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**Inter-American  
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# Behavioral Economics Guidelines with Applications for Health Interventions

Jill Luoto and Katherine Grace Carman<sup>1</sup>

**Abstract** - Chronic diseases have risen in prominence in recent years and are now the major cause of morbidity and mortality globally. The rise in rates of obesity and aging populations are two primary drivers of this global trend, which is predicted to continue to rise in the absence of effective interventions. Notably, much of this disease burden is due to individual behaviors such as physical inactivity, tobacco use, poor eating habits, and lack of proper preventive care. The growing field of behavioral economics combines the fields of psychology and economics to present a potentially promising new understanding of the causes for when and why people's short term decisions often undermine their long-term interests, and people's behavior deviates from a fully rational model. This paper shows how, by incorporating these insights, behavioral economics may be used to inform the design of more effective health policies and projects.

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## 1. Introduction and Goals

Non-communicable diseases (NCDs) such as cardiovascular diseases, cancers, chronic respiratory diseases and diabetes have become the major cause of morbidity and mortality globally, including for Latin America (Glassman et al., 2010). NCDs are responsible for more than 36 million deaths each year worldwide, nearly 80 percent of which occur in low- and middle-income countries (WHO, 2013). In the Latin American and Caribbean region, cardiovascular disease alone was responsible for 35 percent of all deaths in 2004, and 68 percent of the total disease burden (WHO, 2006). Moreover, the share of the disease burden posed by NCDs is expected to increase over time (Glassman et al., 2010; WHO, 2013). Two factors leading to the predicted global rise in NCDs are aging populations and the relative decline of communicable diseases (WHO, 2013). However, the stark and simultaneous increase in rates of obesity worldwide is believed to be a central driver of this trend, as obesity is a major risk factor for NCDs (Shaw et al., 2009; WHO, 2013). Increasing globalization and urbanization often bring about new dietary habits and sedentary lifestyles. Policymakers and researchers realize that in the absence of effective interventions, rates of obesity and NCDs are likely to continue to rise, as will the projected costs—both in terms of health care and morbidity and mortality (Glassman et al., 2010). A sobering fact is that a significant share of much of this disease burden could be reduced by eliminating behavioral risk factors (e.g., tobacco use, unhealthy diets) and increasing activity levels, preventive care, and early detection (Geneau et al., 2010; WHO, 2013).

Although we know that eliminating the preventable risk factors could reduce the burden of NCDs, we do not know how to achieve these goals at a level sufficient to overturn such trends across entire populations. While some US states have experienced recent declines in obesity in very young children (CDC, 2013), thus far no specific public health measures can be credited with reversing the obesity trend at the population level (Swinburn et al., 2011). The majority of public policies designed to address NCDs utilize a rational economic model of behavior. A rational model generally assumes that people are making choices that reflect their true preferences subject to their available resources (time, information, and prices of goods as well as labor)—thus, for example, a rational model implicitly assumes that the rise in obesity rates reflects people’s true preferences regarding their body weight (Ruhm, 2012). Common policy tools informed by the rational model include taxes on “sinful” goods whose consumption we wish to limit, and informational interventions to ensure people are fully aware of the

consequences of their choices. Governments might also use “command and control” policies, such as prohibiting smoking in workplaces, to reduce externalities. The general consensus on the success of traditional efforts to encourage health promotion is that they have been at best modestly effective (WHO, 2008).

This has heightened the search for effective interventions to encourage health behavior change, as well as a search outside of traditional economics for tools to achieve such change. One field that has recently received a lot of attention for its potential to increase healthy behaviors is behavioral economics. By using insights from psychology and other social sciences, behavioral economics focuses on the decision-making process and has shown that actual behavior systematically deviates from economically rational decisions in many situations, often in a predictable way (Ariely, 2009; DellaVigna, 2009; Kahneman, 2011). The central premise of behavioral economics is that when confronted with limited resources (e.g., ability, time, information, willpower), people do not make the same decisions as if complete and certain information were available and temptation did not exist. In the real world, many decisions that people make effectively undermine their own long-term interests, such as failing to exercise, eating dessert even though they are on a diet, and smoking even when they are aware of increased risks (Khwaja et al., 2009; Khwaja, Sloan and Chung, 2007). Behavioral economists have shown that decision-making can be highly sensitive to context (Zimmerman, 2009), and subject to influence by seemingly trivial details (Kahneman, 2011). Behavioral economics focuses on how context and social and physical environments influence and constrain human behavior, often more than we realize (Marteau et al., 2011).

Yet the news that our decision-making frequently deviates from rational is not all bad. Recent developments in behavioral economics hold the possibility of innovative interventions to increase rates of preventive care and healthy lifestyle choices. The idea is that by using insights from behavioral economics, these same decision-making patterns or heuristics that often hinder health outcomes could instead be harnessed to positively change behavior. There are a variety of ways to do this. For example, small micro-incentives or lotteries might be used to change the salience of a decision. The method that has perhaps gained the most attention is to rearrange the social or physical environment in such a way as to nudge (Thaler and Sunstein, 2009) people toward healthier choices and behaviors to realize the greatest benefit.

Such approach built on nudges has been labeled as libertarian paternalistic (Thaler and

Sunstein, 2003). As with all paternalistic approaches, it designs policies that lead people to the “correct” behaviors, or those that are in their own long-term interest. The libertarian descriptor refers to the fact that individuals should be allowed to make their own choices. Thus, such an approach is meant to modify behavior in one’s own long-term interest, but without sacrificing an individual’s freedom of choice. The basic essence of this approach is that the same decision errors that often result in people inadvertently harming themselves can help them instead by rearranging the details of their decisions without formally restricting or otherwise significantly altering their choice sets.

In their original definition, Thaler and Sunstein (2003) suggest that a nudge policy should not significantly change the economic incentives surrounding a given decision; legislation and regulation are also excluded. Rather, nudges included means of altering the physical or social environment to make certain behaviors more likely. One of the most commonly cited examples of such a nudge policy is the ability to dramatically increase organ donation rates by merely changing the default practice to one in which people must opt out of organ donation rather than one where people must opt in. In either case, individuals may choose whether to donate, but changing the default significantly changes behavior. However, the precise definition of nudging, and arguably of behavioral economics more generally, remains in debate, with some concluding “there is no precise, operational definition of nudging. This may reflect a reality—namely, that nudging is at best a fuzzy set intended to draw attention to the role of social and physical environments in shaping our behavior and not to inform a scientific taxonomy of behavior change interventions” (Marteau et al., 2011, 263).

Ultimately, the line distinguishing neoclassical economics from behavioral economics is not as stark as some would make it out to be. Behavioral economists can still assume that agents are maximizing their utility, but that utility functions may take a different form. Alternatively, neoclassical models can be modified to incorporate behavioral phenomena. For example, hyperbolic discounting (a topic covered in chapter 2) introduces the possibility that agents strongly discount future events while using a model that otherwise assumes rational actors. Whether this should be classified as behavioral or neoclassical economics is not obvious; in fact, this behavioral phenomenon is now widely used by economists across the spectrum.

Regardless of this lack of precise boundaries for what constitutes behavioral economics, a number of initiatives and studies have tested different nudges as means to improve health

behaviors, and behavioral economics more generally has found its way into public policy. For example, the UK government has established a Behavioral Insights Team (informally called the nudge unit) whose goal is to apply behavioral economic insights to public policy (<https://www.gov.uk/government/organisations/behavioural-insights-team>).

However, as perhaps should be expected given the uncertainty of what defines the field, the rising prominence of behavioral economics is not without its critics. Some neoclassical economists do not believe that behavioral economics offers anything particularly insightful about human behavior that cannot be similarly (and presumably, better) captured by appropriate modifications to traditional economic models of behavior (Levine, 2009). Other critics argue that the evidence base for nudging as a policy tool to improve population health is far behind popular enthusiasm for the approach. These critics argue there is either a lack of evidence, or, in some cases, evidence of weak effects on what nudging can achieve at the population level (Marteau et al., 2011). One recent review of public health strategies to combat unhealthy diets, physical inactivity, and obesity in low- and middle-income countries argued that more traditional approaches such as informational and pricing interventions and regulation of marketing to children would be most likely to produce the largest impacts in the shortest amount of time (Cecchini et al., 2010). (Although this review did not compare such approaches to behavioral economic policies or nudges.)

This document is meant as a guideline to help clarify what behavioral economics is and what potential it can offer toward the goal of promoting healthier choices and preventive care via public policy interventions. This guideline does not mean to enter the debate about the relative usefulness of behavioral economic versus traditional economic approaches to public policy to address preventive care and is not meant to be a complete review of the history of behavioral economics or cover the entirety of its body of research. More complete syntheses of the body of research that largely comprise the field of behavioral economics can be found in popular and academic texts (such as Ariely, 2009; Kahneman, 2011; Thaler and Sunstein, 2009). Rather, this guideline is meant to offer a more focused synopsis of how behavioral economics differs from a traditional economic approach to health promotion interventions. In later chapters, it offers some practical guidance on how to identify the relevant behavioral barriers in the health sphere and design interventions informed by behavioral economic principles to address those barriers. The remaining chapters in this document will proceed as follows:



- Chapter 2. What Is “Behavioral Economics,” and How Is It Different from “Neoclassical Economics”?
- Chapter 3. Implications of Behavioral Economics for Health Interventions
- Chapter 4. A Toolkit for Identifying Relevant Behavioral Patterns and Developing Appropriate Interventions Informed by Behavioral Economics
- Chapter 5. Brainstorm Potential Interventions to Address Rising Obesity among Adolescents and Adults in Latin America, and/or Poor Medication Adherence and Preventive Care
- Chapter 6. Concluding Thoughts

## **2. What Is “Behavioral Economics,” and How Is It Different from Neoclassical Economics?**

The field of behavioral economics has gained much attention in recent years as an exciting advance in our ability to explain people’s choices in many contexts where the rational model can sometimes fail to explain observed behavior. The neoclassical rational model built upon utility maximization and expected utility theory generally assumes that people have full information and know what is best for themselves, and make decisions accordingly. In instances where people err in their decision-making, the rational model generally assumes that they will learn from their mistakes—that is, any information that was once lacking can be gained through experience. Yet the rational model cannot fully explain certain commonly observed phenomenon such as the stark rise in obesity rates worldwide, or the fact that some people continue to drink excessively or smoke even when they wish to quit. Behavioral economics uses insights from the field of psychology to explain how people actually behave in many situations instead of how they should behave if they were perfectly rational. By incorporating insights from psychology into economics, many believe that behavioral economics can offer a potentially richer set of tools with which to address certain behaviors. A wealth of interventions built upon behavioral economic principles have been developed and tested as a result, including interventions to address behaviors such as overeating, physical inactivity, and various preventive care services. A literature review of behavioral economic (and neoclassical economic) interventions in health will be covered in chapter 3.

Importantly, behavioral economics is a relatively new field within economics, and as

such it does not (and should not) fully replace traditional economics as a model of behavior; rather, it can be thought of as a complement to neoclassical economics, and on many points the two agree. For instance, behavioral economics recognizes that markets and incentives play a central role in shaping people's behavior, a key assumption underpinning traditional economics as well (Thorgeirsson and Kawachi, 2013). But the precise role of behavioral economics and how it is similar or different from traditional economics remains a topic of debate. Some critics argue that while behavioral economics has successfully pointed out certain flaws with the rational model or anomalies in behavior, it has no coherent unifying framework to explain behavior and therefore comprises a random collection of these deviations that are of uncertain value (Levine, 2009; Rice, 2013). Many behavioral economists would agree that the field has focused on a selection of anomalies without developing any unifying framework, but they believe these deviations cause economically important outcomes and by understanding these tendencies we can potentially enrich economic models of behavior. Behavioral theorists are actively working now to develop a unifying theory of the field, but this effort too has its critics. Oliver (2012) writes that such an effort is a mistake doomed to suffer as many problems as the rational model in capturing all behavior, and that behavioral economics can be thought of as offering a library of tools, each of which may be of use in particular contexts.

This chapter clarifies what is meant by behavioral economics and points out key differences with the traditional rational model, but does not advocate for one side or the other. Given this guideline document's emphasis on topics of health behaviors and prevention, we focus on differences and similarities of these two fields applied to topics of health. We first start out by briefly reviewing the traditional economic model including its approach to studying health behaviors before reviewing the behavioral economic approaches.

### ***2.1. Traditional Economic Model of Health Behaviors***

The theory underlying traditional economics (or neoclassical economics) is built upon a simple and straightforward model of human behavior: People make choices in order to maximize their happiness, or utility. The model presumes that people will use available information, process the information correctly and completely, and not allow their preferences to be affected by any concerns outside of their individual payoffs—thus, the framing of the decision will not matter, nor will the timing of the decision, nor is there a role for emotions to affect one's decision-

making (DellaVigna, 2009). Traditional economics assumes that people know what is best for themselves and that, subject to their available resources (wealth and current levels of health or human capital) and time constraints, they can achieve a constrained optimum; that is, choosing wisely among their available options to decide what is best for themselves. This model also assumes that people have innate and stable preferences that are largely predetermined, and thus they cannot be swayed over time by influential advertising or other outside forces. It is a normative theory of decision-making that describes how people should make decisions.

Despite its seeming rigidity, this model is a powerful predictor of human behavior. Where it fails, appropriate modifications or adaptations have often been found, such as allowing for a loved one's utility to enter one's own utility function (to allow for altruism) (e.g., Cochrane, 1991). Yet much observed behavior does fit the theory quite well, which largely explains why no other theory has yet replaced it, including from the field of behavioral economics.

In the context of health behaviors, the foundation for much of traditional economic study derives from Grossman's seminal model of health capital (Grossman, 1972), which is similar to other models of human capital. The Grossman model can effectively be thought of as a rational model applied to health behaviors. It assumes that each person is endowed with a certain amount of health capital that deteriorates with age, but people can make investments in the form of exercise, healthy behaviors, or health care to produce a greater stock of health, at a cost of their time and money for doing so. In Grossman's model, death results when the stock of health goes below a certain threshold, the timing of which is known in the original model because it is based on conscious decisions on health investments with known benefits. Individuals are presumed to allocate their time and money to maximize the present discounted value of lifetime utility, of which health is one input. They will make investments in health up to the point at which the marginal cost for doing so (in terms of time and money) equals the marginal benefit (in terms of additional healthy days produced and enjoyed).

Grossman's model can be used to explain unhealthy behaviors by modeling them as negative investments in health. People are predicted to partake in an unhealthy behavior up to the point at which the marginal costs of participation (in terms of prices and reduced health and longevity) equal the marginal benefits (the instantaneous pleasure derived from the unhealthy behavior).

## 2.2. What Is “Behavioral Economics”?

Behavioral economics differs from traditional economics in the decision-making model that is assumed. Although traditional economics and the rational model do remarkably well at explaining much of human behavior, there are key instances in which it cannot explain well-observed phenomena. Sometimes people’s choices do not maximize their lifetime utility. Whereas the rational model is a normative model of decision-making, behavioral economics comprises a descriptive theory of decision-making that describes how people actually make decisions versus how they should. The book *Nudge* by Thaler and Sunstein (2009) is one of the primary resources explaining what behavioral economics is and how it is different from traditional economics. In their introduction, they cite obesity, smoking, and drinking as choices people make that oftentimes are not rational in the sense of maximizing their lifetime utility, but for one reason or another people seem unable to make better choices. Thaler and Sunstein (2009) describe two types of people: Humans and Econs. Econs behave as the traditional economics model would suggest: they make rational choices at all times, have endless willpower, process all information at their disposal completely, and learn from their mistakes. Their choices always maximize their welfare and there is little room for emotion. Humans, on the other hand, are prone to make decision errors, and often, predictably so. They give into temptation, do not read the full information disclosure at the bottom of every contract they sign, feel emotions, and procrastinate.

Behavioral economists argue that we are all humans. By using insights from psychology and other social sciences, behavioral economists focus on the decision-making process itself and have begun documenting and explaining many of the deviations from a traditional rational model that we see in the real world. Traditional economic theory does not really concern itself with the decision-making process, since it assumes that people will simply match their preferences with price and quality information and choose the best option available to them (Rice, 2013). Thus, “virtually all the behavior studied by cognitive and social psychologists is either ignored or ruled out in a standard economic framework” (Mullainathan and Thaler, 2000). Yet many of these deviations in decision making and judgment have been found to be predictable, and these systematic errors or biases will recur in particular circumstances. Kahneman (2011) argues in his recent book *Thinking, Fast and Slow* that these systematic errors can be traced to patterns of cognitive biases rather than to emotion overtaking people’s thought patterns; they are not

random. The implications of these biases can have real economic importance. Recent work by behavioral economists has focused on implications of these deviations in the health sphere, a topic covered in greater detail in chapter 3 when we discuss various interventions developed to counteract or capitalize on many of these tendencies. First, we discuss the primary biases below, roughly following the outline of Mullainathan and Thaler (2000), who classify three bounds of human nature: bounded rationality, bounded willpower, and bounded selfishness. Although not meant to comprise an exhaustive list of all possible deviations from a rational model of behavior, this list should include the most well-documented or important of the deviations described by behavioral economists and psychologists in their research on decision-making. We put greater focus on those deviations with obvious implications for health behaviors and discuss these health applications in brief where appropriate.

