Integrating Behavioral Economics into Nutrition Education Research and Practice
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ABSTRACT
Nutrition education has a long history of being informed by economic thinking, with the earliest nutrition education guides incorporating household food budgeting into nutrition advice. Behavioral economics research goes beyond that traditional role to provide new insights into how consumers make choices. These insights have numerous potential applications for nutrition interventions to promote healthy food choices consistent with the US Dietary Guidelines for Americans. Research to test the value of such applications can contribute to the development of evidence-based nutrition education practice called for in federal nutrition education programs.

Key Words: nutrition education, economics, behavioral economics, behavioral sciences, health behavior

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INTRODUCTION
Nutrition education has a long history of being informed by economic thinking. Its early beginnings in home economics integrated nutrition information and household budgeting to offer practical guidance that assisted consumers in purchasing nutritious foods at a price they could afford. Indeed, federal nutritionists have provided nutrition guidance on purchasing healthy, economical foods since 1894. Development of food plans that meet federal dietary guidance at different cost levels is still a major federal nutrition guidance activity.

More broadly, nutrition education fits well with the economic concept of a rational consumer who seeks to maximize his or her well-being and will do so if provided with adequate information. Consumers rely on nutrition educators for science-based dietary guidance such as food guides; this role is considered so essential to consumer welfare that federal law requires the government to provide the public with up-to-date dietary advice (the Dietary Guidelines for Americans) based on recommendations of nutrition experts. As the food system became more complicated, with greater reliance on packaged foods, nutrition education policy expanded to address what economists term the problem of information asymmetry—that is, suppliers knowing more about a product's characteristics than consumers do. The Nutrition Labeling and Education Act addressed this problem by requiring that nutrition information be labeled on packaged foods. With restaurant, fast food, and takeout food a ubiquitous part of the American diet, new regulations will soon require calorie information to be provided by chain restaurants and other sources of food prepared away from home, which can help consumers to make more informed choices in those settings as well.

Today, nutritionists are going beyond providing information to stress behavior change, as witnessed by the 2002 change in name of this journal from the Journal of Nutrition Education to the Journal of Nutrition Education and Behavior. Acting on the realization that although information is necessary it is often not sufficient, nutritionists have incorporated behavior change strategies drawn from social marketing and health communication into nutrition programs and messaging.

With its traditional emphasis on a rational consumer, economics may not seem helpful to such efforts. However, recent research investigating consumer behavior and decision making has yielded findings that challenge economists' assumptions of rationality. This new research area, dubbed behavioral economics, integrates research on cognitive, social, and emotional influences on economic behavior. It uses experimental methods to develop new insights into decision making. These insights, which both accept and understand the ways in which people are all sometimes less than rational, may help to generate new strategies for behavior change that can be added to the nutrition educator's arsenal.

DISCUSSION
The information-driven approach to influencing consumer choices has many positives: It shows a basic respect for the consumer and her or his ability to make the final decision regarding what is best. It respects personal autonomy and freedom of choice; it can be empowering. However, behavioral economics...
research has uncovered several cognitive biases that may limit the effectiveness of reason-based approaches. Several writers have summarized these findings elsewhere; this article highlights some findings that are particularly relevant to food consumption and discusses their potential application to nutrition education and behavior change strategies.

Foods have numerous characteristics that consumers value, ranging from the immediate pleasures of taste to practical factors such as price and convenience, to nutritional characteristics that contribute to long-term health goals. All of these characteristics can influence consumer choices. Traditionally, economic theory has assumed that consumers are consistent in their preferences and priorities so that if consumers learn to value health more, that can be reliably expected to guide their choices. Behavioral economics found that consumers are not so consistent. More realistically, they have competing preferences, and the value they place on these preferences can vary from moment-to-moment, depending on numerous factors. Temporal factors have a key role. Some food characteristics such as taste and convenience offer immediate rewards, whereas for others the reward is more distant. Individuals tend to discount the value of far-off rewards, so that even the most health-conscious consumer likely experiences conflict between a healthy food choice and the long-term benefits it promises vs the short-term pleasure of a tastier but less healthy choice. When the choice is immediate, as with a tempting dessert tray presented to a diner, short-term preferences are especially likely to trump the long term.

