

# How Psychological Insights Can Inform Food Policies to Address Unhealthy Eating Habits

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In this article, insights from psychology and behavioral economics are identified that help explain why it is hard to maintain healthy eating habits in modern food environments. Most eating decisions engage System 1, rather than System 2, processing, making it difficult for people to consistently make healthy choices in food environments that encourage overconsumption of unhealthy foods. The psychological vulnerabilities discussed include emotions and associations mattering more than reason, difficulty processing complex information, present-biased preferences and planning fallacy, status quo bias and defaults, and susceptibility to unhealthy foods that are in sight and, therefore, in mind. The article argues that these insights should convince us that supporting healthy eating habits and reversing the worldwide obesity epidemic will occur only if our food environments are changed in substantial ways, largely through policy changes. Such policies include restrictions on food marketing, requiring uniform front-of-package nutrition labeling, changing unhealthy food and beverage defaults to healthy ones, and taxing unhealthy foods and beverages. Psychology and behavioral economics should inform the design of these policies to maximize their effectiveness.

### **Public Significance Statement**

This article discusses psychological vulnerabilities that make it difficult for people to maintain healthy eating habits in modern food environments. To reverse the worldwide obesity epidemic, policies are needed to make the food environment healthier. Such policies include restrictions on food marketing, requiring uniform front-of-package nutrition labeling, changing unhealthy food and beverage defaults to healthy ones, and taxing unhealthy foods and beverages.

*Keywords:* behavioral economics, obesity, food choices, decision making

Maintaining healthy eating habits is notoriously difficult, as evidenced by the global increases in overweight and obesity over the last several decades (Ng et al., 2014) despite the desire of many to lose weight (Gallup, 2016). The problem is so formidable that the World Health Organization's goal for 2025 is not to decrease obesity and

diabetes but merely prevent them from further increasing (World Health Organization, 2018). Even that goal will be enormously challenging to meet (Roberto et al., 2015). Numerous authoritative reports have called for urgent and substantial action to prevent increases in obesity and its related chronic diseases, and there is consensus that policy approaches are likely to be most cost-effective (Gortmaker et al., 2011; World Health Organization, 2016).

The stunningly high prevalence of diet-related chronic diseases has arisen from profound changes in food environments over the last several decades that exploit certain biological and psychological human vulnerabilities (Roberto et al., 2015). Worldwide macrolevel changes in urbanization, economic growth, technology, and culture (Popkin & Gordon-Larsen, 2004) are drivers of changing food environments. These broad shifts have led to more meals being eaten outside the home (Guthrie, Lin, & Frazao, 2002; Nielsen, Siega-Riz, & Popkin, 2002), larger restaurant portion sizes (Nielsen & Popkin, 2003; Young & Nestle, 2002), widespread availability of unhealthy foods (Popkin, 2004),

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increases in food marketing (Harris, Schwartz, & Brownell, 2010; Powell, Harris, & Fox, 2013), and lower costs of nutrient-poor foods relative to healthier ones (Darmon & Drewnowski, 2015; Mendoza, Pérez, Aggarwal, & Drewnowski, 2017), among other changes.

Much of the scientific effort to encourage healthier eating habits deploys and studies interventions at the individual level (e.g., Duckworth, Milkman, & Laibson, 2018; Loewenstein, 2018). Although this work is interesting and undoubtedly useful for some organizations and individuals, individual-level interventions on their own are unlikely to make a substantial dent on a global obesity epidemic driven by large societal changes (Loewenstein, 2018). Similarly, decades of research on behavioral treatments for weight loss and maintenance has taught us that small reductions in weight can produce clinically meaningful benefits (Diabetes Prevention Program Research Group et al., 2009), but they will not be enough to address diet-related chronic diseases on a global scale (Brownell, 2010). In fact, psychological discoveries have taught us that large-scale environmental changes are likely to be the most effective way to help people maintain healthy eating habits. Psychology and behavioral economics also have much to offer for how best to design institutional and government policies to maximize their effectiveness. This article first discusses psychological insights that help explain why humans are vulnerable to overeating in modern day food environments. It then discusses the implications of those insights for institutional and government policies to support healthy eating.