### **2.2.1. Bounded Rationality**

Simon (1955) introduced the concept of bounded rationality by positing that people face limitations in how much information they can process and how much time they have to process it. Because humans have to make many decisions about many things, they use decision heuristics, or rules of thumb, rather than compute the utility-maximizing choice for every decision they face so as to economize on their limited cognitive abilities. This means that people often “satisfice” – choose what will suffice, versus maximize. The standard model ignores such bounds and the heuristics used. Yet a wealth of research from the decision sciences has shown that these heuristics can lead to systematic errors (Tversky and Kahneman, 1974), and these errors often have economic importance (Mullainathan and Thaler, 2000). Recent work has established that these errors can contribute to a variety of unhealthy behaviors (Thorgerirsson and Kawachi, 2013).

Departures from fully rational behavior occur either because of biases in judgments or beliefs, or the process of making a choice. Having biased judgments or beliefs about the likelihood of an event, such as optimism, is likely to affect people’s subsequent decision-making. But there can also be changes in the choice environment, for example the framing of the choice, that affect the choices people make without changing their beliefs. We next describe many of these heuristics that make people boundedly rational, focusing in particular on applications of these heuristics to health behaviors.

### *Optimism and Overconfidence*

A common mistake people make is that they are overconfident in their own ability and intuition. Most of us view ourselves and our attributes more favorably than they really are. As examples, the vast majority of drivers think they are “above average,” and nearly everyone thinks his or her personality is above average (Thaler and Sunstein, 2009). This overconfidence can explain much risk-taking behavior, including risky health behaviors. People understand the risks of heart attacks and cancer from unhealthy behaviors such as overeating and smoking, but are likely to believe that they are less likely than their peers to suffer such poor fortunes, even if they commit such behaviors (Khwaja et al., 2007, Khwaja et al., 2009).

### *Availability Heuristic, Vividness, and Limited Attention*

As stated previously, the rational model in its starkest form assumes that people make decisions based on all available information being processed. A number of studies from psychology suggest that attention is a limited resource, and when attention is limited, the salience, or vividness of a signal will determine what people’s limited cognitive capacities attend to. Closely related to this is the availability heuristic, or the tendency for people to make judgments of likelihood of an event based on the ease with which they can think of an example of that event, that is, the salience of an event. Kahneman (2011) cites as examples divorces among Hollywood couples and sex scandals among politicians. Since instances of such events easily come to mind for most of us, we are likely to overstate their frequency. As a result, vivid causes of death that easily come to mind (e.g., terrorist attacks) are often judged more likely than they truly are, while less salient causes (such as diabetes) are often judged as less likely than they truly are, which can potentially lead to poor decisions. Recent events also play a greater role in our memory. A classic manifestation of this heuristic is the pattern whereby following an airplane crash that is heavily covered by the media, demand for air travel decreases. A potential example from the health sphere could be immediately following the death of an overweight friend from a heart attack, people may be more likely to eat healthier. But over time, as the recency and vividness fades, such habits may dissipate.

### *Representativeness Heuristic*

This rule of thumb is based on the observation that many people use intuitive judgments based on rules of similarity than objective measures of likelihood. Thaler and Sunstein (2009) describe

this heuristic as people asking themselves how similar A is to their stereotype of B when asked how likely it is that A belongs to category B. They cite the example “We think a 6-foot-8-inch African-American man is more likely to be a professional basketball player than a 5-foot-6-inch Jewish guy because there are lots of tall black basketball players and not many short Jewish ones” (26). However, this heuristic can lead to systematic errors in people’s judgments. Kahneman (2011) gives the example of people hearing a description of a man as shy and withdrawn and then being more likely to guess his profession as a librarian versus a farmer, even though there are 20 male farmers for every male librarian in the US.

### *Priming, “Mere-Measurement” Effects, and the Commitment Consistency Principle*

Priming describes the powerful impact that seemingly innocuous or inconsequential details can have on people’s thoughts and sometimes even their actions. Kahneman (2011) describes the priming effect as, if you have recently heard or been exposed to the word EAT, then you are temporarily more likely to fill in the following missing letter to SO\_P as SOUP. On the other hand, if you had just heard or read the word WASH, you are more likely to fill this word in as SOAP. This is an example of the priming effect, which is related to the availability heuristic above.

This priming effect can have surprising consequences. When people are surveyed about their intentions to engage in certain behaviors, the probability that they subsequently follow through on those behaviors increases. This priming effect is also known as a mere-measurement effect, or survey effect, and has been found to apply to health behaviors, both positive and negative (Levav and Fitzsimons, 2006); people are primed to commit certain behaviors simply by being asked about them.

These findings appear related to the psychological principle of commitment consistency, which predicts that once people have stated their intentions—and, particularly, if their statements were made public (therein incorporating social pressure)—they are more likely to follow through with that behavior due to an innate desire to be consistent in their words and actions (Cialdini, 1993). Thus, if you can secure a commitment from somebody today to commit a behavior, this innate desire to be consistent can make them subsequently more likely to follow through on that behavior. Interventions informed by this principle have been designed and tested in numerous trials to positively affect multiple health behaviors such as smoking and exercise (more on this in chapter 3). A recent review found that although commitment consistency can sway people’s

intentions greatly, over time it has small to medium effects on actions (Webb and Sheeran, 2006).

### *Loss Aversion and Endowment Effect*

Loss aversion refers to the fact that people tend to dislike losses more strongly than they enjoy an equivalent gain. That is, losing something makes you more unhappy than gaining the same thing makes you happy. As a result, people are more sensitive to the prospect of a loss of something they already have, than they are a gain of something they do not have, and this concept has been documented to affect a variety of behaviors that otherwise appear irrational. For instance, a famous experiment showed that when half the class was randomly allocated coffee mugs and then all students were asked how much they were willing to pay for the mug (if they did not have one) or how much they were willing to accept for the mug (if they had one), those with mugs demanded much higher payments than the students without mugs were willing to pay (Kahneman, Knetsch and Thaler, 1990). This endowment effect, in which people tend to value items more once they have them, derives from loss aversion and does not accord with the rational model, which predicts that students will value the mugs equally on average. Loss aversion can cause people to hold onto assets longer than they otherwise should, or otherwise to avoid making changes. A real-world example of loss aversion in action is the tendency of many people to prefer lower-deductible, higher-premium insurance plans at a rate that is not predicted by risk aversion and the rational model alone: they overpay to avoid losses down the road (Rice, 2013). Loss aversion may also explain why one study found that subsidizing healthy food options was less effective in promoting healthy eating than was taxing the unhealthy food options. People viewed the discount on healthy foods as a gain, which was subsequently valued less than the loss of having to pay more for the unhealthy food (Cawley, 2011).

### *Status Quo Bias*

Inertia, for our purposes, means that people tend to stick with the status quo. Numerous experiments have shown that people have a disproportionate preference for the status quo, or default option, over having to actively change their decision or circumstances. A lack of attention is one cause of this status quo bias. For example, people forget to cancel their magazine subscriptions even when they do not read the magazines anymore, or people fail to sign up for their employer's 401(k) retirement plan despite the many potential tax benefits. Whether this



pattern truly represents people's preferences or simply their refusal to make an active decision depends on the person and the context. In any case, the status quo bias (combined with loss aversion) means that the default option in a menu of choices can have powerful consequences. As mentioned earlier, a well-known example of the power of the status quo bias is in the default options for organ donation policies which vary across countries and US states. Johnson and Goldstein (2004) show that rates of willingness to donate organs approach 100 percent in Austria but 12 percent in neighboring Germany, and 86 percent in Sweden versus just four percent in Denmark. The large differences are due primarily to what the default option is, and people failing to move away from the default; in places where the default is to presume somebody is willing to donate (an opt-out system), rates are higher. In places defined by an opt-in system, willingness rates are significantly lower. A rational model would not predict such differences.

### *Framing*

Framing refers to the fact that people's choices often depend on the way the choice is described, or framed. This concept is closely related to that of loss aversion, insofar as people's choices are often affected by whether a decision is framed in terms of the gains or losses. Kahneman (2011) cites as examples the different emotions that arise from the statement "the odds of survival after one month is 90%" versus "mortality within one month of surgery is 10%." Although these two statements provide equivalent information, one feels reassuring while the other has the opposite effect. Accordingly, a patient's choice to get the surgery is likely to depend on which way this choice was framed, yet the rational model would not predict any difference in response. Another example from Kahneman (2011) is that cold cuts described as "90% fat-free" sound a lot better than cold cuts that have "10% fat."

### *Anchoring*

Anchoring is closely related to framing. People's estimates for an unknown quantity or value are often affected by a starting value, or anchor. The anchor can be seen as an aspect of framing, by providing a reference point. The problem arises when people do not adequately adjust their estimates from this anchor, even when they are fully aware that the anchor value is meaningless. The original example of how this heuristic can affect decision-making even from meaningless anchors came from a study by Tversky and Kahneman (1974). In the study, the authors would first spin a wheel of fortune that was made to stop only at the values 10 and 65. They would then

ask their students in a classroom whether the share of African nations in the UN was bigger or smaller than the number on the wheel; next, they would ask the students for their best guess as to the correct percentage of African nations in the UN. The average estimates of those who saw 10 and 65 were 25 percent and 45 percent, respectively, clearly suggesting that even meaningless anchors matter.

This anchoring heuristic has recently been incorporated into explaining behaviors such as overeating. Brian Wansink, a professor of economics at Cornell and the author of the book *Mindless Eating*, has found that the quantity of food consumed at a meal is anchored by external cues such as the size of the dinner plate (Wansink, 2007; Wansink and Sobal, 2007). Wansink's (and others') experiments show that people will eat more when served larger portions or provided with larger plates and bowls—even nutrition experts (Wansink, 2004; Wansink and Sobal, 2007; Wansink, Painter and North, 2005). Such findings clearly point to the likely detrimental health effects of the supersizing of portions over the years.

#### *Prospect Theory and Reference Dependence*

Prospect theory, originally developed by Kahneman and Tversky (1979), is a behavioral economics' descriptive theory of decision-making under uncertainty whose key theoretical components incorporate some of the psychological features mentioned here (Mullainathan and Thaler, 2000). Prospect theory models people's preferences according to a value function that differs from a standard utility function in four key ways.. First, people have *reference-dependent* preferences, meaning they evaluate a choice not based on levels of overall happiness or wealth (as in the standard model), but in terms of changes relative to their reference point. This idea incorporates the concept of adaptation. Second, *loss aversion* shows that people are more sensitive to losses than to gains. Third, people tend to *overweight small probabilities*—and underweight large probabilities. Related to the availability heuristic, the vividness and salience of an event increases judgments of its likelihood. Fourth, because of *diminishing sensitivity*, people tend to be more sensitive to the difference between \$100 and \$200 than between \$900 and \$1000 (Kahneman and Tversky, 1979). The overweighting of small probabilities is a common phenomenon: People tend to place increased weight on low probability events with either positive (such as winning a lottery) or negative outcomes (such as developing cancer; Carman and Kooreman, forthcoming). It is also important to point out that the fourth characteristic of

prospect theory is not inconsistent with neoclassical economics, again highlighting the considerable overlap between behavioral and neoclassical economics.

Prospect theory was originally developed to explain gambling for money, but its descriptive accuracy has led to extensions in other domains including medical decision-making. A review of the evidence suggests there is mixed support for prospect theory in health applications that largely depend on the context as well as the component of prospect theory being tested (Treadwell and Lenert, 1999). One study found that pregnant women were more likely to rate avoiding anesthesia as more important than avoiding pain when asked before and after labor, but rated avoiding pain as being more important during labor (Christensen-Szalanski, 1984). The author cites this as evidence of a shift in reference points. Other health studies have shown the importance of framing effects and loss aversion in determining preferences over becoming pregnant (Pauker, Pauker and McNeil, 1981), choosing radiation over surgery for cancer patients (McNeil et al., 1982), and performing breast self-examinations (Meyerowitz and Chaiken, 1987).

Another component of prospect theory, probability weighting, leads to the commonly observed preference for lottery-like payoffs (Barberis, 2013). This has been used by behavioral economists to design effective (but short-term) interventions to improve health behaviors including weight loss (Volpp, John et al., 2008) and adherence to chronic disease medications (Volpp, Loewenstein et al., 2008). However, a recent summary article of prospect theory's applications in economics since Kahneman and Tversky's seminal publication concludes that they are still limited, and particularly in the field of health economics. However, the paper simultaneously and more optimistically concludes that more recent work in prospect theory may overcome this limitation to enable it to eventually join mainstream economics (Barberis 2013).

### *Affect Heuristic*

Emotions affect decision-making, including decision-making about preventive health behaviors. Related to the availability heuristic, the affect heuristic refers to fast and intuitive emotional reactions that guide decision-making instead of cognitive calculation of risks in situations of stress or demanding cognitive thinking (Slovic et al., 2007; Zazonc, 1980). This explains why models in catalogs are always smiling, and why there is often background music to convey emotions in movies. By altering people's mood, choices can be changed. One study found that the affect heuristic, or the immediate emotions associated with a given behavior, can predict young people's tendency to commit both positive and risky health behaviors (Benthin et al.,

1995). In particular, this study used a word-association test, asking US high school students to name the first word that came to mind regarding a given behavior in order to determine the positive or negative emotions attached to various health behaviors. The authors were subsequently able to predict students' participation in those behaviors based on their elicited emotions.

### *Regret Aversion*

A related concept to loss aversion is regret aversion, or the idea that individuals are particularly averse to situations where their own actions lead to missed opportunities for gains. The emotions of regret and disappointment can and do affect people's decision-making. Kahneman (2011, 288) poses the following example of two possible choices for gain to demonstrate this point: "Problem A: Choose between 90 percent chance to win \$1 million OR \$50 with certainty. Problem B: Choose between 90 percent chance to win \$1 million OR \$150,000 with certainty." In problem B, the anticipated disappointment from choosing to gamble for the larger prize and not winning is likely to be much higher, because there was the option to be given \$150,000 with certainty. Traditional expected utility theory and prospect theory do not capture regret aversion well; both assume that available options in a choice are evaluated in isolation. However, despite several attempts by economists, no model of decision-making adequately captures such emotional influences.

### **2.2.2. Bounded Willpower**

Bounded willpower refers to the fact that people do not always make decisions that are in their best long-term interest. This is often due to a lack of self-control. Self-control is most often problematic when decisions involve multiple time periods, so the benefits and costs of a decision are separated by time. Importantly, choices of this type make up the bulk of health behaviors, both positive and negative ones (Thorgeirsson and Kawachi, 2013). For instance, choosing to exercise incurs a cost in terms of your time now, but the benefits are delayed. Furthermore, the benefits are incremental and (for that matter) uncertain—they are not guaranteed to lengthen your lifespan, for example. Such a formula often means that people fail to exercise, or skip a checkup at the doctor, etc. On the other hand, the chocolate cake on the dessert tray at the restaurant is very salient: You can see it and smell it, while the extra pounds it can lead to are delayed, and again, are incremental. Such a formula leads many to give into temptation—enjoy

the cake now and worry about the consequences later. Smoking is another example of a temptation good, as is watching television (versus exercising).

### *Time Inconsistent Preferences, Hyperbolic Discounting, and Present Bias*

In decisions involving multiple time periods, the standard model assumes that people are time-consistent. That is, people have the same preferences regardless of the timing of the decision. The standard model assumes that in such decisions, people will exponentially discount future periods at some (constant) rate relative to the present period and maximize their utility over these multiple periods subject to this time-discounting. Thus, time-consistent behavior assumes the marginal rate of substitution for consumption between any two time periods is constant over time.

Yet there is a wealth of evidence that people's decisions are sensitive to timing, so they are time inconsistent. In particular, the near term is overweighted relative to the long term in people's decisions; this is known as hyperbolic discounting. Hyperbolic discounting leads to present bias, meaning people favor instant gratification and tend to pursue smaller immediate rewards instead of delayed but more highly valued rewards (O'Donoghue and Rabin, 1999; O'Donoghue and Rabin, 2000). That is, when evaluating outcomes in the distant future, people can be patient and plan to exercise, quit smoking, and visit the doctor. Yet when these future plans come due for action now, people watch television, smoke another cigarette, and procrastinate on attending their checkups. In the words of Thaler and Shefrin (1981) (among others), there is a divergence between people's two selves, the planner (who is time consistent and maximizes appropriately) and the doer (who gives into temptation, procrastinates, and is generally present biased). The latest research from the fields of neuroscience and neuroeconomics suggests that decisions involving immediate rewards activate different neural systems than decisions involving only future rewards (DellaVigna, 2009; McClure et al., 2004).