When individuals respond impulsively to immediate stimuli, this is often referred to as a hot state of thinking, compared with cold state thinking, which places a higher priority on long-term payoffs such as health. Individuals have been found to underestimate the effects of such immediate stimuli, a finding referred to as the hot-cold empathy gap. This leads individuals to overestimate their ability to withstand immediate temptations and to find themselves giving in to them.

Withstanding immediate temptations requires self-control, or as it is often termed, willpower. Self-control requires effort; research shows that the ability to maintain the necessary level of effort can be exhausted. Self-control is more likely to fail when individuals are hungry, tired, stressed, or distracted. It is not hard to see how this adds to the challenge of weight loss efforts and any other dietary behaviors requiring self-control.

Behavioral economics research has also illuminated some of the ways in which, as individuals negotiate a complicated world, they seek to simplify decision making. These insights can be particularly applicable to nutrition, where it has been said that consumers typically make hundreds of small food-related decisions daily. Cumulatively, these daily decisions shape overall dietary quality, but it is probably not realistic to expect consumers to give detailed thought to every one of them.

To decrease the cognitive burden of so many decisions, consumers frequently just go along with the choice presented to them, ie, the default option. Norms—the perception of what is the standard or usual choice—act similarly to defaults, in giving individuals an easy guide as to what decision to make. Defaults and norms can influence both choices and amounts: the standard beverage or side offered with a fast-food meal, for example, and also the standard size.

Gains in nutritional knowledge, coupled with public information such as nutrition labeling, allow consumers to access detailed information to guide decisions about what and how much to eat. Ideally, more information should lead to better choices; however, research has shown that consumers can feel overloaded by large amounts of information. These overloaded consumers have been found to rely on simple heuristics or rules of thumb to make dealing with information more manageable. For food decisions, for example, this could mean going with simple rules such as that salads are always low calorie or that the low-fat version will be the lowest-calorie one. Such simple rules of thumb make choices easier for consumers but they may not always work. To continue these examples, a salad could be made with high-calorie ingredients or a low-fat product could contain large amounts of added sugars, resulting in no reduction in total calories.

Mental accounting, another strategy to simplify decision making, can be relevant to food-purchasing decisions. Economic theory assumes that consumers will treat money as a flexible resource that can be spent in any way that best suits the individual’s interest. Research discovered, however, that many consumers found it easier to categorize income for a specific purpose such as lunch money or rent money, and consumers tended to stick with spending patterns defined by such labels. This may be one reason why receipt of Supplemental Nutrition Assistance Program (SNAP) benefits results in more spending on food than would occur if consumers received a cash benefit. Although participants of SNAP could simply substitute their benefits for the cash they were previously spending on food, SNAP benefits tend to stick in the food spending category, resulting in an increase in total food spending.

Applying Behavioral Economics Insights to Nutrition Education

Reviewing all of the factors that can undermine decision making can be discouraging. The difficulty in acting on long-term goals has been demonstrated for other behaviors such as retirement savings. It can be even more challenging for eating behavior, which is so strongly influenced by sensory and visceral stimuli such as taste and hunger. From a positive perspective, however, behavioral economics also suggests some promising strategies that can be used to nudge consumers toward choices that promote nutrition and health. Several researchers have harnessed behavioral economics findings on the effects of defaults and other presentation factors to restructure the choice environment systematically. Settings included school and workplace cafeterias; other possibilities include restaurants and grocery stores, as well as home environments. Aspects of such restructuring have included the choice of healthy items as defaults and presentation that emphasize healthy choices and de-emphasize other selections via placement and attractive, attention-getting names. Healthy norms can be suggested, for example, by describing smaller portion sizes as regular rather than small, or by benchmarking consumer behaviors against a healthy norm. In 1 experiment, signs in grocery stores saying that the average
customer bought ≈ 5 produce items led to a storewide increase in produce sales.28

Because immediate choices are more likely to be governed by short-term preference, strategies for making food choice decisions in advance may help individuals stick to health goals. Students who preordered lunch entrees were more likely to make healthy choices.29 Preordering foods or shopping from pre-prepared grocery lists also seems to encourage healthier decisions.15,30