## Two Perspectives on People and Policies: Economics Versus Behavioral Economics

Classic economics assumes people are rational processors of information, consistent when they make decisions and well-calibrated when they make forecasts (Becker, 1962; R. Thaler, 1980). People are viewed as intentioned actors that are highly capable, good at planning, selfish, and incentive-driven. Through this lens, if a person is not engaging in a desired behavior, it is either because he does not know that he should or because he lacks the incentives to do so. Thus, to get him to adopt the desired behavior, you either have to persuade him that it is the right thing to do or incentivize him to do it. There is a great deal of truth and value in these assumptions and their implied solutions for shaping behavior. For example, taxes on sugar-sweetened beverages have generated modest to large effects on reducing taxed beverage purchases (Roberto et al., 2019; Silver et al., 2017). But there are also limits to the assumptions of traditional economic theory, which tend to be very person-centric and to ignore context.

Infusing psychological theory into economics is what generated “behavioral economics,” which puts bounds on the core assumptions of economics (R. Thaler, 1980; Simon, 1955). Psychology has shown us that people are imperfect processors of information, they are sometimes inconsistent, and they often rely on intuition and emotion to make decisions and forecasts (Kahneman, 2003). We have learned that people can be poorly calibrated and that context and environment influence them. Further, people are error prone and tend to be myopic—overly focused on the here and now (O’Donoghue & Rabin, 2000). Psychology and behavioral economics has also shown us that people can be motivated by forces beyond self-interest, like moral values.

These differences in fundamental assumptions between traditional economics and psychology lead to some differing prescriptions for behavior change. Psychology and behavioral economics acknowledge that incentives and education are critically important paths to behavior change, but they may not always be effective or cost-effective. It also greatly matters how an incentive or education program is delivered. For example, paying people to lose weight is unlikely to be a long-term cost-effective strategy for healthy loss and maintenance (John et al., 2011; Volpp et al., 2008) compared with passing a range of laws and regulations that incentivize healthy behaviors like unhealthy food and beverage taxes. The psychological perspective on people suggests that changing the environmental context in which people make decisions is a critical way to change behavior (R. H. Thaler & Sunstein, 2009).

In support of traditional economic theory, people are often good enough at making decisions and processing information. Nevertheless, psychologists have identified a variety of errors and biases that can plague people’s judg-

ments and decisions (Kahneman, 2013). An important framework in psychology holds that there are two systems for processing information: System 1 and System 2. System 1 makes “fast” decisions that tend to be automatic and driven by associations and emotions (Kahneman, 2013; Sloman, 1996). In contrast, System 2 is engaged during slow, deliberate, and effortful reasoning (Kahneman, 2013; Sloman, 1996).

Eating decisions, which are made often and with little forethought, tend to be heavily reliant on System 1. System 1, for example, is clearly in the driver’s seat when a person sees a Coca Cola commercial telling him to “open happiness,” and he subsequently walks to the refrigerator to grab a Coke. In contrast, flipping two boxes of cereal over while in the supermarket aisle to scrutinize and compare the amount of sugar per serving engages System 2 reasoning. The former circumstance is, of course, much more common than the latter given that people are busy, time-constrained, focused on other priorities, and/or have difficulty making sense of complicated nutrition information. And so when it comes to food choices, it is largely a System 1 enterprise. In this article, a range of System 1 psychological processes are described that can make us vulnerable to unhealthy eating habits in current food environments. After describing these processes, the article provides a series of policy recommendations informed by these insights.