Present biased preferences are often operationalized using Laibson's (1997) suggestion of a quasi-hyperbolic discounting approach. In this case, lifetime utility is expressed as:

$$U_t = u(c_t) + \beta \sum_{\tau=1}^{\infty} \delta^{\tau} u(c_{t+\tau})$$

Where  $u(\cdot)$  is utility in any one period,  $c$  is a composite consumption good, and the discount factor is  $\delta \leq 1$ . The only difference with a traditional model of exponential discounting is the introduction of the  $\beta$  term, where  $\beta \leq 1$ . In cases where  $\beta = 1$ , this simplifies to the exponential

model. But in cases where  $\beta < 1$ , a person with such preferences is present biased: between this period and next period the relevant discount factor is  $\beta\delta$ , but between any future two adjacent periods the discount factor is just  $\delta$ . Thus, there is a bigger discount factor applied on choices between tomorrow relative to today compared to choices between one-year-plus-one-day from now relative to one year from now.

To fight against such temptations for immediate gratification requires self-control. Much work in behavioral economics has shown that many people elect for commitment devices today in order to constrain themselves in the future when they recognize they will face temptation to deviate from their plans. For example, people may avoid keeping ice cream in the house if they know they will be unable to resist eating too much of it when temptation strikes. However, people need to be sophisticated to recognize their own time-inconsistency in order to sign up for such commitments; those who are naïve about their time-inconsistent tendencies may be overly optimistic about their ability to constrain their future selves. Importantly, time-inconsistent preferences can affect many health behaviors, from exercising, eating healthy foods, and getting a mammogram to other preventive or protective health behaviors (defined by effort today and benefits tomorrow) such as smoking, overeating, and skipping dental appointments (behaviors characterized by benefits today, costs tomorrow). (Chapter 3 will have more on commitment devices as an intervention to overcome problems of self-control.)

### *Ego Depletion and Decision Fatigue*

Recent work by the psychologist Roy Baumeister and colleagues has shown that exercising self-control is tiring and tends to deteriorate over time in the same way that a muscle fatigues with repeated exertion. This pattern has been termed ego depletion. A well-known study demonstrating ego depletion consisted of asking one group of people to resist the urge to eat cookies and chocolate and instead consume radishes and celery, another group was allowed to indulge in the sweets and a third group did not have any food in front of them (Baumeister et al., 1998). Later on, those in the group who had to resist temptation were the first to quit at a cognitively demanding task relative to the other groups. In another experiment (Vohs and Heatherton, 2000), ego-depleted women who had been asked to control their emotions while watching a scene from the movie *Terms of Endearment* subsequently ate much more ice cream in

a taste test than did a group of women who had not been instructed to suppress their emotions while watching the film.

Recent work from psychology shows that exertion of purposeful effort of any form—emotional, cognitive, and physical—seems to draw from a common pool of mental energy, and that pool can deplete with exertion over time. Such a phenomenon does not fit well with a rational model that assumes consistency in decision-making—people should make the same decisions when faced with the same problem. Instead, people grow tired of making active decisions and begin to suffer decision fatigue, making the decision maker subject to potentially bad decisions.

This has obvious implications for people’s food choices, such as in supermarkets where consumers have to make multiple decisions and in a short amount of time. One study found that consumers spend about 12 seconds searching per brand purchased, which increases the likelihood that intuitive appeals will be processed more than complex nutritional information (Hoyer, 1984; Macdonald and Sharp, 2000). Another study found that when participants were asked to choose between cake and fruit salad, participants who had been given the challenging mental task of remembering a seven-digit number were 50 percent more likely to choose cake than were those participants given an easier mental task, remembering a two-digit number (Shiv and Fedorikhin, 1999).

### **2.2.3. Bounded Selfishness**

Another area in which the standard model does not always capture observed real-world behavior is in the area of selfishness. Although the standard model does not rule out altruism, generally speaking, the standard model assumes that people act in their own self-interest as a primary motive for their decision-making (Mullainathan and Thaler, 2000). Yet empirically we see many actions that would seem to be less than perfectly selfish—joining the army and giving to charity are two obvious examples. Both behavioral and neoclassical economics can allow for altruistic behavior, but this is most often associated with the former. Such altruism can have applications in public health that concerns itself with the behaviors of entire populations, and therefore group and peer-based interventions may particularly benefit from the insights based on behavioral economic models that incorporate altruism (Thorgerirsson and Kawachi, 2013). Another important example is participation in vaccination programs that can be due both to selfish and altruistic motives. Behavioral economics can also incorporate spiteful behavior, which is

behavior that imposes a cost on others and one's self, with no material benefit (Wilkinson, 2008). Enforcement of social norms may operate partly via such behavior, and social norms have also been leveraged in some of the most successful behavioral interventions in public health (Thorgeirsson and Kawachi, 2013). For example, they may be a central reason that tobacco control laws have been largely self-enforcing (Jacobson and Wasserman, 1999; Thorgeirsson and Kawachi, 2013).

### *Social Norms*

People's behavior is strongly influenced by social norms. Adjusting people's perceptions of social norms can be an easy way of changing behavior, including health behaviors (Zimmerman, 2009). There is a large body of literature on peer effects and risky behaviors, and more recently on the role of peer effects on obesity. Christakis and Fowler (2007) is a well-known study of over 12,000 individuals tracked over the course of more than 30 years, which finds clear evidence that the spread of obesity can come through social ties. The risk of an individual becoming obese increased by 57 percent if a friend became obese in a given timeframe. They conclude that this has implications for the sorts of interventions that may be suitable for addressing the spread of obesity. In general, this literature posits that the behavior of others may influence choices, either by changing social norms about acceptable behavior or by providing information.

## **3. Implications of Behavioral Economics for Health Interventions**

Concepts of bounded rationality, bounded willpower, and bounded selfishness can have important implications for the design of policy interventions to address health behaviors such as healthy eating, physical activity, adherence to medical recommendations, and smoking behaviors. Tools typically considered to be in the realm of neoclassical economics, such as information provision or financial incentives, can be harnessed to encourage health behaviors when there is otherwise a market failure preventing their uptake. In certain instances, such traditionally neoclassical tools can also be used to address behavioral biases. However, if these behavioral biases are ignored in the design of any policy, there can be important unintended consequences. Additionally, similar types of interventions could be viewed as neoclassical or behavioral, depending on the context. As an example, a command and control regulation could be used to tackle externalities (such as banning smoking indoors to reduce second hand smoke),



which is a neoclassical concept to correct individuals' behavior. An example of the latter could be the recent ban on Happy Meal toys in San Francisco that was designed to protect children (and parents) who place too much weight on the short-term gains of a toy and not enough weight on the long-run implications of poor dietary habits (Huffington Post, 2011). Again, the relationship between neoclassical economics and behavioral economics should be seen as a continuum and not as two completely distinct camps.

Financial incentives are of particular interest in this discussion. One could argue that financial incentives are clearly in the realm of neoclassical economics. However, incentives can also be used to address behavioral biases, either by raising the salience of a desired behavior or by addressing issues of bounded willpower. In such instances, they can be classified also as a behavioral tool. For example, micro-incentives, which arguably do not significantly alter the budget constraint, may be used to motivate behavior. In particular, by providing an immediate small reward for behaviors that generally provide health gains only in the long run, they can capitalize on present bias. Alternatively, behavioral interventions often make use of incentives based on lotteries. Consistent with prospect theory, a small probability of a large reward may be more motivating than a certain award of the same expected value. Moreover, behavioral economics takes a wider view of incentives, to include social incentives, and recent work has even directly compared the efficacy of social incentives versus financial incentives in encouraging certain behaviors. For example, Ashraf, Bandiera, and Jack (2012) find that social incentives in the form of peer recognition are more effective than financial incentives at inducing effort in a pro-social task involving the promotion and sale of female condoms in Zambia. Bandiera, Barankay, and Rasul (2010) also find evidence that social incentives can be a complement or substitute for financial incentives to induce greater effort in the workplace, and Bertrand et al. (2010) find that behavioral incentives can be as important as financial incentives in financial decision making.

In this chapter, we discuss some traditionally neoclassical interventions to address health behaviors as well as ways in which such interventions may neglect important behavioral phenomena. We then review the literature on interventions that have been developed and tested that take behavioral economic insights into account, whether intentionally or more inadvertently (they did not cite behavioral economics per se in their design). To keep tractable, we primarily focus our literature review on those interventions or tools designed to address health behaviors,

and when available, cite evidence from Latin American countries or populations. However, it is worth noting that the majority of behavioral economic research and interventions tested thus far come from US populations. Applying insights from the field of behavioral economics to problems in developing countries is a relatively recent, although fast growing, area of research.

### ***3.1. Traditional Economic Tools to Address Health Behaviors***

In our discussion in chapter 2 on traditional economic theory, we emphasized that individuals are assumed to maximize their utility subject to their constraints. In aggregate, this should result in a well-functioning market, and in such cases government involvement is assumed only to get in the way. Of course, neoclassical theory does not rule out that sometimes there exist market failures, in which case government intervention can be justified. These failures generally take the form of externalities, asymmetric information, or public goods. When people's health behaviors do not align with the optimal outcomes from the rational model due to a market failure, government policy is justifiable, and policy tools to address health behaviors generally take one of the following forms:

- a) Informational interventions: increasing the amount of information available so as to correct any asymmetric information that may explain low take-up of healthy behaviors
- b) Incentives: rewarding the intended behavior directly, such as through the use of financial incentives
- c) Taxes and subsidies: changing the relative prices in the marketplace in order to encourage the intended behavior, such as through the use of taxes or subsidies
- d) Legislation: regulating the access or legality of certain products to discourage their consumption, or expediting certain legal initiatives to encourage other behaviors

Although options b and c are closely related, as taxes and subsidies are a way of incentivizing certain choices, we distinguish between financial incentives paid directly to a consumer to increase his/her income or wealth contingent on a certain behavior being committed and taxes/subsidies to encourage or discourage the same behavior among consumers.

These tools are often based on a rational model. However, their effectiveness may be limited by behavioral phenomena, such as bounded rationality or bounded willpower, if the issues were not considered in the tools' design. Here we describe some examples of these tools

and, when appropriate, discuss limitations attributable to the behavioral phenomena summarized in chapter 2.

### **3.1.1. Informational Interventions**

One of the most stark information interventions in the health realm was the US Surgeon General's first report about smoking in 1964 (Public Health Service, 1964). While information was already available, many people were unaware of the dangers of smoking. Tobacco companies, on the other hand, were aware of these dangers. This intervention corrected an information asymmetry in the market and allowed individuals to make a fully informed decision. We classify this as a neoclassical intervention because it was not intended to address bounded rationality, bounded willpower, or bounded selfishness, but rather to fix an information asymmetry leading people to make choices that did not maximize their long-term welfare. However, the Surgeon General's report was clearly not sufficient to put an end to smoking, largely due to behavioral limitations discussed in more detail in section 3.2.6.

### **3.1.2. Incentives for Healthy Behaviors**

Financial incentives have been tested as a means to reward healthy behaviors across a variety of contexts including exercise (Charness and Gneezy, 2009; Cawley and Price, 2013), weight loss (Cawley and Price, 2013; John, Loewenstein and Volpp, 2012; Volpp, John, et al. 2008), smoking cessation (Volpp et al., 2006), and immunizations (Banerjee et al., 2010; Moran, et al., 1996). The use of incentives in directly rewarding healthy eating behaviors is more recent, and, accordingly, the evidence on their effectiveness is less well-established. One recent study focused on US school children and found that incentives can increase rates of fruit and vegetable consumption, particularly among lower-income children, who are most likely to benefit (Just and Price, 2011).

A recent review by Gneezy, Meier, and Rey-Biel (2011) suggests that incentives for such healthy lifestyle changes can work in the short- and medium-term, but in the long-term bad habits can again reappear. Marteau et al. (2009) draw a similar conclusion in their review of financial incentives to achieve health behaviors. Kane et al. (2004) have somewhat more promising findings on the efficacy of economic incentives on preventive health behaviors in their review, but continue to agree that they are most likely to succeed in the short-term and for simple preventive care. In sum, the evidence seems to suggest a difference between the likely long-term

success of incentives meant to improve one-time or infrequent behaviors, such as immunizations and checkups, and that of repeated and frequent behaviors such as healthy eating and exercise. Indeed, following the two randomized controlled trials (RCTs) that found positive effects from financial incentives as a way to encourage weight loss, the participants regained the weight upon withdrawal of the incentives (John et al., 2012). Once the incentives are taken away, individuals are likely to return to their normal behavior, exhibiting bounded willpower and ignoring the future benefits of healthy behaviors.

Perhaps the best known real-world examples of the use of financial incentives to reward healthy behavior come from conditional cash transfer (CCT) programs, which pay people (usually the poor) upon completion of a stated goal or behavior. Most often, the conditions for such transfers surround school attendance or uptake of preventive health services such as health checkups or child health immunizations. Thus, often the rewarded behaviors are those which parents would prefer to commit in the first place, but circumstances of poverty may prevent them from doing so. The design of CCTs is meant to relax such financial constraints.

CCTs programs have grown tremendously throughout many developing countries, including several in Latin America, and even some developed countries. Overall, the evidence suggests that such programs can be effective in increasing uptake of health services, though the evidence is mixed on its impacts on health status. A 2007 systematic review of 10 published reports concluded such programs have marginal impacts on health status (Lagarde, Haines, and Palmer, 2007), while a more recent study from Brazil found more significant effects (Rasella et al., 2013).

However, one recent study from Colombia found that an existing CCT program that rewards low income families with young children who maintain regular health checkups and immunizations as well as school attendance had the unintended effect of worsening rates of obesity among poor women (Forde et al., 2012). A similar unintended negative effect on rates of adult obesity from cash transfer programs that reward behaviors surrounding children's health was found in Mexico's large-scale *Oportunidades* program (Fernald, Gertler and Hou, 2008). These results are from CCT programs focused on rewarding children's health and schooling investments and are not focused on adult's own health and eating behaviors. We abstract from the question whether such unintended consequences are worth it if the trade-off is children

attending school. We simply highlight the possibility for unintended effects from the use of financial incentives that have been found by some researchers.

Other potentially unintended effects of financial incentives to reward healthy behavior have been posited, such as whether they will replace intrinsic motivation. The tradeoff between intrinsic and extrinsic motivation has been debated extensively in the behavioral and psychological literature. Benabou and Tirole (2003) and Ryan and Deci (2000) are among the most widely cited papers in this debate. Whether extrinsic motivation, in the form of financial incentives, crowds out intrinsic motivation is unsettled. Another issue surrounding the use of financial incentives is that rewarding people for behaviors they should be undertaking anyway has its share of critics who argue that the practice is a form of bribery and is unfair. That is, paying people to quit smoking and lose weight is unfair to those who do not smoke or do not need to lose weight.

### **3.1.3. Taxes and Subsidies**

A recent real-world example of a price manipulation meant to encourage healthier habits to combat obesity is the proposed tax on sugar-sweetened beverages that has been or is being considered by many governments, local and national, around the world. For instance, Mexico's Minister of Health was considering such a tax in light of findings on the steep rise in consumption of such beverages in recent years and that nearly a quarter of adults' daily calories derive from high-calorie beverages (Barquera et al., 2008). There is a clear public health and economic rationale for such measures, as well as a compelling scientific basis linking the consumption of such beverages to the risk for chronic diseases (Brownell et al., 2009). The central argument behind such a tax is that obese individuals have more expensive health care costs that they do not fully pay for, but rather are shared among all of those in a common insurance market. A tax would force obese individuals to bear the full cost of their unhealthy habits to correct this externality they currently impose on others. However, introducing new taxes of any form is often politically unpalatable, and opponents argue that a tax on sugary drinks unfairly distorts the market as this is just one of many contributors to the obesity epidemic (Barry, Niederdeppe and Gollust, 2013).

In a related effort, the Danish government recently instituted a "fat tax" on foods high in saturated fats. However, the tax did not have the intended effects. Many Danish families responded by crossing the border into Germany to purchase cheaper fatty foods. Furthermore,

the tax applied not only to potato chips and French fries, but also to artisanal cheeses and other fares not necessarily targeted for reduction. Many local vendors lost revenue as a result, and the law was widely unpopular; it was rescinded after a year (“A fat chance,” 2012). As with taxes on cigarettes and alcohol, when nearby countries or states have lower prices, cross-border shopping is likely.

Additional studies have found that price manipulations can have unintended effects on food purchasing behaviors. Waterlander et al. (2012a) found that although offering subsidies on healthy foods increases the amounts purchased, the proportion of healthy foods to total purchases remained unchanged, as people used those savings to purchase more calories overall. The same study found that taxes on unhealthy foods had no effect on purchases. However, the same authors found in other studies that price discounts on fruits and vegetables can encourage their purchase, with no clear offsetting behaviors (Waterlander et al., 2012b), and such impacts may be complementary to nutrition education (Waterlander, de Boer, et al, 2013). The overall evidence on the impact of price manipulations to encourage healthier eating is unclear, but there is a clear rationale to consider options other than taxes for practical political purposes: Many people oppose taxes on ideological grounds, and those for whom unhealthy habits are most ingrained are likely to be relatively more price inelastic anyway.