In addition, behavioral economics concepts may be incorporated into information strategies, potentially increasing their effectiveness. Recognizing that consumers seek heuristics that will simplify food choice decisions, nutrition educators could research the development of simplifying approaches that give more reliable results than ad hoc rules of thumb used by many consumers. Examples would include front-of-package or shelf-talker icons that assist consumers who find detailed nutrition and ingredient information overwhelming.31 Thaler and Sunstein11 suggested more use of technological innovations to simplify cognitively complex decisions. Because 90% of American adults own smartphones,32 this opens up numerous opportunities to harness technology to simplify the choice process and personalize it to consumer needs.33,34 It could also be used to reinforce self-control and adherence to long-term goals. For example, some stores provide personalized reports about how much a shopper saved during a given trip and over the course of a year by using the store's loyalty card; similarly, consumers signed up for a health promotion program could receive feedback regarding the amount of produce or other healthy foods bought over the course of a month, which would provide reinforcement.

Concepts based on mental accounting may be incorporated into food-purchasing guidance. Household purchasing data showed that consumers underspend on fruits, vegetables, and whole grains compared with US Department of Agriculture (USDA) Food Plan guidelines and overspend on other categories.35,36 Shifting expenditures in line with Food Plan guidance could improve diet quality, especially for low-income consumers who must make trade-offs within tight budget constraints.37 If consumers rely on mental accounting to guide spending decisions, strategies that suggest an appropriate amount to spend, such as a shopping list or a smartphone-based app with recommended spending guides, could shift their thinking. More directly, partitioned shopping carts suggesting an amount of fruit and vegetables to purchase have been shown to lead to higher produce purchasing without increasing overall spending; this suggests that funds were shifted in a nutritionally desirable direction.38

Nutrition Education for Low-Income Consumers

Whereas the typical American’s diet falls short of recommendations, this is particularly true of low-income Americans. Analysis of dietary intake data reported as part of the 2003–2010 waves of the National Health and Nutrition Examination Survey found that higher-income adults averaged 53 out of a possible 100 points on USDA Healthy Eating Index, significantly higher than the 46 points averaged by low-income adults participating in the USDA’s Supplemental Nutrition Assistance Program (SNAP).39 The USDA supports nutrition education for SNAP and SNAP-eligible individuals through its SNAP-Education program, funded at $408 million in fiscal 2016.40 Nutrition education targeting low-income consumers is also delivered through the USDA’s Expanded Food and Nutrition Education Program as well as other public and private efforts. Given both the need of the target population and its priority among nutrition education efforts, it is worthwhile to consider whether behavioral economics has any special insights that may help development of effective dietary improvement strategies that meet the needs of low-income Americans.

Behavioral economics research has illuminated how stress, including the stress of poverty, can create an overwhelming cognitive burden.41 Findings from national survey data showed that although low-income food assistance program participants value nutrition, they face time and money constraints that complicate the task of making healthy food choices.39 Ethnographic research on food-purchasing behaviors of participants in food assistance programs illuminated how striving to optimize their budgets in the face of multiple constraints consumes considerable amounts of time and mental energy,42 whereas tight budget constraints make trying new healthy purchases seem more risky.43 Nutrition educators working with low-income individuals such as SNAP participants may find it useful to consider how these insights might be applied to the development of nutrition education targeting low-income consumers. Strategies for simplifying choices and tactics such as samples and tastings that make adoption of new foods or preparation techniques seems less risky may be particularly helpful for low-income consumers.

Critiques of Behavioral Economics: Do They Limit Its Value for Nutrition Education?

New ideas are often greeted with a huge burst of enthusiasm. At the same time, there are cautious voices raising caveats. These critiques merit consideration by nutrition educators who are thinking of incorporating behavioral economics approaches into their nutrition education programs and activities.

Even the strongest enthusiasts for behavioral economics strategies noted their limitations. Wansink and Hanks14 found that when taste preferences were especially strong, the healthy default was rejected. Instead, a compromise default side that included a mixture of the preferred side and the healthier side was more successful. It has also been pointed out that the effects of behavioral economics manipulations are often small.45 At the same time, the small, voluntary, unobtrusive changes prompted by many behavioral economics approaches may be more acceptable to consumers than mandates.45,46 and small changes in food choices can have cumulative effects if they are consistent over time. But are they consistent over time? The duration of the effects of behavioral economics–based environmental manipulations will have important implications for their long-term health effects and requires more study. For example, it may be that students in a school cafeteria lose interest in the vegetable with the attention-getting name and revert to a formerly preferred choice. Alternatively, it may be that the initial consumption prompted by the nudge of an attractive name helps to develop new
preferences and form healthier habits. Only more research will answer that question, or the associated question of whether new habits are carried over into other environments: eg, do school cafeteria–based nudges lead to healthier home consumption as well?