## Psychological Vulnerabilities to Modern Food Environments

### Emotions and Associations Tend to Matter More Than Reason

Emotional appeals can be a more powerful way to persuade individuals than providing information alone, which engages more deliberative processes (Heath & Heath, 2007). Coca Cola is famous for their emotion-evoking marketing campaigns that can bring tears to viewers’ eyes. Food marketing is often designed to create positive associations between a brand and the consumer. This is why many food companies use celebrities and sports stars to market products (Bragg, Roberto, Harris, Brownell, & Elbel, 2018; Gwinner & Eaton, 1999). They hope the positive associations people have with the celebrity will transfer over to the associated product. For example, in his book, *Salt, Sugar, Fat* (Moss, 2014), Michael Moss explained how Coca Cola intentionally put itself in places where happiness occurs (e.g., parks, sporting events, beaches) to create inextricable links between Coke and happiness. Other common child-targeted marketing strategies leverage positive associations between licensed characters from popular children’s TV shows or movies to promote foods. Research has found, for example, that children think the same food tastes better when it has a licensed character on the packaging, and

children strongly prefer the food with a character on it for snack (Letona, Chacon, Roberto, & Barnoya, 2014; Roberto, Baik, Harris, & Brownell, 2010).

### Difficulty Processing Complex Information

In contrast to tactics deployed by marketers, many public health tools designed to educate and influence consumers legally require unemotional, fact-based messaging. Such information is often complicated and presented in numeric form (e.g., body mass index, calorie information, serving sizes), which people have trouble processing quickly (Paulos, 1988), particularly those with low education levels (Pelletier, Chang, Delzell, & McCall, 2004; Rothman et al., 2006). In general, low health literacy is associated with a range of poor health outcomes (Berkman, Sheridan, Donahue, Halpern, & Crotty, 2011). To help people understand and process information, simplicity is key (Heath & Heath, 2007) but tends not to be the norm when conveying links between nutrition and health.

### Present-Biased Preferences and Planning Fallacy

People have a tendency to desire immediate over delayed benefits, a term referred to as *present-biased preferences*, and to grapple with two selves when making decisions: a current and future self (Ainslie, 1975; Frederick, Loewenstein, & O’Donoghue, 2002; O’Donoghue & Rabin, 2000). Your current self might want to eat a brownie, whereas your future self wants to live a long, healthy life. More often than we like, the current self wins out, and we eat the brownie (though people also make deliberative decisions to focus on the present or are led by System 1 to anxiously focus too much on the future; Loewenstein, 2018). In the case of eating decisions, such thinking often leads us to choose something tasty and convenient because it aligns with our immediate desires. This phenomenon was illustrated in a study in which participants first made a choice between a healthy versus unhealthy snack 1 week before consuming it. Then, 1 week later, immediately before receiving the snack, they were asked to make the choice again. The researchers found that the vast majority of those who decided in advance to pick the healthy snack switched to the unhealthy snack immediately before the consumption episode. Very few people who started with the unhealthy snack switched later (Read & van Leeuwen, 1998). In conjunction with present-biased preferences, people often succumb to the *planning fallacy* (Buehler, Griffin, & Ross, 1994), which is a tendency to be overly optimistic about how much we will be able to accomplish in the future. It is easy to think, “I can eat this brownie now because I will exercise later,” but often, when later comes, we do not exercise.



## Status Quo Bias

People are highly prone to stick with whichever options are the current defaults, a phenomenon known as *status quo bias* (Samuelson & Zeckhauser, 1988). Traditional economic theory suggests that people will pick the most preferred option regardless of how options are presented. In contrast, psychologists and behavioral economists have demonstrated that people are highly prone to sticking with default options even when superior options are available and regardless of the order of options (Johnson & Goldstein, 2003; Johnson et al., 2012). Defaults can exert powerful effects even if changing the default is easy and even when there are big incentives to make correct decisions. The canonical study of health defaults demonstrated that countries that default people into being an organ donor, with the option of opting out, have far higher percentages of donors than countries that require people to opt in (Johnson & Goldstein, 2003). Similarly, when electronic medical records defaulted doctors to prescribe generic drugs, generic drug prescriptions greatly increased (Patel et al., 2016).

