

Decision Making in Eating Behavior: State of the Science and Recommendations for Future Research

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Abstract

Background The National Institutes of Health Division of Nutrition Research Coordination, the National Cancer Institute, the National Health Lung and Blood Institute, the Eunice Kennedy Shriver National Institute of Child Health and Human Development, and the National Institute of Diabetes, Digestive and Kidney Diseases convened a scientific workshop entitled "Decision Making in Eating Behavior: Integrating Perspectives from the Individual, Family, and Environment" in April 2008

Purpose/Methods The purpose of this paper is to provide a synthesis of the workshop.

Results The common themes that ran throughout the conference were as follows: (1) Initiating behavior differs conceptually from sustaining behaviors; (2) The intersection of biology, genetics, and environment (physical, political, economic, and social) is where eating behavior occurs; (3) Marketing and advertising influence eating behavior influence; and (4) sometimes, seemingly unrelated policies influence eating behavior.

Conclusions Additional research is needed.

Keywords Decision making · Eating behavior · Food-related decisions

Introduction

Eating behaviors are extremely complex and difficult to characterize, especially since they are driven by a number of factors including individual (e.g., sociodemographics, interpersonal, psychosocial, and economics) as well as environmental and policy factors. Public health researchers who study dietary behaviors often spend a considerable amount of time developing and evaluating interventions geared towards altering these behaviors, sometimes without fully understanding or taking into account what is driving these behaviors. For example, in the case of dietary intervention studies, some studies seek to educate study participants about healthier food choices and measure how much their dietary behavior(s) change over the course of the intervention. This type of intervention makes the assumption that the participants are selecting unhealthier fare because they lack knowledge of what constitutes healthy or unhealthy food. However, although knowledge is sometimes a "predictor" of behavior change, this is not always the case [25, 39]. Additional understanding of facilitators and barriers to individual food choice and decision making patterns associated with these choices is necessary for the development of interventions to target individuals where knowledge of behavior does not necessarily facilitate behavior change.

In an attempt to understand the state of the science with regard to decision making and individual food choice, the National Institutes of Health Division of Nutrition Research Coordination, the National Cancer Institute, the National Health Lung and Blood Institute, the Eunice Kennedy Shriver National Institute of Child Health and Human Development, and the National Institute of Diabetes, Digestive and Kidney Diseases convened a scientific workshop entitled "Decision Making in Eating Behavior:

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Integrating Perspectives from the Individual, Family, and Environment” in April 2008. An overview of the workshop, including its objectives and a summary of presentation topics, is discussed in the introductory paper for this supplement. The purpose of this paper is to provide a synthesis of common themes that arose from the workshop and outline future directions and a research agenda in the area of decision making in eating behavior.

State of the Science of Decision Making in Eating Behavior

Poor eating behaviors was implicated in 15.2% of the total number of death in 2000 [21]. Millions of dollars are spent every year by the government to give grants to develop and evaluate interventions that will help the American public improve their dietary intake [24]. These studies are often highly controlled, adhere to strict protocol, and have mainly focused on individual-level behavior change. Recently, there has been a shift in research to include more upstream environmental and policy level approaches aimed at changing diets [20]. Although these more macrolevel approaches are warranted, we suggest that they be considered in conjunction with some individual-level strategies, such as decision making. In the end, although environmental and policy-level factors will influence what a person eats, the “individual” eating a particular food is making the final decision of what to consume or not consume. Dr. Ellen Peters [28] said this best when during the meeting she quoted well-known learning theorist Hobart Mower by stating “To understand or predict what a rat will learn to do in a maze, one has to know both the rat and the maze.” [22].

Could our failure to understand the rat and the maze be the missing link? Have we as scientists failed to link the complexity of the individual with the further complication of environment? Would additional knowledge of influencers of health decisions help us to strengthen the link? Most importantly, how should we approach a research agenda in this area?

What We Know

The researchers from the Decision Making in Eating Behaviors Workshop identified several themes to further our understanding of the antecedents of eating behavior with regard to decision making. These themes were as follows: (1) Initiating behavior differs conceptually from sustaining behaviors; (2) The intersection of biology, genetics, and environment (physical, political, economic, and social) is where eating behavior occurs; (3) Marketing and advertising influence eating behavior influence; and (4) Sometimes,

seemingly unrelated policies influence eating behavior. We will describe each of these themes and identify some relevant research available in the current literature to support them. In addition, we will raise pertinent questions whose answers would shed light on the many intricacies of food-related decisions.

Initiating and Sustaining Behaviors: Different Concepts

People are continually initiating new eating behaviors, e.g., switching from whole milk to low fat, switching from fried foods to baked, etc. Initiating a new eating behavior appears to be considerably easier than maintaining the new behavior. The literature is full of examples where the intervention was successful in getting people to change their eating habits over the short term. Sadly, however, the literature is replete of examples that show people being unable to maintain these changes long term. The question that continues to puzzle researchers is why?