#### **3.1.4. Legislative Bans or Policies**

Well-known examples of proposed or actual legislative bans to discourage unhealthy behaviors or encourage healthy behaviors from various places include policies that raise the minimum age to purchase alcohol or tobacco products, policies that ban smoking in public places, and the restriction on the media against advertising food to children. As discussed earlier, such policies may be viewed as neoclassical or as behavioral. For example, bans on smoking in restaurants were initially passed as labor protection laws designed to protect workers from the externalities of secondhand smoke. The minimum-age policies for purchasing alcohol or tobacco and policies restricting media advertising to children are more paternalistic by nature. Assuming such bans are implemented and enforced, they are generally effective by construction, and thus evidence of their effectiveness is inherent in their enforcement.

### ***3.2. Behavioral Economic Interventions to Address Health Behaviors***

In light of the findings that people regularly and systematically deviate from a rational model of behavior, and that such deviations can hurt their own long-term interests, much of the recent work in behavioral economics has focused on developing interventions that expressly take such decision-making tendencies into account. The idea is that by knowing these decision-making heuristics and errors and rearranging the context of the problem with such patterns in mind, these same errors that usually hurt people can potentially be harnessed to help them instead. That is, behavioral economists have developed a variety of “nudges” to encourage individuals to make better choices that are informed by behavioral economic insights into how people actually make decisions. Thaler and Sunstein (2009, 3) argue that no matter the decision, there is always a default option, there is no such thing as a neutral design, and “small and apparently insignificant details can have major impacts on people’s behavior.” A problem always has a choice architecture, which is the way to organize the context of even micro-decisions so that people are nudged in a certain direction. Examples of choice architects include doctors who describe treatment options to patients or those who create the restaurant menus, choosing details like the sequence of ingredients and of meal choices and which meals will be shown in photographs.

In this section, we present some of the evidence on the most common and successful behavioral economic interventions, many based on nudges, to address various health behaviors. Rather than organize this section around behavioral economic phenomena or heuristics as was done in chapter 2, we organize around different health behaviors or topics. Some of these topics are process-oriented behaviors such as healthy eating, and others are health outcomes such as weight loss (whether achieved via healthy eating or exercise or some combination thereof).

#### **3.2.1. Healthy Eating**

One area that has garnered much attention in the behavioral economics literature is eating. Because eating is a fundamental part of our lives, we tend to make choices based on habit and without much thought. Thus we are susceptible to many biases including affect heuristics, framing, anchoring, and status quo bias.

### *Salience and Framing Effects with Calorie Information*

A prominent example of an intervention that changed the framing or salience of a choice was the mandating of calorie content labels on the menus at chain restaurants in New York city and other locations. Such interventions were designed to make calorie information and the overall healthfulness of options more salient. Rather than hiding information on a small pamphlet, content was displayed on the menu immediately next to the items themselves. This intervention could also be classified as a neoclassical intervention to provide missing information. That is, it could be argued that this inherently assumes that people do not have full information about how energy-dense certain menu items are, and by providing such information, people can make more informed (and presumably healthier) choices. However, most research suggests that information interventions alone do little to improve diet (Downs, Loewenstein and Wisdom, 2009; Finkelstein et al., 2011; Variyam and Cawley, 2006; Waterlander, de Boer, et al., 2013). One reason is likely to be that overeating often stems from problems of self-control that occur even when people have full knowledge of their consequences (O'Donoghue and Rabin, 2000). As Ruhm (2012) points out, all adults are experienced consumers when it comes to food choices, so there should be little uncertainty about the consequences of eating on body weight.

### *Portion Control*

Another important example of the study of behavioral economics on eating behaviors is that of “Mindless Eating” (<http://www.mindlesseating.org/>). Mindless Eating is a concept, book, and website founded by Brian Wansink, a professor of economics at Cornell who is an expert on eating behavior. The name refers to the ways in which people eat more than they realize, and argues that the environment—the way food is made available and the subtle cues encouraging consumption—is a key driver of people’s behavior and the obesity epidemic. Many of the ideas from Mindless Eating incorporate behavioral economic principles, such as the anchoring bias, and the way emotions affect people’s food choices.

The concept of portion control also plays on the anchoring bias. One study that was not conducted by behavioral economists that did not cite such biases by name, looked at the use of portion control plates for dispensing meals to obese patients in Canada. The use of the plates resulted in a significantly greater weight loss and less need for diabetes medications after six months among those assigned to the intervention group versus a control group that was given the



usual care, or dietary teaching (Pederson, Kang and Kline, 2007). Portion control plates suggest a default serving size and can create a more appropriate anchor for how much to eat: 17 percent of the intervention group achieved five percent weight loss and 26 percent required a decrease in diabetes medications, compared to five percent and 11 percent among the control group, respectively.

#### *Restaurant-Menu Design Interventions*

Another study harnessed the status quo bias along with the common tendency for present biased preferences; it included the design of a menu featuring healthful options on the front page and unhealthy options at the back of the menu (Downs et al., 2009). Present-biased people tend to choose unhealthy options because the immediate gratification of a meal outweighs the weight gain that is delayed. This convenience manipulation played on such present biased preferences by adding a small and immediate additional cost to finding the unhealthy options (having to open the menu to the back), which in theory should make the relative costs and benefits of the healthy and unhealthy options more equal. This treatment harnessed the status quo bias by making the healthy options the implicit default, given that one had to look in the back of the menu to find the unhealthy fare. The results suggested that highlighting the healthy options can improve people's choices to select more healthful fare. Those who received the menu highlighting healthy fare were 48 percent more likely to purchase a low-calorie sandwich relative to the standard menu that had a mix of healthy and unhealthy options. A third group was given a menu that highlighted unhealthy fare, and as a result they were 47 percent less likely to purchase a low-calorie sandwich. This study further tested the ability of calorie information to affect orders and found no effect (a more neoclassical approach).

#### *Grocery Store and Cafeteria Interventions*

Another study used the anchoring bias to encourage healthier shopping at grocery stores. A yellow line was placed across the width of shopping carts, which had one side labeled as being for fruits and vegetables and the other side reserved for everything else. Shoppers ended up purchasing 102 percent more fruits and vegetables, with no changes in the supermarket's overall profits (Bannister, 2010).

Another study used the status quo bias and salience to encourage healthier food choices among schoolchildren (Just and Wansink, 2009). Interventions included putting fruit in front of

the cash register instead of candy (to add salience and the status quo bias to fruit), closing the lid on the ice cream freezer (to increase the costs of choosing ice cream), and putting salad bars in the middle of the cafeteria versus against one wall (salience effect plus status quo bias). They also required that soft drinks and other sweets be purchased with cash rather than lunch cards (to increase the costs of soft drinks). These various interventions improved the healthiness of children's meal selection. However, changing the default option for "apple fries" in place of French fries did not override children's strong prior preferences for the latter.

### *Commitment Contracts*

Finally, perhaps the best known example of the power of the status quo bias comes from outside the health sphere and can be exemplified by the real-world intervention known as Save More Tomorrow<sup>™</sup> (SMarT), developed by behavioral economists Thaler and Benartzi (2004) and now used by many Fortune 500 companies. This employee retirement savings program switched the default from an opt-in system to one in which new employees had to opt out of the savings program. It further included a commitment device by allowing employees to commit today to designate a portion of any future pay raises to their retirement accounts. This commitment device was designed to be effective among those who are loss averse and exhibit present bias; current paychecks are not decreased, and the commitment is only regarding future pay raises. Among participants, savings rates have reportedly quadrupled (Rice, 2013). A similar intervention to overcome present bias with regard to healthy eating found that students made more healthful school lunch choices when they precommitted to a main course rather than selecting it while in line at the cafeteria (Hanks, Just and Wansink, 2013).

### **3.2.2. Weight Loss**

There has been some work by behavioral economists in designing interventions to address weight loss goals. These interventions are closely related to those that have as goals healthy eating and exercise, as weight loss is an outcome from such intermediate behaviors. The interventions discussed below specify the end goal of weight loss, but not the behavioral means for achieving this goal (whether achieved through increased exercise or improved diet, or some combination therein).

## *Incentives*

In a well-known study that tested the role of financial incentives to encourage weight loss, the design of the incentives incorporated many insights from behavioral economics (Volpp, John et al., 2008). Obese participants from the US were randomly assigned to one of three treatments: monthly weigh-ins, a lottery, or a “deposit contract incentive system.” In the “deposit contract incentive system,” participants committed between \$0 and \$252 per month of their own money towards the goal of losing weight. The money would be returned to them with a 1:1 incentive match upon meeting their goal (losing 16 pounds in 16 weeks), but they would forfeit the money if they failed to meet their weight loss goal. Such a contract incorporates the behavioral economic findings of overconfidence and optimism bias, as people are ex-ante overly optimistic about achieving their weight loss goals and therefore more likely to enter the contract than they otherwise might be. This incentive design also takes advantage of loss aversion because once the money is committed, the motivation to lose weight is heightened by the motivation to avoid the loss of the funds. Finally, the contract can potentially appeal to those who are sophisticated about their present-biased preferences: their “planner” selves today will sign up their future “doer” selves for the hard work of following through on the binding commitment.

In the lottery-based incentive system, participants were entered into a lottery and received any winnings conditional on their having met a prespecified weight loss goal (16 pounds in 16 weeks). This incentive design incorporates the behavioral economic finding that people tend to overweight small probabilities and therefore overestimate their own likelihood of winning. It also plays on the finding of regret aversion, as participants could only collect lottery winnings if they met their weight loss goal.

Although the study was based on very small sample sizes, it revealed that both incentive systems worked: Average weight loss was 13–14 pounds across both types of incentive programs, compared with just four pounds in the control group that underwent monthly weigh-ins. Furthermore, nearly 90 percent of participants chose to participate in the deposit contract. However, in both treatments, participants were found to regain the weight upon withdrawal of the incentives (John et al., 2012).

Other studies on the use of financial incentives to reward weight loss also offer more temperate results. Cawley and Price (2013), Finkelstein et al. (2007), and Butsch et al. (2007) find disappointing results for financial incentives to encourage weight loss.

### *Self-Monitoring and Feedback*

Feedback on one's progress toward achieving a goal is another tool suggested by behavioral economics for its motivational purposes to counteract bounded willpower. Feedback can increase awareness of one's health behaviors, as well as add salience (to counteract limited attention) to one's goals for improving those behaviors. Finally, feedback potentially can also take advantage of framing effects by emphasizing the gains or losses as appropriate. Self-monitoring is another form of feedback and one commonly used in weight loss interventions given its focus on behavioral self-regulation.

A recent randomized trial was conducted to test the role of feedback in the form of mHealth SMS messages to encourage greater adherence to self-monitoring in a weight loss regimen. The two-year study found that daily feedback SMS messages enhanced greater adherence to self-monitoring and increased weight loss (Burke et al., 2012). However, the overall effects on weight loss were small, around two percent of bodyweight on average.

Another recent study that was outside the health sphere demonstrated the power of feedback in achieving one's goals to overcome problems of bounded willpower and lack of self-control in building savings (Kast, Meier and Pomeranz, 2012). This Chilean study found that savers who received an SMS message providing feedback on their savings goals that was benchmarked to that of their peers performed almost as well as an intervention that included in-person meetings among members of a self-help savings group. The authors interpret this evidence as suggesting that the role provided by regular feedback is central to the maintenance of self-control, and the roles played by other factors inherent in a self-help peer group (such as peer pressure, having one's behavior observed, etc.) may be less important.

### *Commitment Contracts*

Commitment contracts have increasingly been used to encourage a variety of forward-looking behaviors including savings (Ashraf, Karlan and Yin, 2006), smoking cessation (Gine, Karlan and Zinman, 2008), and weight loss (as part of the incentive program described above, in Volpp, John, et al., 2008). The basic tenet of why commitment contracts are hypothesized to work is that committing oneself today to a behavior tomorrow can overcome hyperbolic discounting and present bias. That is, it is easy to plan to start saving, or dieting, or exercising tomorrow. If your present self can precommit your future self to follow through on such behaviors, intentions and

actions can align where they otherwise might deviate. Such commitment contracts have obvious appeal for healthy behaviors that are almost always characterized by costs (e.g., effort) today and benefits tomorrow. The financial incentive deposit contract system, discussed above, to encourage weight loss incorporated this commitment element. Success is predicted by the fact that such contracts take into account present bias, as the tendency to underweight tomorrow can mean that more people will enter such contracts today; the systems also capitalize on overconfidence and optimism bias, because people are likely to overpredict their success in meeting their goals. Finally, the systems can incorporate loss aversion if the commitment contract demands an investment of one's own money.

The website stickK.com has grown in popularity in recent years as a place where people can form their own commitment contracts to follow through on their goals and commit their own money as a way to ensure they meet those goals (or risk losing the funds). Christmas clubs, retirement accounts, and prepaid exercise classes are other real-world examples of commitment contracts in which people willingly restrict access to their own savings or willingly deposit money now to sign themselves up for future exercise in order to avoid temptation later.

### **3.2.3. Physical Inactivity**

Another health behavior for which behavioral economics is believed to have many potential insights is physical inactivity, although this specific application is somewhat underdeveloped compared to the outcome of weight loss. Over the years, a wealth of interventions has been developed and tested to improve rates of physical activity among different populations, but few expressly take behavioral economic insights into account (although may do so inadvertently). These include informational interventions such as community-wide or mass media campaigns, small nudges such as point-of-decision prompts to encourage taking the stairs, behavioral and social interventions such as school-based physical education and exercise peer groups, and environmental interventions such as enhanced access to places for physical activity. A systematic review of these different types of interventions generally concludes there is mixed evidence on their effectiveness (Kahn et al., 2002). Some argue that physical activity would increase if it became the default option in a given environment, such as new building designs that make stairs comparatively easier to access than elevators (Bleich and Sturm, 2009). Zimmerman (2009) offers a review of the potential for interventions specifically informed by behavioral economic

principles to increase physical activity. Although not all of his recommendations have been formally tested, we summarize them here.

### *Framing*

Zimmerman (2009) hypothesizes that the power of framing could work to encourage greater physical activity. Specifically, he suggests framing physical activity as something fun to do instead of an obligation, as is current practice among doctors and policy setting bodies (e.g., “30 minutes a day 5 times a week...”).

### *Social Norms*

Zimmerman (2009) also argues that changing people’s perceptions about the social norms surrounding an active lifestyle, such as by communicating the average exercise habits of others, could help encourage more people to adopt such active lifestyles. The increasing recognition among researchers about the role of one’s peers in influencing the likelihood of becoming obese has meant that there are increasing numbers of interventions designed around the role of social norms to encourage healthy behaviors more generally. Many of these include interventions designed for schools or the workplace, where groups of people naturally congregate. An example comes from Arkansas, US, where in 2006 children’s school reports were supplemented with an “obesity report” indicating, by percentile, the child’s position in the weight distribution of same-age children in school. For example, the report mentioned that the child’s BMI was in the 80<sup>th</sup> percentile. Similar initiatives have been developed in Delaware, South Carolina, Tennessee, Pennsylvania, and New York. To the best of our knowledge, none has been subject to a rigorous evaluation of its impacts, and the programs have been criticized for having a negative effect on students’ self-esteem as well as contradicting the school’s own environment, such as the offering of unhealthy fare (Carman and Kooreman, 2011).

### **3.2.4. Attendance at Medical Checkups**

Another area of needed improvement for many populations is attendance at preventive care appointments such as physicals, dentist checkups, routine screenings (e.g., mammograms and colonoscopies), and immunizations (e.g., flu shots and child vaccinations). Many people fail to schedule such routine preventive care on time if at all, and uptake is lower than what the rational model would predict if everyone were optimally discounting the future benefits of preventive

care against today's costs of attendance. We group together these different types of attendance at preventive care due to their similar nature in terms of frequency, given that they are all characterized by a one-time or infrequent behavior (versus a daily repeated behavior such as healthy eating).

### *Channel Factors*

Channel factors refer to small details that can help facilitate (or inhibit) means to achieve a desired goal. Seemingly small details can stand in the way of people committing behaviors they wish to commit, leading to problems of bounded willpower. However, a similar phenomenon can be harnessed to help people follow through on their behaviors. The most well-known study demonstrating the power of channel factors consisted of seniors at Yale University (in the US) receiving persuasive messages about the benefits of getting a tetanus vaccination (Leventhal, Singer and Jones, 1965). These messages succeeded in changing students' perceptions about tetanus vaccinations and intentions to get one. However, just three percent followed through on such plans when they received the messages alone. Another group of students received a campus map with the student health center circled, and a request to look at the map to select the route they would take to the health center, as well as to look their week's schedules and select a particular time to receive a vaccination (although they did not have to schedule any formal appointment with the clinic). Of this group, 28 percent were vaccinated—nine times as many as in the first group. This study demonstrated the power of channel factors; asking people to think about how they will achieve their goals, not just asking them to state their goals, can lead to higher rates of success.