The current defaults in U.S. food environments clearly favor less healthy options, meaning that the easy choice is often a less healthy choice. For example, most default portion sizes are very large (Nielsen & Popkin, 2003). Although many customers are interested in smaller portions, few tend to ask for them (Schwartz, Riis, Elbel, & Ariely, 2012). There are a number of mechanisms through which defaults likely work. Sometimes they work because people simply forget about them or want to avoid transaction costs associated with switching from a default option (e.g., it is hard to cancel a subscription). Sometimes people stay with the default because it is effortful to decide what to do (Dhar, 1997). Defaults are also sometimes perceived to be a recommendation or an endorsed social norm (McKenzie, Liersch, & Finkelstein, 2006). In addition, people might fear regretting a switch away from the default (e.g., asking for salad instead of fries; Sautua, 2017), or they may simply procrastinate on changing their choice. And finally, people might stick with defaults because they do not feel they have enough information to make an active choice.

## In Sight, In Mind

Consumers' decisions are significantly influenced by what is in front of them. This is the reason why food companies spend large sums of money to have their products prominently displayed on aisle end caps and at eye level on supermarket shelves. Current food environments bombard people with cues for tempting options. Even a seemingly benign trip to an office supply or home goods store in the United States will end with a candy-filled checkout aisle. Because people are influenced by what is visible and easily accessible, it is difficult to resist the abundance of unhealthy options constantly in sight. Re-

search, for example, has demonstrated that people are less likely to eat unhealthy foods when it requires more effort to obtain them (Engell, Kramer, Malafi, Salomon, & Leshner, 1996; Meiselman, Hedderley, Staddon, Pierson, & Symonds, 1994), and participants are more likely to choose healthy options when they are easy to access. In one study, participants were more likely to take water when it was on a table in front of them versus 20 or 40 ft. away (Engell et al., 1996; Meiselman et al., 1994). A study in a hospital cafeteria also found that combining traffic-light food labels with a choice architecture intervention that made bottled water visible and accessible significantly increased bottled water sales (Thorndike, Riis, Sonnenberg, & Levy, 2014).

## Policy Implications

Taken together, these psychological insights suggest that large-scale institutional and government policies are needed to change current food environments to promote sustained, healthy eating habits. In the section below, this article identifies promising policies that follow from the insights described above with discussion of how psychology can further inform the optimal design of these policies.

## Restrict Food Marketing

Policies that try to minimize the association between unhealthy products and positive cues may be one important way to reduce the undue influence of System 1 on food choices. A law in Chile, for example, prevents food companies from displaying cartoon characters like Frosted Flakes' Tony the Tiger on sugary cereals (Jacobs, 2018). Policies are also needed to reduce the extent to which marketing for unhealthy foods places these products in sight and mind. The United Kingdom and Australia do not allow child-targeted advertising for unhealthy foods to occur during children's TV programming (Obesity Policy Coalition, 2018; World Health Organization, Regional Office for Europe, 2018). Adolescents in particular are experiencing unprecedented levels of targeted, interactive food and beverage marketing through social media, requiring updated regulations for online settings to minimize their exposure (Montgomery & Chester, 2009). More studies are needed to understand the unique influence that online food advertisements delivered through social media have on people and adolescents in particular. Further, a U.S. study documented that retailers in New York State engage in more sugary-drink marketing at the beginning of the month (a time when Supplemental Nutrition Assistance Program [SNAP] benefits are distributed), and this is more likely to happen in lower income neighborhoods (Moran et al., 2018). Policies that place restrictions on the types of in-store marketing that SNAP retailers can engage in or that require SNAP retailers to promote healthy foods in specific ways may help level