According to Rothman [33], initiation of behavior change is guided by expectations about outcomes and is motivated by the desire to achieve certain benefits, while maintenance of a behavior is predicated by satisfaction with the outcomes. Despite the conceptual differences both initiation of behavior change and maintenance of behavior change are influenced by the reasoned and reactive processing systems [36]. However, the reasoned and reactive systems appear to have differing influence across the spectrum of behavior change. The reasoned system, which relies on deliberative thought, appears to have a more pronounced effect during the initiation stage, whereas, the reactive system which is more cue-driven seems to exert a more pronounced effect on maintenance.

Rothman [33] has hypothesized that a change in behavior can be made successful when the new behavior results in an expected outcome with which the individual is satisfied. He further hypothesizes that one of the reasons for lack of sustained behavior is declining satisfaction. Ouellette and Wood's [26] meta-analysis found that people repeat responses and form habits that produce desired outcomes. In the case of weight loss, Jeffery et al. [15] found that people were more likely to lose weight if they were told of the positive benefits of weight loss (the desired outcomes). They also found that reflecting on positive weight loss history had little impact on sustaining weight loss over the long term even though they continue to support the conceptual argument put forth by Rothman. Instead, Jeffery et al. [15] suggest that their failure to realize a meaningful change between the intervention and control groups' ability to sustain weight lost may have been a result of the methodology they used to induce satisfaction and thus call for formative research on how to infuse satisfaction within an intervention. Ouellette and Wood [26] offer

another explanation by suggesting that the knowledge of one's past achievements is too distal to the desired benefits to invoke satisfaction. Within this area, it may be particularly important to distinguish between a decision to maintain a behavior and a habit. Rothman et al. [35] suggest that understanding the distinction between habits and maintenance might help to elucidate when perceptions of satisfaction are important predictors of behavior.

Payne and Just [27] assert that the more distracted people are the more they are likely to rely on their environment to inform their eating decisions. Further, Rothman et al. [36] suggest exploring implementation intentions as a means of preparing for the distractions. This seems like a reasonable alternative if one is actively trying to change or sustain their behavior, but this seems unlikely to be successful for those who are not. In other words, the success of this strategy is dependent on the existence of favorable goal intentions. This raises a number of questions: (1) Does the public perceive that changing diet results in positive outcomes? (2) If so, do we as researchers understand what the public perceives as desired outcomes of dietary change? (3) If not, how do we clearly communicate the desired benefits of dietary change in light of all the miscommunication about diet from a myriad of sources? These are potentially powerful research questions to explore and could have a dramatic impact on future diet-related interventions.

To date the majority of individual-level dietary interventions that have been conducted had the expectation that individuals would make rational deliberate food choices based on knowledge acquired during the course of the intervention. These interventions rely on individuals weighing the advantages and disadvantages of performing a behavior and willfully making changes [29, 36]. Most of these interventions reflect health behavior theories (e.g., as Social Cognitive Theory, Theory of Reasoned Action and Planned Behavior), which usually explains a limited amount of the variance in health behavior change in individuals. Rothman [34] encourages the challenging of theories and calls upon theorist to generate theories which are specific and that provide testable hypotheses. Other researchers have pointed out that additional research is needed to understand the usefulness and feasibility of theories under varying circumstances [1, 4]. Recently, Resnicow and Vaughn [30] have suggested the use of the Chaos Theory to complement the existing traditional health behavioral theories, since it highlights the dynamic nature of the behavior change and potentially to explain more of the variance. They also suggest that while the more cognitively informed theories may be effective at sustaining behaviors, chaotic theory may be more useful in explaining initiating behaviors [29]. This is clearly an exciting time for health behavior research.

Intersection of Biology, Genetics, and Environment (Physical, Political, Economic, and Social): Where Eating Behavior Occurs

Zald, Wardle, and Carnell [42, 43] have included papers in this supplement that provide examples of how biology and genetics influence eating behaviors. The dynamics of biology and genetics are further complicated by context (environment). The physical, political, economic, and social environments provide the backdrop for eating behavior. For example in the case of obesity, it is estimated that 30–50% of the variability is explained by genetics [3]. However, Faith et al. [7] found that parental feeding style (social context) only became factor in a child being overweight if the child was predisposed to obesity. If the child was not predisposed, she or he did not become overweight regardless of feeding style. Similarly, Heitmann et al. [11] found that a sedentary lifestyle resulted in increased weight among men predisposed to obesity. In each of these examples, the predisposition to obesity was not enough to cause obesity. It was only in the presence of the right environment that obesity was realized.

According to Gosden and Feinberg [10], “individual behavior is influenced by biology and genetics and environment which are operating in complex ways.” Within this issue, strong arguments have been made for eating behavior being driven by biological factors and previous experiences that may in turn inform the operation of the reactive and reasoned systems. Unraveling this complexity will provide us much needed insight to assist with the development of dietary interventions, possibly by allowing us to better predict which strategies might be more useful for which people. However, our current methodologies appear to be insufficient for disentangling the multitude of factors involved. Research rooted in systems science appears to hold some promise in application to this area since it traverses various disciplines and levels of influence [12].