### **3.2.5. Adherence to Medication Regimens**

Daily adherence to medication regimes is a challenge for many people with chronic disease and is another area in which behavioral economics may offer some insights. Some interventions developed to address this broad area of preventive care follow.

### *Incentives with Lottery Payouts*

Volpp and Loewenstein and colleagues conducted a randomized trial of the use of financial incentives to encourage greater adherence to warfarin, a blood thinning medication taken by millions of patients worldwide (Volpp, Loewenstein, et al., 2008). Again based on a very small

sample, this study found that a variable rewards mechanism—incentivizing people with a daily lottery that offered a small chance of a large payout—resulted in a significant reduction in the fraction of missed doses. However, just as in the trials of weight loss incentives, after the variable rewards were removed, adherence returned to baseline levels. The intervention’s design included many insights from behavioral economics, including the tendency of people to overweight small probabilities and be particularly emotionally attracted to small probabilities of large rewards, therefore often preferring a lottery-based incentive instead of a known consistent incentive amount. Also, the daily lottery incentive provided daily feedback, which addressed present bias, as even small rewards and punishments can have large effects on behavior when they occur immediately. This feedback also addressed people’s tendency to wish to avoid regret, because people found out each day if they would have won had they been compliant.

#### *SMS Reminders*

Another increasingly common intervention informed by behavioral economics to address poor medication adherence is to send SMS messages via mobile phones to patients to remind them to take their medicine. Two randomized trials of SMS messages sent to HIV-positive patients in African settings found such messages can help increase adherence to ARV medication (Lester et al., 2010; Pop-Eleches et al., 2011). The precise mechanisms through which these SMS messages affect behavior remains unclear; they may address limited attention by adding salience as a basic reminder or increase feelings of engagement with the health provider and increase motivation or remind people of the future benefits of adherence.

#### **3.2.6. Alcohol, Drugs, and Smoking Behaviors**

A commonly used model from traditional economics to explain addictive smoking and alcohol behaviors is Becker and Murphy’s (1988) theory of rational addiction (TORA). The TORA model assumes that utility is derived from current consumption of the addictive good, as well as past consumption of the addictive good, plus consumption of all other goods, with consumers taking into account the future consequences of their decisions this period (i.e., future addiction). The model posits that a consumer may knowingly choose to consume addictive substances such as alcohol or tobacco up to the point at which they become addicted if doing so maximizes their present discounted value of utility. The TORA assumes addictive behaviors are rational and therefore responsive to price incentives, whereas other models of addiction have assumed that



addicts were irrational and therefore unresponsive to such traditional tools. Recent work in behavioral economics has abstracted away from this question of the rationality or irrationality of addiction to design various interventions to try to improve behaviors with regard to addictive substances that takes decision-making heuristics into account.

### *Incentives*

Contingency management offers are incentives offered to addicts to abstain from consuming the addictive good. The addict receives a voucher for market goods that can be redeemed after the person tests negative for drugs. These incentives may be based on small amounts of money, only a few dollars per week (in the US), or be based on a lottery design. Such programs have been applied to a variety of drugs including cocaine, alcohol, marijuana, nicotine, and opiates (Cawley and Ruhm, 2012). Although such incentives fit in well with a rational model, their design takes some behavioral economic insights into account. A meta-analysis of the effectiveness of such incentives found strong evidence that they can help encourage compliance, with greater effects for rewards that came immediately (to overcome present bias and time-inconsistent behaviors) and were larger (Lussier et al., 2006). However, even incentives of relatively small value have been found to be effective in this arena, possibly suggesting the immediacy of the reward is enough to overcome the urge to use.

### *Peer Effects*

The influence of peers on a person's behavior is a much-studied subject in the social sciences. Kremer and Levy (2008) find that peers influence college students' preferences regarding alcohol use rather than influence their choice sets, and male students randomly assigned to a roommate who reported drinking alcohol before college have lower grades on average. Powell, Tauras, and Ross (2005) similarly find a large role for peer influences on youth smoking behaviors. Although peers can have negative effects on one's behavior, there are many real-world instances in which peers effects can be harnessed to support one's own goals. Alcoholics Anonymous (AA) and Weight Watcher groups are examples of self-help peer groups meant to overcome self-control problems of bounded willpower with regards to battling alcoholism or being overweight and obese, respectively. Recently, interventions have been developed that harness peer effects to positively affect drinking behaviors by updating people's perceptions of the normative behaviors of their peers. In particular, many college students overestimate the

amount of alcohol consumed by their peers. By correcting such misperceptions with social marketing or personalized feedback that communicates how much students actually drink on average, alcohol consumption can decrease (Lewis and Neighbors, 2006).

### *Commitment Consistency Principle*

A variety of trials have tested whether interventions designed to affect people's smoking intentions can affect their subsequent smoking behaviors. Such interventions play on the commitment consistency principle, which is our innate desire to make our words consistent with our actions. A meta-analysis of the efficacy of such interventions across a wide variety of health behaviors (from condom use to sunscreen use to breast self-examination) finds that a medium-to-large impact on people's intentions leads to a small-to-medium change in behaviors (Webb and Sheeran, 2006). The key modifying factors that reduce the power of intentions on subsequent behaviors are the frequency a given behavior needs to be committed (more frequent behaviors can have greater divergences between intentions and actions) and the effort involved (more intensive tasks also increase divergence between intentions and actions).

### **3.3. Summary**

Looking across the spectrum of health behaviors, both the positive (e.g., exercise) and the unhealthy (e.g., drug addiction) ones, we find that behavioral economics can offer insights into some of the underlying drivers causing such behaviors. The interventions developed and tested with a behavioral economic lens take a variety of forms and depend largely on the behavior of interest as well as the surrounding contextual environment.

Many of the interventions designed to address health behaviors comprise some form of incentives. As stated earlier, incentives can fit within both rational and behavioral economic frameworks. The wide variety of findings of their efficacy (mixed evidence for weight loss, more promising evidence of effectiveness for combating addictive behaviors and infrequent behaviors) suggest that the structure of incentives matters as does the nature of the underlying behaviors being addressed (Cawley and Ruhm, 2012). This could imply a specific role for behavioral economics to examine such decision-making rules in depth as well as to inform the precise design of any incentives.

As stated previously, no precise boundaries delineate behavioral economics from neoclassical economics. Nonetheless, to clarify some differences, in table 1 we conclude by listing some commonly observed problematic health behaviors as well as selected examples of potential policy tools that are largely informed either by behavioral economics or neoclassical economics.

**Table 1. Behavioral Economic versus Traditional Policy Solutions to Problematic Behaviors**

| <b>Problem behavior</b>                               | <b>Potential behavioral economic solution (and operative channel)</b>   | <b>Potential policy tool informed by rational model</b>                |
|---|---|--|
| <b>Smoking</b>  | Mass media campaign showcasing that majority of people do not smoke (redefine social norms)   | Tax cigarettes   |
| <b>Overeating</b>                                     | Portion control plates (reduce anchoring bias)  | Information campaign about dangers of overeating and obesity           |
| <b>Choosing unhealthy food options in restaurants</b> | Move high calorie options to back of menu/highlight low calorie fare (change the default/capitalize on present bias/change the salience or framing of food choices) | Tax unhealthy food or ban trans-fatty acids                            |
| <b>Physical inactivity</b>                            | Design buildings so stairs are at the front and center of the building, give elevators less prominent locations   | Reward gym attendance with discounted membership for regular attendees |

*Source:* Authors

In the next chapter, we will examine the process by which the relevant decision-making rules are identified surrounding a given health problem or behavior. By paying particular attention to the decision-making process, we will introduce a set of steps or tools for how to apply insights from behavioral economics to identify the relevant behavioral barriers to a given problem and discuss how to determine whether a behavioral intervention may be appropriate to help address the problem.

#### **4. A Toolkit for Identifying Relevant Behavioral Patterns and Developing Appropriate Interventions Informed by Behavioral Economics**

An intervention or program can only be successful if people actually behave in the way that the programs designers assume they will behave. Interventions designed around a rational choice model can often be disappointing in practice if people do not always behave the way it is

assumed they will. This is the potential power of behavioral economics. By designing programs or interventions around people's actual psychology, those programs may be more likely to achieve the desired policy goal. However, a successful design for a new program or policy intervention depends on having a clear portrait of the underlying psychology surrounding a given issue.

#### ***4.1. Behavioral Design Process for Policy Design***

Datta and Mullainathan argue that behavioral economics affects policy design in three stages: defining a relevant problem, diagnosing the relevant behavioral barrier(s) that result(s) in the given problem, and designing a solution to the problem that is built on how people actually behave (versus how they should behave). Defining the scope of a given health or development problem is not always straightforward. For example, Datta and Mullainathan (2012) argue that merely ensuring access to a needed medicine at low-cost does not ensure that people actually take the drugs; behavioral economics considers this follow-on point: do people accept the intervention and take it as intended? Without this step, ensuring access alone will not solve the problem. Secondly, behavioral economics helps identify the relevant barriers to an observed problem, including health problems. That is, it offers new potential diagnoses to a given problem. Whereas a rational model might assume that people may lack information or the necessary financial means to address a problem, behavioral economics might look to other explanations such as self-control—people may know something is a problem and have the means to fix it, but simply procrastinate on doing so. Finally, behavioral economics offers new potential designs for interventions or policies (ideally, scalable ones) to address a given development or health problem built around people's actual psychology.

Along with a fourth stage to this process that is testing a designed solution to determine its effects, this process has been termed Behavioral Design. It uses behavioral economics and psychology to inform better policy design that is built around people's natural decision-making tendencies. Following Datta and Mullainathan (2012), we briefly outline a set of advisable steps for how to carry out a behavioral design process to a given health or development problem. Throughout this process, we include some relevant examples from our previous work and the literature to help illustrate the steps involved. While these steps describe how one can go about designing policy with behavioral economics in mind, they should be seen as general guidelines;

each problem, context, and population are different, and it is not possible to define a single formula that explains how to change behavior in a desired way.

#### **4.1.1. Defining the Problem**

The first step of defining the problem requires that all possible behaviors involved in a given problem be incorporated. That is, any decisions undertaken by any party involved in the problem must be considered and included in the problem's definition. Multiple development interventions have failed because the definition of the problem was too narrow. For example, an intervention may only consider issues of access, and only at the beginning, such as making sure people have access to the birth control pill, technology (e.g., a new water well), or whatever is needed today. Considering whether people take the pill, accept the technology, and do so continually over time if need be (e.g., maintain the well over time, or take the pill every day), should also be included in the problem's definition.

The stage of defining the problem to be addressed in the behavioral design process is often straightforward, but can necessitate a broader sweep of the behaviors related to the problem at hand than is sometimes done. For an example, if the problem is low attendance at adult preventive care services, defining the problem should include not only issues of access (e.g., does the clinic keep convenient hours?), but also issues of whether people understand that they need to go to the doctor and whether they intend to do so. If people both understand the need for attendance and intend to go, but then they repeatedly procrastinate each day on following through with this intention, the problem is not access so much as lack of self-control (related to time-inconsistent preferences and present bias). Defining the problem can mean laying out all relevant actions or decision points along the chain of events that lead to a given problem. However, determining where in the chain of events a relevant barrier lies brings us to the second stage of the behavioral design process: diagnosing the problem.

#### **4.1.2. Diagnosing the Problem with Field Data Collection**

After defining the problem of interest and listing out all decision points in the process, the next step is to identify where in that process one's decision-making breaks down and the given health behavior is not committed. This process can also determine whether the relevant barriers are behavioral in order to shed light on whether a behavioral economic intervention might be appropriate for addressing it. In the words of Datta and Mullainathan, we must determine what

the bottlenecks are, and whether they are actionable bottlenecks (i.e., likely to be addressable through an appropriate intervention). This process of identifying barriers, or bottlenecks, is called behavioral mapping (Datta and Mullainathan, 2012). It is a stage of formative work to understand the specific nature of the problem in the local context and to identify the relevant barriers (bottlenecks) that are likely to be amenable to an intervention informed by behavioral economic principles.

For an example, if the problem is that many people do not get adequate exercise, there are many possible decision points leading to this problem. Do people know that lack of regular exercise is bad for their health? If not, a relevant barrier (or bottleneck) is lack of basic information (addressable via traditional economic tools). If they do know this, do they intend to exercise regularly? If not, then a relevant bottleneck comes at the point of decision or intentions. A policy tool that addresses people's actions may have little effect if people did not intend to undertake the action to begin with. If people do intend to exercise but then fail to follow through, the problem is at the point of actions deviating from intentions. Did people give in to the immediate temptation to skip today's workout, figuring they would exercise tomorrow...only to repeat the same decision pattern tomorrow? This would again suggest a problem of time-inconsistent preferences and self-control. If instead people intend to exercise, but then simply forget each day, the problem would be limited attention or forgetfulness.

Each of these diagnostic questions is informed by psychological principles outlined in chapter 2, where we summarized the primary behavioral biases affecting people's decision-making which can cause them to deviate from a rational model of behavior. Unfortunately there is no simple recipe of behavioral economic interventions that researchers can use for all observed problems, nor is there a clear-cut one-to-one mapping from behavioral economic biases to bottlenecks/barriers. It is not likely to be cost-effective or successful to use all the potential behavioral economic tools in the hopes one or two will work. For instance, assuming an observed problem is due to lack of self-control, loss aversion, social norms, limited attention and overconfidence, and developing interventions designed to address each of these in turn, is likely to produce disappointing results. Each situation has its particularities, and it is necessary to have a detailed portrait of a given problem before designing any intervention, whether behavioral or otherwise.

To identify such particularities, after defining the problem in stage one and including all relevant decision points in the problem, a formative work stage generally consists of collecting data via the use of surveys, focus group discussions (FGDs), or a combination of both. These surveys and FGDs can be quantitative or qualitative and should help answer initial questions about the nature of the problem as well as lead to further, follow-up questions to help fine-tune our understanding of how the problem came to be.

It is important to keep an open mind during this formative work stage. Although we may have initial hypotheses about the relevant barriers leading to a given problem (and our survey questions and FGD guides should be designed with these in mind), it is possible that the relevant barrier(s) is not in fact due to a behavioral economic phenomenon at all, and is more structural in nature. Diagnosing the problem correctly is a crucial step necessary to designing an intervention that is appropriately targeted and defined to address this problem.

### *Formative Work Stage*

A formative work stage is crucial to try to disentangle a given problem's bottleneck(s). Carrying out FGDs and surveys to diagnose the problem has elements of being both a science and an art, and in many places there are professional firms that specialize in this type of work since there is no magic formula for how to do it or do it successfully. In general, FGDs as well as surveys should be targeted to the population of interest and designed to elicit the necessary information to help answer whether a hypothesized barrier or bottleneck might play a role. That is, well-designed and focused questions can be generated and asked to help uncover whether a hypothesized bottleneck is a factor. We outline a few basic principles for this type of work process here, and include specific examples from our previous work and the literature to help illustrate the process.

### *Focus Group Discussions (FGDs)*

FGDs are a useful tactic for early-stage research that tries to understand the reasons for an observed behavior or pattern. Carey (1994, 226) defines FGDs as “using a semi structured group session, moderated by a group leader, held in an informal setting, with the purpose of collecting information on a designated topic.” They can generate in-depth knowledge about attitudes, beliefs, and opinions on a topic (Carey, 1994; Kitzinger, 1995). Although the process was borrowed from marketing research, FGDs have specifically been recognized as a useful method

for uncovering the reasons behind usage (or lack thereof) of health services (Kitzinger, 1995) and have grown in popularity over the past few decades among health researchers more generally (McLafferty, 2004).

Focus groups explicitly use the group dynamic and interaction as a part of the method to generate data, in the hopes that the group dynamic will allow people's shared experiences to unveil common themes in the discussion. As a result, many researchers encourage arranging for homogeneous focus groups to capitalize on people's shared experiences (Kitzinger, 1995). Sampling strategies for focus groups really depend on the question or problem at hand. Groups can be naturally occurring (such as microfinance borrowing groups) or brought together by the researcher based on some sort of representativeness criteria. Ideal group sizes often range from roughly six to eight participants, although there is a lack of consensus on this point among practitioners. Smaller groups are sometimes found to be more manageable, but also sometimes necessitate more moderator involvement to keep the conversation going (McLafferty, 2004). A typical session will last about an hour.

The number of FGDs needed for a study depends on the aims of the research as well as the timeline and budget, but often ranges from six to ten (Kitzinger, 1995; McLafferty 2004). Findings from earlier focus groups can help refine the discussion guide used for later focus groups. That is, if a certain barrier to a given health behavior reveals itself in early focus groups as particularly relevant, later focus group questions can include more probing questions about this particular barrier, or add additional questions about possible interventions to address this barrier. For example, if a focus group of women is being held to understand the reasons behind low rates of cervical cancer screenings and earlier FGDs revealed that many women do not perceive themselves to be at risk, a later FGD could include questions asking their opinions on different interventions designed to address this barrier. These could include information pamphlets, an education campaign delivered via SMS, or attendance at group classes. Thus, the groups can help not only to learn about the relevant barriers to help during the diagnosis stage of behavioral design, but also during the design phase, which is discussed in greater detail below.