the playing field to support healthy choices, particularly for lower income individuals (Thorndike & Sunstein, 2017). Policies can also be implemented that regulate where unhealthy products like sugary drinks or candy are displayed in stores, so that they must be placed at the back of the store as opposed to highly visible locations like aisle end caps (Pomeranz, 2012). Similar policies have been implemented with tobacco products, requiring them to be sold behind sales counters or preventing them from being sold in vending machines or pharmacies (Pomeranz, 2012). There have also been voluntary initiatives to remove candy and other unhealthy snacks from store check-out aisles to minimize temptation (Rankin, 2014). These efforts may reduce impulse purchases of these snacks, but studies are needed to determine whether such policies accomplish their goals or whether people continue to buy these products as often.

### **Require Front-of-Package Nutrition Labeling on Foods and Beverages**

Having visible and easy-to-understand food labeling on the front of food and beverage packaging is a way to convey simple information to consumers at a key decision-making point. There are, however, limited data on the degree to which well-designed, uniform food labeling systems influence consumer choice. One study of traffic-light food labels in a cafeteria setting found the proportion of red items sold decreased by 4 percentage points, whereas the proportion of green items sold increased by 5 percentage points over 2 years following label implementation (Thorndike et al., 2014). But many more field studies using objective sales data and control sites, particularly in supermarket settings, are needed.

Food labels are also important public health tools because they can motivate large-scale changes in the food industry by prompting the removal or reduction of unhealthy nutrients. In the United States, for example, the requirement to label trans fat on the nutrition facts label is credited with the large-scale removal of unhealthy trans fats from the food supply (Otite, Jacobson, Dahmubed, & Mozaffarian, 2013). In Denmark, this removal of trans fat has been associated with reductions in cardiovascular disease (Restrepo & Rieger, 2016). Having a required, uniform food labeling system such as traffic-light labels can also serve to undergird major government initiatives. Being able to categorize foods as more or less healthy creates opportunities to implement clear-cut government and institutional procurement standards for food items that can be purchased and distributed. It would also make it easier to implement programs such as incentivizing “healthy” purchases in the SNAP program, because once a labeling system that categorizes foods is in place, the hard work of determining which foods qualify as “healthy” is complete.

There might also be a role for warning labels on foods and beverages, which can infuse more emotion into public health messaging. Chile, for example, has labeled their food supply with stop-sign warning labels indicating high levels of sodium, sugars, saturated fat, and calories in products (Subsecretaría de Salud Pública, 2016), but there are currently limited data on the policy’s impact. Several bills have been introduced in the United States (but none have passed) to require sugary drinks to display text-based warning labels that include language such as “Warning: Sugary drinks contribute to obesity, diabetes, and tooth decay.” Two studies of hypothetical choices suggest that these labels are likely to be more impactful than providing consumers with calorie information (Roberto, Wong, Musicus, & Hammond, 2016; VanEpps & Roberto, 2016). For example, in one of these randomized-controlled online studies, 2,381 parents of a 6- to 11-year-old child were asked to imagine they were out shopping with their child and stopped to get a drink at a vending machine. In the control group without any labels, 60% of parents chose a sugary drink for their child compared with 53% exposed to calorie labels and 40% exposed to one of four text-based warning labels. A randomized controlled experiment in a laboratory store found that sugary-drink warning labels led participants to purchase 33 fewer calories from these drinks compared with a control group (Grummon et al., 2019). Other research suggests, however, that graphic labels on sugary drinks (similar to the ones on tobacco in some countries) are more likely to reduce sugary-drink purchases than text-based warning labels, which might have limited effects (Donnelly, Zatz, Svirsky, & John, 2018). Understanding the optimal design of these labels and the degree to which they influence consumer and industry behavior as well as social norms is a critical area for future study.