Marketing and Advertising Influence Eating Behaviors

According to Furst et al. [9], “The choices people make among foods...influence food production systems through consumer demand.” Our food choices are influenced also by marketers who use iconic personalities, toys, etc., to make us want or desire their products [40]. As a result of these tactics, we demand more of these products, and suppliers try to meet our demand in a number of different venues, which speaks to why our environments are so prolific with food. In light of the fact that marketing budgets for the food industry dwarfs the budgets that public health professionals have to deliver their message, public health professionals have to be willing to adopt a new set of

strategies. Several strategies have been proposed; however, the public health community remains divided over these.

Huang and Yaroch [13] propose that the mileage will be gained by partnering with industry and appealing to their desire to promote the public good. Yet, others like Ludwig and Nestle [17] believe that because of industry's need to maintain the bottom line at all costs, these public-private partnerships are not an optimal approach.

Jacobson and Brownell [14] proposed adding a “sin tax” to unhealthy food. Payne and Just [27] believes that the elasticity of food is relatively high and that adding a sin tax to unhealthy food without discounting healthier food items is not likely to bear much fruit. Others have suggested providing tax breaks to food industry to help promote healthier options [8]. Evans et al. [6] have shown that neither of these taxation strategies is popular with the public. Additional research is needed to determine the feasibility, effectiveness, and the acceptability of these strategies.

Impact of Seemingly Unrelated Policies

Research on the role of policies directly related to improving access and availability to healthful foods (e.g., Child Nutrition Reauthorization Policy) has increased over the last couple of decades. However, evaluation of the impact of a wider net of policies may be in order. Several seemingly unrelated policies, like zoning and educational attainment, may also have a role in health improvement [16, 37].

Zoning

Zoning laws, which were first established to protect residents' welfare, typically segregated land into certain uses, e.g., residential, commercial, etc. [18]. While instituted to ensure public health and maintain land values, these laws may now be contributing to the detrimental phenomenon of “food deserts”—areas with little or no access to the foods needed to maintain a healthy diet [44]. This was the case in the state of New York where zoning laws in certain areas called for more area designated for parking than was required in other retail locations. In areas where land use costs are expensive, this requirement acted as a deterrent to merchants that might have otherwise considered moving to the area. In addition, this law did not take into consideration the manner in which local residents reached the store (by foot or mass transit instead of by car) therefore negating the need for this requirement [32, 41].

Zoning laws also impact our food environment in other ways namely by allowing fast food establishments, “as of right,” without limiting the quantity in a particular area, thus increasing our exposure to unhealthy food venues. The lack of stringent requirements has probably encouraged the proliferation of these outlets. The impact of zoning

regulations on the physical landscape in which people live has indirect but possible major effects on food-related behaviors. Elucidation of these complicated relationships requires further investigation.

Educational Attainment

Education attainment has been repeatedly shown to impact diet quality; however, the literature reflects very few if any studies that have used a general education intervention to combat poor diet [19, 31]. Instead, most of the intervention studies have focused on the role of nutrition education (nutrition literacy) in improving diet, and most of these interventions have failed to result in sustained diet improvement. What has not been addressed, however, is the potential impact of “general” literacy.

Even though limited health literacy is correlated with limited general literacy, there are differences, i.e., limited health literacy can occur at any educational level while limited general literacy skills are more likely to occur among adults with less than a high school education, limited English proficiency, those living in poverty, and those with disabilities. The rationale for focusing on general literacy as a mean of improving health outcomes can be found throughout the literature [2]. Sanders et al. [38] conducted a systematic review of the literature to assess the impact of literacy and child health. They found that low caregiver literacy was associated with poor health outcomes for children. DeWalt and Pignone [5] found that persons with lower literacy were 1.5 to 1.3 times as likely to have poor health outcomes. According to the National Center for Education Statistics, 55% of the persons with below basic understanding of prose were high school dropouts. The rate of dropouts varies by race, ethnicity, and geography [23]. Dropout rates directly impact income which in turn affects where we live, our food environment, and our health status.

Conclusions

Considering that individual factors as well as environmental factors exert influence on a single food decision has proved to be a great challenge for researchers attempting to dissect its many facets. Understanding the drivers of eating behavior is important to developing interventions to change eating behavior. Yet, identifying these drivers is not straightforward. Many of our interventions' foci to date have dealt with eating behavior as if it were an isolated event that could be changed if we were just more mindful. The lack of success from this approach suggests the need to approach this issue from a new paradigm using new strategies. The goals of the workshop were to shed light on several aspect of eating behavior and to further our

understating of how eating decisions are made. The workshop accomplished these goals and identified the need for more formative research in this area.

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