An FGD discussion guide can be developed based on prior knowledge of a given problem as well as the existing literature. The purpose of a guide is to direct group discussion and stimulate conversation as well as ensure that all questions are asked. Questions should progress from general to specific, and non-sensitive to sensitive, the purpose being to encourage



participation by all members of the group to start (McLafferty, 2004). However, the discussion guide is meant only to be a general tool, and the moderator may ask other questions based on the discussion to (re)focus the direction of the discussion.

A focus group moderator or interviewer should encourage participants to sit in a circle to encourage equal discussion (the moderator can also be a part of this circle), have a series of open-ended questions, and encourage group members to explore the issues that are important to them using the questions as a starting point. This process can take the research into new and unexpected directions, but the dynamics of a live conversation can often unveil deeper truths about a given problem than can a survey, which relies on reasoned responses to direct questions (Kitzinger, 1995). If the discussion is stalling, the moderator can ask probing questions to get the conversation flowing. The moderator should always remain neutral during the discussion to avoid biasing any results (McLafferty, 2004).

The moderator may also use a range of group exercises as appropriate to stimulate discussion. Ideally the group discussions are recorded and transcribed, but at the very least careful notes should be taken (Kitzinger, 1995).

The basic methods for analyzing data generated by FGDs include examining the transcripts for thoughts, feelings, actions, and assumptions relevant to the central discussion themes. Ideally, more than one researcher undertakes such an exercise separately, and then the researchers come together to discuss their findings and reach consensus on important themes to develop a codebook detailing inclusion and exclusion criteria for each theme as well as typical and atypical exemplars (Bernard and Ryan, 2010). Atlas.ti software (among others) can be used to apply these codebooks to the data, and again, if done by more than one researcher independently, inter-coder reliability can be assessed with discrepancies resolved by the group. Such methods allow for a more quantitative interpretation of qualitative data.

#### *Practical Example of FGD Guide Questions for Diagnosis*

In table 2, we provide specific examples both from our own work and the literature of some FGD guide questions that have been asked by previous studies in order to better understand people's knowledge, attitudes, and behaviors surrounding various health topics (Luoto et al., 2013; Krummel, Humphries and Tessaro, 2002; Vanslyke et al., 2008; Walcott-McQuigg and Prohaska, 2000). The precise outline for any FGD guide, as well as the precise questions included, very much depend on the specific problem at hand, the local context, as well as any

theoretical underpinnings informing the study. Generally speaking, for studies of health behaviors, FGD guides often start out trying to understand people’s basic beliefs and attitudes about the health behavior or topic, and then try to uncover more specific information about different barriers or facilitators hindering or helping people to commit the given behavior. From there, discussion guides can explore the roles played by different factors such as social support or self-efficacy to help people achieve a given behavior, if deemed of interest. If possible intervention designs are already envisioned (such as for later focus groups that have benefitted from findings of earlier focus groups), a discussion guide can include questions that ask participants their impressions of these potential interventions. In general, discussion guide questions all aim to help in the diagnosis stage of behavioral design, and can also help in the design phase as appropriate.

**Table 2. Examples of FGD Topics, Aims, and Sample Questions to Address Various Health Behaviors**

| General topic   | Motivation  | Sample questions across different health behaviors/topics  |
|---|---|--|
| <b>General knowledge, intentions and attitudes surrounding a given health topic or behavior</b> | Perceptions of importance of the health behavior/ perceived severity of a disease | <ul style="list-style-type: none"> <li>• What does it mean to be healthy?</li> <li>• What comes to mind when you hear the term _____ (e.g., cervical cancer/exercise)?</li> <li>• Tell me your thoughts about giving birth in a health facility. What are some of the reasons women choose to give birth in a clinic?</li> <li>• If you found out you had _____ (e.g., cancer/heart disease), how would you feel?</li> <li>• Are there benefits to _____ (e.g., exercise/healthy eating)? Please describe any you can think of.</li> <li>• What are your thoughts about exercise when you wake up in the morning?</li> </ul> |
|   | Perceived norms surrounding the behavior/ perceived susceptibility to a disease   | <ul style="list-style-type: none"> <li>• What kinds of cancer affect women in your community?</li> <li>• Do you know anyone who has _____ (e.g., cervical cancer/heart disease)? Tell me about that person.</li> <li>• Do people in your neighborhood exercise? What do they do?</li> <li>• Do you know anyone who has given birth in the clinic? Tell me what you know about the person’s experience.</li> </ul>  |
| <b>Barriers and facilitators to behavior change</b>   | Explore factors helping or hindering a behavior                                   | <ul style="list-style-type: none"> <li>• Are there things that may prevent you from _____ (e.g., exercise/eating healthy/attending clinic/getting screened for cancer)? <i>Probe with follow-on questions such as:</i> <ul style="list-style-type: none"> <li>○ Please describe an experience you have had when you were unable to _____ (e.g., exercise/eat healthy/attend a clinic or screening) as planned?</li> </ul> </li> </ul>  |

|   |  |   |
|---|--|---|
|   |  | <ul style="list-style-type: none"> <li>○ Please describe an experience you have had when you <i>were</i> able to _____ (e.g., exercise/eat healthy/attend a clinic or screening) as planned?</li> <li>● What is the biggest difficulty in attending your antenatal appointments? <i>Probe with follow-on questions on transportation, time, other childcare, cost, such as:</i> <ul style="list-style-type: none"> <li>○ How do you get to the clinic? Is this difficult?</li> <li>○ What would make it easier to attend the clinic?</li> </ul> </li> <li>● What do you not like about _____ (e.g., colonoscopy screening test/mammogram/clinic visits)?</li> <li>● What things can help you to _____ (e.g., exercise/eat healthy/attend clinic appointments)?</li> </ul> |
| <b>Self-efficacy and social support to carry out behavior changes</b> | Explore perceived roles of own self and others in achieving change | <ul style="list-style-type: none"> <li>● How confident are you that you could _____ (e.g., follow a healthy eating diet/exercise regularly/attend all your clinic appointments/take your medication as prescribed)?</li> <li>● What role does social support play for you to _____ (e.g., follow a healthy eating diet/exercise regularly/attend all your clinic appointments/take your medicine)?</li> </ul>   |
| <b>Feedback on proposed interventions (for later focus groups)</b>    | Elicit opinions on hypothesized interventions                      | <ul style="list-style-type: none"> <li>● How would each of the following help you to _____ (e.g., maintain a healthy diet/exercise regularly/attend your appointments)? <ul style="list-style-type: none"> <li>○ <i>Sample options:</i> reading a pamphlet/attending a group class/watching a video/receiving regular SMS</li> </ul> </li> <li>● If you were to receive text messages throughout this program regarding appointment reminders and tips for staying healthy during your pregnancy, do you think you would like that? Explain why or why not.</li> </ul>  |

*Source:* Authors' compilation and summary as based on Luoto et al., 2013; Krummel, Humphries and Tessaro, 2002; Vanslyke et al., 2008; Walcott-McQuigg and Prohaska, 2000;

### Surveys

Surveys can complement FGDs and are often more quantitative in nature. Whereas focus groups collect a large amount of detailed qualitative information from a smaller number of people, surveys usually collect a relatively smaller amount of quantitative data from a larger sample. Surveys can also collect qualitative data using open-ended questions, but even then the information is likely to be more limited than in FGDs. Survey questionnaires can be more appropriate for determining how many people hold a predefined opinion or belief. A key difference with FGDs is that while “surveys repeatedly identify gaps between health knowledge and health behavior, only qualitative methods, such as focus groups, can actually fill these gaps and explain why these occur” (Kitzinger 1995, 302). However, this does not mean that the data generated by surveys is less important. On the contrary, often determining the extent of a barrier identified in FGDs is helpful for practitioners to determine whether a policy designed to address

that uncovered barrier is likely to realize much impact on the population at large. Also, survey data can often be more straightforward to collect (since it does not involve the logistics of arranging people into groups), and in certain settings, survey data may also be easier and cheaper to collect, such as if telephone or mailed surveys are possible. Finally, as survey data is often collected from a larger sample of people, it allows for a more representative sample (as long as the survey's sample is appropriately representative of the population). This is where surveys and FGDs are often found to be complementary, with the natural chronology leading from FGDs to surveys, and from survey findings to the next stage of the behavioral design process.

Designing a survey questionnaire should include a careful piloting stage wherein the phrasing and ordering of questions is tested initially to ensure respondent understanding and flow, as well as that all respondents interpret the questions in the same way so that they have consistent meaning. Many details about a questionnaire can affect the type of responses obtained, and often in unintended ways. Careful design is necessary to avoid biasing results (Kelley et al., 2003).

Questions should be numbered and clearly grouped by subject while avoiding leading or ambiguous questions. Questions may be open (whereby the respondent answers at will) or closed (where predetermined response options are available). Closed questions are quick to administer and easier to code and analyze. A piloting stage can help to determine if the categories available in a precoded list are not sufficient.

A sampling plan that will generate sufficient data for its intended use should be determined prior conducting surveys. If quantitative analysis is planned, a careful consideration of sampling error should be done. Random sampling generally allows the results to be generalized to the larger population but can be more expensive and complicated to administer. Snowball sampling techniques and other non-random techniques based on convenience samples can often save money and time over a random sampling technique, but their results risk not being representative of the underlying population.

The appropriate method for analyzing the collected data from a survey will depend on the design of the survey and should be considered during the planning stages of the survey itself (Kelley et al., 2003). When quantitative data are collected, analysis can be more straightforward than data generated by FGDs.

### *Practical Example of Survey Questions for Diagnosis*

Surveys, like FGDs, can help uncover a relevant barrier or bottleneck preventing a given health behavior. For example, one of our own studies aimed to understand the barriers to pregnant women attending prenatal care in Kenya (Luoto et al., 2013). FGDs (including some questions included in table 2, above) suggested that relevant barriers included time, transportation, cost, general laziness (procrastination), and simply forgetting. Based on these findings, during a baseline survey we asked the question, “What reasons do you sometimes not attend or not keep antenatal appointments?” Enumerators were then trained to listen to the respondent, and record which possible reasons the woman named from the following list: No Money, No Transportation, No Time, No Motivation, Forgetfulness, Other (specify). For this question, enumerators were allowed to mark down as many answers as the woman freely provided.

### *Findings from FGDs and Surveys Can Help Diagnose the Bottlenecks*

The findings from surveys and FGDs can often be complementary—qualitative FGDs can help to identify a first set of candidate barriers or bottlenecks, and then quantitative surveys designed with findings from these FGDs can help to uncover more rigorously whether in fact those barriers are playing a role among a population of interest more generally. However, there is no magic formula for how to diagnose a given bottleneck, and no simple recipe that can be administered for diagnosis of all identified problems. Although FGD discussion guides and survey questions can be designed to try to carefully disentangle whether certain behavioral economic phenomenon are a factor, such guides and questions must be informed by the problem at hand, as well as knowledge of the various likely candidate bottlenecks based on an understanding of behavioral economic phenomena as outlined in chapter 2. (For example, a potential close-ended survey question to understand if lack of self-control, not lack of intentions, is preventing people from exercising could be, “When you wake up in the morning, do you plan to exercise that day?” A related potential open-ended question for discussion in a FGD on the topic could be, “What are your thoughts about exercise when you wake up in the morning?”) Finally, many behavioral problems are complex, with potentially multiple relevant bottlenecks that a formative work stage could help uncover.

### *Practical Example of Diagnosing Barriers Based on FGD Findings*

In table 3, we provide some exemplary quotes from our own studies as well as from published studies on other health topics that demonstrate how certain behavioral barriers can be identified based on findings from FGDs. The process of uncovering common themes can help discern what barriers are preventing a given health behavior. The identified barrier(s) in this table does not imply that these were the only barriers at play for each health topic; in fact, for each health topic and each cited study multiple barriers were identified by FGDs. Rather, these examples are meant to demonstrate how to connect the focus group conversations to a more structured understanding of the relevant themes or factors affecting people’s decision-making surrounding a given health issue. The precise mechanics of how to analyze qualitative data is beyond the scope of this guide, but a short summary is provided above when we discuss FGD techniques generally. Further guidance can be found in any textbook on qualitative analysis.

**Table 3. Exemplary Quotes from FGDs Demonstrating Diagnosis of a Particular Barrier**

| <b>Behavior/health topic</b> | <b>Identified barrier(s)</b>         | <b>Exemplary quote</b>  | <b>Source</b>         |
|------------------------------|--------------------------------------|---|-----------------------|
| <b>Cancer screening</b>      | Procrastination and fear of bad news | <i>“I think that many times it is procrastination but also fear. You tell yourself, ‘Maybe I have something,’ and you get nervous. It is like you want to know, but you don’t want to know. But that is wrong; that is only nerves.”</i>  | Vanslyke et al., 2008 |
| <b>Healthy eating</b>        | Time                                 | <i>“Being always in a hurry, it’s a lot easier to grab a \$0.99 Wendy burger; I mean you know it’s economic, and it’s quicker and then due to time.”</i>  | Krummel et al., 2002  |
| <b>Clinic attendance</b>     | Procrastination/ present bias        | <i>“Some women are just lazy. They don’t want to come to clinic in their early pregnancy because they are saying that when they start early, then they are going to get tired and bored of coming to the clinic every month. So when they know that they are almost due, that is when they come.”</i> | Luoto et al., 2013    |
| <b>Exercise</b>              | Self-control                         | <i>“I am not exercising and I cannot control my diet because whenever I see food I want to eat.”</i>  | Ali et al., 2010      |

Source: Authors

### *Practical Example of Diagnosing Barriers Based on Survey Findings*

Survey responses can also be used to diagnose barriers, as is done above with findings from FGDs. For example, in our own study of the barriers to pregnant women attending prenatal care

in Kenya, the survey question “Why do you sometimes not attend or not keep antenatal appointments?” elicited the responses listed in Table 4.

**Table 4. Examples of Survey Responses Demonstrating Diagnosis of a Particular Barrier, by Percentage**

| <b>Barrier</b>  | <b>No Money</b> | <b>No Transport</b> | <b>No Time</b> | <b>Harassment from nurses</b> | <b>No Motivation</b> | <b>Forget</b> | <b>Other</b> |
|-----------------|-----------------|---------------------|----------------|-------------------------------|----------------------|---------------|--------------|
| <b>Response</b> | 21              | 7                   | 45             | 5                             | 11                   | 7             | 32           |

*Source:* Authors

Based on these findings, we concluded that the necessary time it takes to attend the clinic, when there are not set appointment times so women are served on a first-come, first-served basis, was a primary barrier to attendance, as is the cost of services. When asked to specify an “other” response, a large share of these responses was that women sometimes feel too tired to attend. Combined with “low motivation,” this suggested to us another barrier of present bias. Thus, our survey findings which were built on our findings from FGDs helped us to refine the list of relevant barriers to this problem of low antenatal attendance.

More generally, from a formative work stage, a final list of relevant actionable bottlenecks can be generated in order to then take the next step of designing appropriate solutions to address them, and then finally to test those designed solutions.

#### **4.1.3. Designing a Solution to the Identified Problem**

Determining the appropriate design for an intervention meant to address the identified bottleneck(s) found in the diagnosis stage depends on a few factors. Just like there is no simple one-to-one mapping from behavioral biases to bottlenecks for the diagnosis stage, there is not a simple recipe of behavioral economic solutions that researchers can use for all observed behavioral problems. However, there are some common themes or tools that one can identify through a synthesis of the literature. Datta and Mullainathan (2012) outline a number of what they term Behavioral Design Principles that are useful to list here. Each of these principles focuses on one or more of the more common decision-making tendencies, as discussed in chapter 2. By keeping these design principles in mind, researchers can potentially improve the design of policies or interventions.

Principles 1 and 2 are based on the common problem of self-control, a component of people's tendency for bounded willpower. Due to present bias many struggle to follow through on their intentions. Principle 3 observes the common tendency of people's choices to be unduly influenced by the default, or status quo bias, a component of people's tendency to be boundedly rational. Principle 4 can be both a neoclassical and behavioral economic principle, and simply posits that people respond to incentives, a tenet recognized by both fields. When financial incentives are used to address behavioral phenomena, they can be classified as a behavioral economic tool. Principle 5 recognizes that attention is a limited resource, and Principle 6 simply advises to keep all known behavioral economic findings in mind when designing any intervention to capitalize on all known tendencies to make a given intervention more powerful. Finally, Principle 7 underscores the importance of a formative work stage to understand the full decision-making process regarding a certain behavior or health problem. Although incomplete information can be a neoclassical phenomenon, understanding the full mental model and how information is processed can take behavioral insights into account. That is, once again there is overlap between the two fields.