To date, a relatively small number of studies have been conducted that applied behavioral economics to improving food choices, which makes it premature to draw broad conclusions. A recent systematic review of nudge studies found them to be generally effective in improving dietary choices among adults, but recommended replication of successful studies in more socioeconomically diverse settings.44 It would also be important to assess effectiveness across age groups or for interventions specifically targeting children and youth. Such research is necessary to determine how well a given strategy would work in different target populations, which is essential information for translating research into effective, evidence-based nutrition education practice.

Regardless of effectiveness, some critics believed that behavioral economics is manipulative, in contrast to an ideal of giving consumers information but not interfering in the choice decision. It has been argued that manipulating the choice environment to tilt it in favor of a behavior that is believed to be better for the individual is paternalism.45 Behavioral economics proponents contended that such concerns are overblown. In many cases, some decisions need to be made about organization and the presentation of information and choices, and whatever decision is made may have some effect.46 For example, nutrition labeling requires decisions regarding placement of one nutrient vs another and the style of presenting the information (eg, grams of fat vs calories from fat), and these decisions are likely to affect interpretation. To study these effects and then make decisions about labeling that seems most likely to improve consumer welfare seems an uncontroversial decision. Drawing on research indicating that selective presentation of lean vs fat content (eg, 90% lean) tended to bias consumer decisions, USDA regulations require that if a ground meat package lists the percentage of lean meat, it must also list the percentage of fat.49

The rationale for nutrition information policy decisions such as labeling formats is generally a matter of public record. In other cases, as with changing a menu default, there may be concerns that consumers are being manipulated without their knowledge. One study found that informing consumers about the intent behind a default option does not decrease its effectiveness,50 so if surreptitious manipulation is a concern, it may be best to inform consumers regarding the reasoning behind the choice of defaults. Some consumers may value and actually seek out behavioral economics tools that help them act on their long-term interest. In 1 study of the effects of grocery preordering on healthy choices, some participants asked not to be given the option of changing their preorders at the moment of purchase, which suggests that they recognized the value of making advance decisions and did not want to have the opportunity to yield to their more impulsive, immediate wishes.30 These findings may address concerns about behavioral economics strategies being manipulative. Nevertheless, nutrition educators may wish to consider these issues when designing specific interventions, to minimize any ethical concerns.

IMPLICATIONS FOR RESEARCH AND PRACTICE

Just as nutrition education moved from being information-oriented to a broader focus encompassing behavior change, economic thinking has expanded to incorporate a wider understanding of decision making than its traditional assumption of the rational consumer. Incorporating behavioral economics–based insights into nutrition education research and practice appears to offer potential for generating practical, applicable strategies to improve food choices. In September, 2015, President Obama issued an Executive Order urging more use of research into behavioral insights to improve public programs, which makes this especially relevant for nutrition educators working in public programs such as SNAP-Education, the Special Supplemental Nutrition Program for Women, Infants, and Children, the National School Lunch Program, and other USDA child nutrition programs. The federal government’s recently published National Nutrition Research Roadmap called for research examining how behavioral economics theories and other social science innovations can be used to develop strategies to improve eating patterns.52

Some studies are already generating encouraging findings, demonstrating positive effects on food choices.22,25,36,53 As more research-tested approaches are identified, it is important to think about how to translate them effectively into practice. Given the diversity of America’s population, it is important to assess how well a given approach works in varied populations and settings before implementing it broadly. Practical considerations of how to translate small-scale experiments into larger-scale programs and activities will also need to be addressed. For example, the USDA has worked with the USDA-funded Cornell Center for Behavioral Economics in Child Nutrition Programs to develop a Smarter Lunchrooms Scorecard that provides schools with a guide to incorporating research-tested behavioral economics strategies into their school meals program.54 Similar translations into practice could be developed for other interventions.

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CONFLICT OF INTEREST

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