effective way to help individuals make food choices that align with their own future health goals.

Similarly, explicitly modeling how mental accounting affects individuals' sensitivity to price differences reveals subtle techniques that might be able to significantly improve the quality of food choices. Knowing that people undervalue fixed costs relative to variable costs suggests that allowing people to prepay for healthful items may be another way to strengthen the link between intended and actual behavior.

Willingness to try new foods and a propensity to like them are strongly influenced by the actions of those around us. In terms of nutrition education and marketing, this suggests that who delivers the message and how satisfied they appear may have more of an impact than simple information about the virtues of healthful foods.

These findings expand the list of ideas for improving the diet quality among participants of specific food and nutrition programs, such as food stamps, WIC, and the school meals programs, without limiting freedom of choice. And unlike more traditional interventions, such as changing prices or banning specific food items, many of the proposed changes could be targeted to only those participants who wanted to make choices that are more harmonious with their own (or their parents') long-term health objectives.

This exploration of new ideas is by no means a recommendation or endorsement of any of them. A thorough analysis of costs, benefits, and potential impacts would be needed before any strategy could be considered as a policy option. Many of these suggested ideas may also influence where households shop, how they manage limited resources, and the total package of what

they purchase. Practical and legal issues may also pose hurdles to implementing some of these strategies. As such, an important area for research would be to design experiments and pilot programs to gauge the efficacy, cost, legality, and feasibility of these possibilities. Comparing results of these experiments against estimated costs and benefits of more traditional approaches to nutrition assistance would also clarify the merits of these ideas relative to other strategies.

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