*Principle 1: Facilitate Self-Control by Employing Commitment Devices*

This first principle focuses on pervasive self-control problems, namely that our intentions and actions do not always align in practice, particularly when the costs and benefits of a given action are separated by time. An increasingly common solution to this problem comes in the form of commitment devices, such as a contract that commits oneself today to follow through on a given action at some point in the future. For example, individuals might commit to quit smoking or risk paying a fine.

*Principle 2: Reduce the Need for Self-Control*

Also related to self-control problems, the design of policies should aim to minimize as much as possible any additional burden on individuals to exercise self-control. For example, lump-sum payments necessitate recipients' self-control in smoothing out earnings over time. A better policy might include more frequent payment intervals (Datta and Mullainathan, 2012).



### *Principle 3: Remove Snags to Choosing*

This principle is informed by the status quo bias, in which people have a disproportionate tendency to choose the default option (i.e., to fail to actively choose). By making participation in a given program or intervention easier, or even the default option, it can help people overcome this bias.

### *Principle 4: Use Micro-Incentives*

This principle takes as its basis the realization that “the size of the incentive need only be as large as the barrier that caused the problem” (Datta and Mullainathan, 2012, 21). Simply moving from no incentive to a small incentive can often result in the largest increase in take-up of a given behavior or program. If the behavior in question is defined by being an investment good (i.e., costs incurred today with benefits delayed, such as many health behaviors), micro-incentives can potentially work to reduce problems of present bias.

If considering the use of micro-incentives to address a given behavioral problem, a key design point to keep in mind is the cost-sustainability of such an intervention. As discussed in section 3.1.2, there is some evidence that behaviors will revert to old habits once incentives are removed.

### *Principle 5: Reduce Inattention: Reminders and Implementation Intentions*

Because attention is a limited resource, this principle recognizes the outsized potential power of simple reminders to overcome forgetfulness to achieve a desired behavior. Having people draw out their plans for how they will commit a desired behavior can also act like a reminder for them to subsequently follow through on that behavior, which may further address any present bias causing actions to deviate from intentions.

### *Principle 6: Maximize the Impact of Messaging: Framing Effects, Social Comparisons, Norms*

The precise design of a given intervention can be improved and made potentially more powerful by taking certain behavioral economic insights into account in their design. For example, considering people’s tendency to exhibit loss aversion, messages that focus on potential losses versus gains may be more effective in encouraging the desired behavior because people tend to be more sensitive to losses than equivalent gains. Luoto et al. (2014) found this to be true in a study that encouraged poor rural Kenyans to adhere to safe water treatment behaviors. Similarly,

framing a message in a way that focuses attention on social norms and the actions of one's peers can be effective because people often decide what appropriate behavior is surrounding a given issue depending on their perceptions of the behavior of their peers relative to themselves.

*Principle 7: Frame Messages to Match Mental Models*

Messages that provide information to correct people's inaccurate beliefs about a given problem are likely to be ignored unless they can be framed to address the root of why people hold those beliefs. That is, better-targeted information that gets at the core for why people believe something is likely to be more successful than generic information campaigns. An example comes from a study in Kenya, in which teenage girls were getting pregnant by older men. Existing information campaigns instructed girls to abstain from premarital sex, but this reinforced for girls the desirability for marriage. As such, they sought out older partners, viewing them as the most marriageable, and viewing getting pregnant as the quickest way to matrimony. Thus existing information campaigns had unintended effects. A focused campaign that laid out for teenage girls information about HIV prevalence by age group, which showed that older men are more likely to be HIV-positive, reduced by two-thirds the number of girls who got pregnant by older men (Dupas, 2009).

These seven behavioral design principles are founded on common decision-making tendencies. As a result, by keeping these principles in mind when brainstorming potential interventions or policies meant to address an identified behavioral problem, success can be more likely than if they are ignored.

To summarize this design phase of the Behavioral Design process, based on the identified bottlenecks or barriers from the previous phase, this phase should be informed by the identified decision-making tendencies or deviations from a rational model, as summarized in chapter 2. Common themes or tools that one can identify through a synthesis of the literature for some of the most common bottlenecks are identified.

One of the most common bottlenecks affecting all health behaviors is a wedge between intentions and actions. This is because most health behaviors can be described as an investment good whereby the costs of undertaking the behavior are incurred today, while the benefits are delayed, allowing people's tendency for time-inconsistent preferences to prevent the desired action from being committed. A common tool to address this problem is some form of commitment contract, in which people commit today to follow through on a behavior tomorrow

(or sometime in the future). However, knowing precisely how to design an appropriate contract, and deciding whether in fact this is the best design for an intervention in a given context, depends on many other factors to be considered in a formative work stage and subject to the resources and capabilities at hand. Among populations with limited resources, commitment contracts can still be used so long as the amounts are reasonable for the local context. In fact, one of the most widely cited papers about commitment contracts was a study about encouraging savings behaviors that was based on an experiment conducted among poor households in the Philippines (Ashraf et al., 2006).

Limited attention is another commonly cited potential bottleneck that can prevent certain health behaviors from being committed if people simply forget. Reminders are an increasingly popular and simple tool for addressing limited attention, particularly because they can be delivered via SMS to take advantage of the growing prevalence of mobile phones throughout the world. Again, determining the best design for a reminder intervention must take into account a number of other factors such as means of implementing the intervention, design for the intervention, etc., all of which are factors that a formative work stage can help to determine.

#### *Practical Example of an Intervention Design to Address Identified Barrier(s)*

In response to our study's findings of the barriers preventing women from attending prenatal care in Kenya, we developed a comprehensive intervention. Because of a women's shortage of time, low motivation and procrastination appeared most relevant (see tables 3 and 4), women are now given set appointment times for their prenatal appointments, with small incentives to attend prenatal care. We hope the set appointment times will reduce the total time for clinic attendance by reducing wait times to see the clinic nurse, and we hope the small incentives will overcome any present bias. Also, prenatal appointments are now arranged in groups of women based on their estimated due dates. The group element is designed to facilitate strong peer support among women, which can potentially help address problems of low motivation. It can also streamline delivery of care for clinic nurses, who are often working in understaffed facilities, which leads to those long waiting times. This intervention is recently launched and thus we do not yet know the results from a testing stage, discussed next.

#### **4.1.4. Testing the Designed Solution**

A final stage of the Behavioral Design process is to test a proposed solution. The easiest and most cost-effective way to test a proposed solution is often to pilot test it with a rigorous design in place to facilitate an analysis of its causal impacts. This often means a RCT in which one group receives the intervention and another group does not, where group assignment is randomized and thus the two groups are comparable other than one receiving the intervention. By comparing outcomes across the two groups the effect of the intervention or program can be identified. A useful guide introducing how to design RCTs to evaluate public policy interventions and reasons for doing so has been produced by the UK Government's Behavioural Insights Team (Haynes et al., 2012).

From there, tweaking the proposed solution and retesting in an iterative fashion can lead to a finalized intervention that is built on solid psychological principles, administratively feasible, and not cost-prohibitive. In the next chapter, we describe a set of potential policy interventions informed by behavioral economics that can help to address behavioral problems of interest for Latin Americans' health, such as the rising obesity rates among adolescents and adults as well as the poor rates of attendance at medical care and adherence to medications among certain subpopulations.

### **5. Brainstorm Potential Interventions to Address Two Prominent Health Issues**

Two health issues of rising policy importance for many Latin American countries are (1) the stark increase in rates of obesity among adolescents and adults in recent years and, (2) poor rates of medication adherence and attendance at preventive care among certain subpopulations. In chapter 3 we presented some examples of interventions informed by behavioral economic principles that were designed to address these same behavioral patterns, although not necessarily for Latin American populations in particular. In this chapter, we brainstorm some policy interventions that could potentially help address such problems, following the process outlined in chapter 4. It is important to note the ideas outlined here are preliminary, and are suggested without the benefit of a formative research stage to help uncover the precise behavioral bottlenecks contributing to these identified problems at hand in a local context. However, the

interventions can potentially begin the exercise of asking what the relevant bottlenecks are and whether they address those bottlenecks directly.

### ***5.1. Obesity Intervention Designs***

The interventions in chapter 2 that are designed to address problems of rising obesity can take many potential forms, and, as discussed in chapter 4, it is important to first define the scope of the problem and potential policy intervention before identifying the relevant behavioral barriers and designing any solution. For example, rising obesity rates are a big problem in many countries. Yet there are many different populations a policy could focus on such as urban youth, or populations that are already overweight or obese. In addition, obesity interventions can address or reward different behaviors, such as the intermediate behaviors of improved diet or increased physical activity or a final outcome such as weight loss, whether achieved by improved diet or increased physical activity or some combination therein (this is most appropriate for a program designed for those already overweight or obese).

After defining the problem and scope for intervention, we must diagnose the relevant bottlenecks that affect that population. However, a difficult thing about interventions designed to address obesity in many countries is that its causes are thought to be multifaceted, and there are likely to be myriad barriers or bottlenecks contributing to the problem (Ruhm, 2012; Swinburn et al., 2011). Another complication comes from the fact that the traditional point of implementing many health interventions—the health clinic—is often not feasible for interventions designed to address issues of obesity, since eating and physical activity (or lack thereof) are frequent and recurring behaviors undertaken largely outside the scope of the formal health system. (Interventions designed to reward weight loss among the already overweight and obese could be implemented via health clinics, but the scalability of such an approach comes into question.) Thus, interventions with the power to affect people’s frequent decision-making regarding what to eat and whether or not to be active must likely find a way to be more present in people’s lives than an occasional doctor’s visit, and ideally will hit a key bottleneck contributing to the problem.

This implies that when designing an obesity intervention, one must decide through what forum or means an intervention can be implemented, ideally with an eye toward potential scalability. For example, interventions designed to improve diet could potentially be

implemented through restaurants to affect foods eaten away from home (such as the calorie information policies enacted in many locales today), or via changes to the grocery shopping environment to affect people's food purchasing behaviors, or through school or work cafeterias. However, any policy which affects one of these environments would not necessarily be expected to affect people's decision-making for food eaten outside the given context, which limits their potential overall impact and leads to the possibility of offsetting behaviors. For example, an improved menu design at restaurants might nudge more people to order salad as opposed to French fries, but then people who chose the salad for lunch might feel entitled to eat ice cream for dessert at home later that night. Similarly, an intervention could be implemented in conjunction with existing public nutrition assistance programs. However, this necessarily only targets the subpopulation of beneficiaries (which may be a key population of interest), and still cannot account for offsetting behaviors for foods purchased elsewhere.

Interventions designed to increase physical activity as an outcome might pose less risk of such offsetting behaviors, but necessarily comprise an additional burden on the part of consumers who ultimately have to make a choice whether to be active (i.e., without a policy to radically change environments and urban design, it is hard to make physical activity the default option). Along these lines, Swinburn et al. (2011) argue that "policy interventions for obesity can only be realistically directed at the environment (making health choices easier) rather than the individual (compelling them to take the healthy choices)." We briefly summarize the multiple decision points for any obesity intervention before outlining a few possible interventions implementable through various forums, as well as provide a real-world example of a related policy implemented in Buenos Aires. Table 5 lists possible target populations, to define whose behavior a planned intervention is meant to address; possible target behaviors/outcomes, to decide the focus behavior of the intervention; and possible means of implementation, to decide through which means a given policy intervention can be implemented, ideally with an eye toward scalability.

**Table 5. Decision Points for Design of Obesity Interventions, with Suggested Possibilities**

|   |
|---|
| <b>Target population (examples)</b>                 |
| Already overweight/obese                            |
| Everyone  |
| Children  |
| <b>Target behavior/outcome</b>                      |
| Increased physical activity (intermediate behavior) |
| Healthy eating (intermediate behavior)              |
| Weight loss (final outcome)                         |
| <b>Means of implementation</b>                      |
| Health clinic                                       |
| Restaurants/away-from-home meals                    |
| Grocery stores                                      |
| Gyms/parks/recreational areas                       |
| School cafeteria/work cafeteria                     |
| Food distribution system                            |
| Nutrition assistance programs                       |

Source: Authors

**5.1.1. Potential Obesity-Related Interventions**

Dr. Deborah Cohen, a medical doctor and researcher at RAND, has spent her career studying how the environment influences health behaviors including physical activity and eating behaviors. Her forthcoming book, “A Big Fat Crisis—The Hidden Forces Behind the Obesity Epidemic—And How We Can End It” outlines a number of potential policy measures to stem the rise of obesity in the US, many of which take behavioral economic insights into account (Cohen, 2014). We believe these suggestions can serve as a solid starting point for brainstorming potential policy interventions for Latin American countries as well; we summarize the most promising ideas here as well as the behavioral heuristics they are designed to address.

*Problem: Anchoring Bias Leads to Overeating*

*Potential Solution: Standardized Portion Sizes for Away-from-Home Meals*

In most places, restaurants have no standard serving guidelines. Yet there is strong evidence that serving sizes strongly determine how much food is consumed, because of the anchoring bias. Furthermore, people often do not feel any less satisfied when they are served smaller amounts (Wansink et al., 2005; Wansink, 2004). Having standardized portion sizes could establish the correct amount to eat as well as make portion sizes uniform across an industry.

*Problem: Salience, Status Quo Bias, and Decision Fatigue Lead to Impulse Eating*  
*Potential Solution: Restrictions on Impulse Marketing*

Impulse marketing refers to the way marketing of food is designed to disrupt conscious decision-making and appeal to choices based on emotion, contextual cues, and instant gratification. In many cultures, the food environment in recent decades has become increasingly saturated with temptation items, which obesity researchers argue is a key contributor to rising rates of obesity. Some examples are the candy bars that often for sale near department store cash registers or the end-aisle displays in grocery stores featuring salty snacks. In fact, in the US a recent assessment found that candy, salty snacks, and sugary beverages or baked goods were available in 41 percent of all retail outlet stores (not just food establishments) and usually located close to the cash register, including 96 percent of pharmacies; 94 percent of gasoline stations, 55 percent of hardware stores and automobile sales and repair outlets; 29 percent of bookstores; 22 percent of furniture stores; and 16 percent of apparel stores. Candy was offered for free in 22 percent of outlets (Cohen, 2014). Such manipulations raise the salience of unhealthy options and can make it difficult for people to resist. Even if they are able to resist temptation at first, the sheer number of opportunities for impulse purchases of unhealthy items today means that eventually ego depletion sets in, and people are prone to make less healthy choices.

A policy to restrict sales of unhealthy foods only at established food retailers, or a policy to reduce the salience of such items such as mandating the location of such items in stores, could help address this problem. Sales of items from end-aisle displays account for 30 percent of sales at supermarkets, and people tend to buy two to five times more items from these locations than when the items are displayed elsewhere (Sorenson, 2009). If only healthful foods were allowed to be located in the most prominent locations, or at eye level, this could make such items the default option and nudge people to make healthier purchases, without formally restricting their choice sets.

*Problem: Limited Attention and Salience Lead to Unhealthy Choices*  
*Potential Solution: Counter Advertising*

Another suggestion by Cohen is to use counter-advertising such as public service announcements that reminds the population of the ill-effects of unhealthy foods, particularly if such advertising can include vivid, salient images and frame the issue in negative terms—what people risk losing if they fail to make the healthy choice. This strategy could address people’s limited attention and



loss aversion. A similar approach has been utilized (with seeming success) to discourage smoking and drug use among youths in the US and many other countries.

*Problem: Non-Vivid Communication of Nutrition Information Leads to Unhealthy Choices*  
*Potential Solution: Vivid Warning Labels*

A related idea to counter-advertising is to feature vivid warning labels on unhealthy processed foods or menu items at restaurants whose consumption can increase the risk of certain chronic diseases. Such warning labels exist in many countries on alcohol and tobacco products, but are often limited to nutrition information on food items presented as numbers in a Nutrition Facts Panel that lack vividness and can fail to draw one's attention (Kiesel and Villas-Boas, 2013). A warning label system that featured graphic and vivid images as well as framed warnings to emphasize the costs of their consumption could help improve people's choices by reminding them of the long-term consequences without formally limiting anyone's choice set.

*Problem: Obesogenic Food Environments in the Workplace*  
*Potential Intervention: Workplace Interventions*

As countries develop, an increasing share of the labor force adopts sedentary jobs. Workplace interventions could help improve both food choices and physical activity. Employer-mandated walking and exercise breaks are one idea, although this is not a behavioral intervention per se; another idea is simple reminders to exercise that pop up on employee's computer screens to address limited attention; placing restrictions on vending machines on every office floor is another potential intervention to help people have less tempting food environments by increasing the immediate travel costs of getting a snack, potentially overcoming present bias.