### **Implement Policies That Change Unhealthy Food Defaults to Healthy Ones**

The profound effects of defaults on one-time decisions like organ donation suggest that changing unhealthy food defaults to healthy ones is a promising strategy, but it is not yet clear whether such policies can shape long-term eating behavior, which requires repeatedly making healthy choices. New York City’s proposal to limit the portion size of sugary drinks to 16 ounces permitted customers to still buy two drinks if they wanted a larger size, but the theory was that most people would probably stick with the default. Although there is considerable research showing that people eat more when served larger portions (Ledikwe, Ello-Martin, & Rolls, 2005; Rolls, Roe, & Meengs, 2007), we have little understanding of how people will respond to portion restriction policies, which is a key area for future research. One study, for example, found that a sugary-drink-portion-limit policy could lead customers to drink *more*

ounces of sugary drinks if restaurants simply offer free refills (John, Donnelly, & Roberto, 2017). This highlights the need for researchers to study multiple ways that firms might respond to such policies before implementation so laws can be written to address potential design flaws. There might also be more effective compromise options when designing defaults. For example, researchers have found that customers often want to eat healthy when dining out but do not want to completely forego a more indulgent option. When presented with the option of fries or a salad, many people will pick the fries, but if an option of half-fries/half-salad is offered (referred to as a vice–virtue bundle), many people will opt for that combination (Liu, Haws, Lambertson, Campbell, & Fitzsimons, 2015). More studies are needed to determine whether these types of compromise options might yield better outcomes than pure healthy defaults.

Many U.S. cities, as well as California, have also passed “healthy-by-default” policies that require restaurants to provide water or milk as the default beverage with kids’ meals (Muth et al., 2019). Research is needed to understand whether parents simply circumvent the policy by asking to switch to soda or order a larger soda from the adult menu for their children. It is also possible that such policies create a health halo around restaurants that serve largely unhealthy fare, drawing parents to those restaurants more frequently. Research studies that investigate these types of unintended consequences are needed. There might also be opportunities to leverage defaults with online shopping. For interested customers, online grocers could prepopulate shopping carts with a few healthful choices based on past purchasing history, and customers could remove the items from their cart if they do not want them (Coffino & Hormes, 2018).

### Tax Unhealthy Foods and Beverages

Taxes are a highly promising economic policy tool to change unhealthy eating habits. Data on beverage taxes indicate that they are effective at reducing sweetened beverage purchases (Roberto et al., 2019; Silver et al., 2017), but like other policy changes, they might also influence behavior by changing social norms. Data from U.S. state-wide tobacco taxes, for example, suggests that pregnant women significantly reduce cigarette consumption following political and social debate about tobacco taxes but prior to the actual tax going into effect (Rees-Jones & Rozema, 2019).

### Do Not Assume Voluntary Nudges Will Make a Dent

The fields of psychology and behavioral economics are often associated with the idea that we can nudge people in simple, cost-effective ways to improve well-being (R. H.

Thaler & Sunstein, 2009). “Simple” and “cost-effective” have real appeal, so it is not surprising that nudge units have popped up around the globe and are doing impactful work to improve people’s lives (Halpern & Sanders, 2016; Matjasko, Cawley, Baker-Goering, & Yokum, 2016). In the case of deeply entrenched, poor eating habits, nudges undoubtedly have a role to play to encourage healthier choices, but they will need to be combined with, and integrated into, mandatory policy actions to create the substantial change that is needed. To illustrate, Cohen et al. (2015) conducted a randomized controlled trial in schools that compared a “smart cafe” that implemented a range of behavioral nudges to promote healthy food choices with simply making the food test better with expert chefs and the combination of the two. In the long term, the smart cafe approach alone did not produce sustained changes in fruit and vegetable consumption; only the intervention that made the food taste better did that. This study reminds us that nudges must be rigorously tested and may often need to be combined with other approaches to produce sustained behavior change on a large scale.

Behavioral sciences like psychology and behavioral economics can shed light on the reasons why people make the food choices they do in our current food environment, and such insights should be used to inform the types of policies and interventions pursued to create healthy food environments. They should also help convince us that real lasting change will only be produced if we change our food environments in substantial ways.

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