### **5.1.2. A Real-World Obesity-Related Intervention in Latin America**

The large Latin American city of Buenos Aires in Argentina recently introduced a policy intended to nudge the population to make improved health decisions. In Buenos Aires Province, nearly a quarter of the population suffers from hypertension, and the average Argentinean consumes 13 grams of salt each day, while the World Health Organization recommendation is for less than five grams. Because of these figures, the health department introduced a policy in 2011 that removes salt shakers from restaurant tables in Buenos Aires (Staff, 2011). This qualifies as a nudge policy informed by behavioral economics because it simply rearranges the choice architecture—salt shakers are still available upon request—but makes not having salt at

the table the default option, potentially capitalizing on the status quo bias as well as present bias tendencies, since the immediate cost of adding salt has just increased. Following table 1, this policy is targeted to the whole population (at least those within it who eat in restaurants) and directed to affect the behavior of eating healthy, and it is an implementation means to alter the environment in restaurants.

## **5.2. *Interventions to Increase Preventive Care and Medication Adherence***

Two other areas in which people fail to adhere to the behaviors predicted by a rational model are that many people fail to take their medicines as prescribed, and many fail to attend routine preventive care. Although these are distinct behaviors characterized by differing frequencies and different underlying psychologies, we group them together since both involve some degree of patient interaction with the formal health system. In chapter 3 we outlined some of the interventions that have been developed to address both of these problems. To summarize, channel factors and various incentive schemes have been utilized to improve rates of attendance at preventive care, and incentives and SMS reminders have been used to increase rates of medication adherence. We outline some additional potential interventions or suggest improvements on these for each goal behavior below.

### **5.2.1. Attendance at Preventive Care**

If we simply define the problem that attendance at preventive care is lower than predicted by a rational model, we next need to diagnose the potential reasons why. When we think about the reasons why people may fail to attend routine preventive care, a number of possible reasons come to mind. One could be that people do not know what routine care is needed or at what frequency because they lack full information, an explanation from the neoclassical model. For example, in the US, preventive dental care is generally recommended every six months and routine physicals once a year, but colonoscopies are recommended for those over age fifty only every 10 years. Until recently, mammograms were recommended yearly in the US for women over age 40, but these recommendations have recently come under debate and the latest recommendations from the United States Preventive Services Task Force are for women over age 50 to get mammograms every two years (E, 2012).

It is easy to imagine that people simply do not know when and if they are due for certain checkups. Another potential explanation for this is more behavioral: people forget. Again, there

are many types of recommended care at different frequencies, and it is easy to imagine that the bottleneck is simply that sometimes people forget. Yet another possible explanation for poor attendance is that some types of preventive care have the potential to deliver bad news. For examples, a mammogram or a colonoscopy can detect certain kinds of cancers. Although for many such diseases early detection can help increase one's chances of survival, people may overweight the immediate bad news at the expense of the potential long-term benefits from having full information about one's own health. Finally, it is possible that many people know they need a certain checkup, and mean to schedule it, but then the bottleneck comes when they procrastinate on doing so, and their intentions and actions deviate. Each of these potential diagnoses calls for a different solution.

*Problem: Low Attendance Caused by Limited Attention*

*Potential Solution: SMS and Other Reminders for Appointments*

If the primary bottleneck preventing attendance at preventive care is that people simply forget, simple reminders might be enough to increase rates of attendance. Mailed reminders are a common tool utilized by many health providers, and, recently, SMS-based reminders sent on cell phones have been used to take advantage of the vast increase in rates of mobile phone adoption and the potential cost-sustainability of this approach. Reminders of prescheduled appointments (perhaps made at the last checkup visit), versus reminders to schedule appointments, could realize even larger effects by changing the default to take advantage of the status quo bias. Alternatively, an SMS reminder that asks people to plan a time and means to schedule their appointment could utilize channel factors to help people follow-through on their goals. Finally, the text of any reminder message could incorporate behavioral principles such as mentioning that the average person gets a physical once a year (for example), to play on social norms and comparisons with one's peers.

*Problem: Low Attendance Caused by Fear of Bad News, Present Bias*

*Potential Solution: Contemplation Exercises*

If people are afraid of getting tested or afraid of receiving test results because of the risk of receiving bad health news, and this is a primary cause of low attendance at certain types of preventive care, then one possible intervention to increase testing rates consists of having people simply think of the reasons for getting tested. By having people contemplate the reasons for

getting tested, they activate the slow, rational Econ thinker in themselves, who takes over for the emotional Human in this important decision. One recent study found that asking people to contemplate three reasons for learning their lifetime risk of cardiovascular disease as well as three reasons not to learn their risk, and then ranking the importance of each reason, caused significantly more people to retrieve the results of their tests than those who were simply asked facts they know about cardiovascular disease (Howell and Shepperd, 2013). However, this same study found that when the testing was for a (made up) incurable disease, contemplation had no similar effect; people largely preferred not to know their risk of contracting a disease for which nothing could be done.

*Problem: Procrastination Leads to Low Attendance*  
*Potential Solution: Incentives for Prompt Attendance*

If procrastination is a relevant bottleneck preventing attendance, insurance companies or health providers could offer micro-incentives to people to attend their routine care on time, as long as such a policy were cost-sustainable. These incentives could be designed in a number of ways to take other behavioral insights into account. For example, discounted co-pays, coupons for a free coffee, or automatic enrollment in a lottery if they attend on time could help people attend their routine checkups promptly.

### **5.2.2. Medication Adherence**

Many people fail to take their medicines as prescribed. Poor rates of adherence to a prescribed medication regimen can contribute to increased medical costs and negative health complications. The potential bottlenecks leading to poor medication adherence are many. Just like with attendance at preventive care, it could be that people simply forget to take their medicines every day. Alternatively, the time and pecuniary costs of getting a medicine or a refill could prevent some people from adhering to their regimen if present bias is occurring (although present bias is not the only relevant factor here; costs and structural barriers could also be an issue). Finally, it could be that people know when and how they need to take their medicines, but do not like the side effects and view the immediate negative side effects as worse than the long-term potential consequences of non-adherence, even if the net present value of those consequences are in fact greater than the side effects under a rational model. Again, each of these potential bottlenecks calls for a different solution.

*Problem: Limited Attention Leads to Poor Adherence*

*Potential Solution: SMS Reminders or Smart Packaging*

If forgetting is a large contributor to poor adherence, simple SMS reminders could go a long way to improving rates of adherence. Again, such an intervention could further feature framing effects that appeal to loss aversion if people know they need to take their medicines but outweigh the side effects over the long-term benefits. Reminding people of the costs of non-adherence when reminding them to take their medicines might realize even larger effects by capitalizing on people's tendency for loss aversion. Alternatively, medication bottles that remind patients to take their medication as prescribed have been used in some recent trials (Brubaker, 2013). These bottles will glow and make musical sounds to remind patients to take their pills. After a certain number of missed doses, a signal can be sent to the clinic, and clinic staff can reach out to the patient directly.

*Problem: Costs, Structural Barriers, and Present Bias Prevent Timely Refills*

*Potential Solution: Mailed Prescriptions*

If people simply procrastinate on (re)filling their prescriptions, mailed prescriptions might be an appropriate tool to address such a bottleneck by bypassing the necessary behavior.

*Problem: Present Bias Leads to Poor Adherence*

*Potential Solution: Immediate Incentives for Adherence*

Other than improving the drugs themselves, if people fail to take their medicines as prescribed because the immediate side effects over the long-term delayed outweigh the benefits of adherence (assuming the net present value of the effect of treatment adherence is in fact positive), the creation of an incentive system offering some sort of immediate reward for daily adherence in the manner of Volpp, Loewenstein, et al.'s (2008) warfarin adherence trial may be appropriate. Such a design could overcome any present bias causing people to overweight the immediate costs of compliance by adding to the immediate benefits. However, again such incentive schemes must consider whether they are a long-term sustainable solution, since many studies find that behaviors tend to revert to old habits upon withdrawal of the incentives (Gneezy et al., 2011; John et al., 2012).

## **6. Conclusions**

The rise of NCDs across many populations around the world, including in Latin America, poses

many new challenges for public policy and the effective delivery of health services. The concurrent and stark rise in rates of obesity worldwide is largely recognized as a primary contributor to the growing disease burden posed by NCDs (Shaw et al., 2009). Finding ways to reduce the sheer prevalence of the underlying risky behaviors that contribute to these growing problems—such as tobacco use, unhealthy diets, physical inactivity, underuse of preventive care and poor medication adherence—has the potential to significantly reduce much of this disease burden (WHO, 2013). Yet traditional policy tools that are largely informed by a rational model of behavior have in many instances fallen short, or been at best modestly effective at modifying such behaviors and slowing these trends (Europe, 2008). The growing field of behavioral economics has become a promising alternative source for informing the design of policies intended to increase uptake of healthy lifestyle behaviors. Behavioral economics is an extension of neoclassical economics that incorporates insights from psychology and other social sciences to improve our ability to understand people’s decision-making tendencies in instances where the rational model can fall short.

The potential for behavioral economics as a source for helping to solve such health problems is thought by many to be large and promising and to primarily lie in the field’s recognition of the way the social and physical environments shape our behavior. However, the field is still emerging, and its ability to change behaviors at the level of general populations or to achieve long-term sustained behavior change remains largely unanswered (Marteau et al., 2011).

In reviewing what is meant by behavioral economics and how it differs from neoclassical economics and summarizing a number of tested policy interventions on health behavior change that are informed by one or both fields, we have offered some practical guidance on how to identify the relevant behavioral barriers surrounding a given health behavior issue and design policy interventions to address those barriers. This paper also summarized some common behavioral barriers leading to three commonly observed health issues for Latin America, such as the rise in rates of adolescent and adult obesity, low rates of attendance at preventive care, and low rates of medication adherence for chronic disease management. It suggested some potential barriers or “bottlenecks” leading to such outcomes, as well as some potential interventions informed by principles from behavioral economics to address those barriers.

In summary, we believe that the field of behavioral economics holds the potential for informing promising new policy applications to improve health behaviors, and we look forward

to the field's continuing growth and development in this context. We also believe behavioral economics is not likely to be able to "fix" all health behavior problems, particularly on its own. The most successful policy interventions are likely to incorporate both behavioral and neoclassical insights together, given the promising insights offered by both fields.

## References

- “A fat chance: The Danish Government Rescinds Its Unwieldy Fat Tax.” 2012. *The Economist*, November 17. Available at: <http://www.economist.com/news/europe/21566664-danish-government-rescinds-its-unwieldy-fat-tax-fat-chance>.
- Ali, H.I., L.M. Baynouna and R.M. Bernsen. 2010. “Barriers and Facilitators of Weight Management: Perspectives of Arab Women at Risk for Type 2 Diabetes.” *Health and Social Care in the Community* 18(2): 219–28. doi:10.1111/j.1365-2524.2009.00896.x.
- Ariely, D. 2009. *Predictably Irrational: The Hidden Forces That Shape Our Decisions*, rev. ed. New York, United States: Harper Collins Publishers.
- Ashraf, N., D. Karlan and W. Yin. 2006. “Tying Odysseus to the Mast: Evidence from a Commitment Savings Product in the Philippines.” *The Quarterly Journal of Economics* 121(2): 635–72.
- Ashraf, N., O. Bandiera and B.K. Jack. 2012. “No Margin, No Mission? A Field Experiment on Incentives for Pro-Social Tasks.” CEPR Discussion Paper No. DP8834. London, United Kingdom: Centre for Economic Policy Research. Available at: [http://papers.ssrn.com/sol3/papers.cfm?abstract\\_id=2013825](http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2013825).
- Bandiera, O., I. Barankay and I. Rasul. 2010. “Social Incentives in the Workplace.” *The Review of Economic Studies* 77(2): 417–58. doi:10.1111/j.1467-937X.2009.00574.x.
- Banerjee, A., Duflo, E., Glennerster, R. et al. 2010. “Improving Immunisation Coverage in Rural India: Clustered Randomised Controlled Evaluation of Immunisation Campaigns with and without Incentives.” *British Medical Journal* 340(May17 1): c2220. doi:10.1136/bmj.c2220.
- Bannister, J. 2010. “Eye on Research: NMSU Researchers Shop around for Healthier Grocery Carts.” NMSU News Center, July 10. Available at: <http://business.nmsu.edu/2010/07/19/eye-on-research-nmsu-researchers-shop-around-for-healthier-grocery-carts/>.
- Barberis, N.C. 2013. “Thirty Years of Prospect Theory in Economics: A Review and Assessment.” *Journal of Economic Perspectives* 27(1): 173–96.
- Barquera, S., Hernandez-Barrera, L., Tolentino, M.L. et al. 2008. “Energy Intake from Beverages Is Increasing among Mexican Adolescents and Adults.” *The Journal of Nutrition* 138(12): 2454–61. doi:10.3945/jn.108.092163.
- Barry, C.L., J. Niederdeppe and S.E. Gollust. 2013. “Taxes on Sugar-Sweetened Beverages: Results from a 2011 National Public Opinion Survey.” *American Journal of Preventive Medicine* 44(2): 158–163. doi:http://dx.doi.org/10.1016/j.amepre.2012.09.065.
- Baumeister, R. F., Bratslavsky, E., Muraven, M. et al. 1998. “Ego Depletion: Is the Active Self a Limited Resource?” *Journal of Personality and Social Psychology* 74(5): 1252–65.
- Becker, G.S., and K. Murphy. 1988. “A Theory of Rational Addiction.” *Journal of Political Economy* 96(4): 675–700.
- Benabou, R., and J. Tirole. 2003. “Intrinsic and Extrinsic Motivation.” *The Review of Economic Studies* 70(3): 489–520.
- Benthin, A., Slovic, P., Moran, P. et al. 1995. “Adolescent Health-Threatening and Health-Enhancing Behaviors: A Study of Word Association and Imagery.” *Journal of Adolescent Health* 17(3): 143–152. doi:http://dx.doi.org/10.1016/1054-139X(95)00111-5.
- Bernard, H., and G. Ryan. 2010. *Analyzing Qualitative Data: Systematic Approaches*. Thousand Oaks, CA, United States: Corwin.
- Bertrand, M., Karlan, D., Mullainathan, S. et al. 2010. “What’s Advertising Content Worth?”



- Evidence from a Consumer Credit Marketing Field Experiment (January 23, 2009).” *Quarterly Journal of Economics* 125(1): 263–306.
- Bleich, S.N., and R. Sturm. 2009. “Developing Policy Solutions for a More Active Nation: Integrating Economic and Public Health Perspectives.” *Preventive Medicine* 49(4): 306–8. doi:10.1016/j.ypmed.2009.07.003.
- Brownell, K.D., Farley, T., Willett, W.C. et al. 2009. “The Public Health and Economic Benefits of Taxing Sugar-Sweetened Beverages.” *New England Journal of Medicine* 361(16): 1599–1605. doi:10.1056/NEJMhpr0905723.
- Brubaker, H. 2013. “Research Partnership Between IBC and Penn Medicine.” *Philly.com*. Available at: [http://articles.philly.com/2013-06-28/business/40235333\\_1\\_ibc-nigam-research-projects](http://articles.philly.com/2013-06-28/business/40235333_1_ibc-nigam-research-projects).
- Burke, L.E., Styn, M.A, Sereika, S.M. et al. 2012. “Using mHealth Technology to Enhance Self-Monitoring for Weight Loss: A Randomized Trial.” *American Journal of Preventive Medicine* 43(1): 20–26. doi:10.1016/j.amepre.2012.03.016.
- Butsch, W., Ard, J., Allison, D. et al. 2007. “Effects of a Reimbursement Incentive on Enrollment in a Weight Control Program.” *Obesity* 15(11): 2733–38.
- Carey, M. 1994. “The Group Effect in Focus Groups: Planning, Implementing, and Interpreting Focus Group Research.” In: J. Morse, editor. *Critical Issues in Qualitative Research Methods*, 225–41. London, United Kingdom: Sage Publications.
- Carman, K., and P. Kooreman. 2011. “Social Interactions and Obesity: An Economist’s Perspective.” in *Obesity Prevention: The Role of Society and Brain on Individual Behavior*. Ed. Laurette Dube, Antoine Bechara, Alain Dagher, Adam Drewnowski, Jordan LeBel, Philip James and Rickey Y. Yada. Amsterdam: Elsevier, 2010. pp. 757-765.
- Carman, K.G., and P. Kooreman. “Probability Perceptions and Preventive Health Care.” *Journal of Risk and Uncertainty, forthcoming*.
- Cawley, J., and C.J. Ruhm. 2012. “The Economics of Risky Health Behaviors 1.” *Handbook of Health Economics* 2: 95–199. Elsevier B.V. doi:10.1016/B978-0-444-53592-4.00003-7.
- Cawley, J., and J.A. Price. 2013. “A Case Study of a Workplace Wellness Program That Offers Financial Incentives for Weight Loss.” *Journal of Health Economics* 32(5): 794–803. doi:10.1016/j.jhealeco.2013.04.005.
- Cawley, J.H. 2011. *The Oxford Handbook of the Social Science of Obesity*. New York, United States: Oxford University Press.
- Cecchini, M., Sassi, F., Lauer, J.A. et al. 2010. “Tackling of Unhealthy Diets, Physical Inactivity, and Obesity: Health Effects and Cost-Effectiveness.” *The Lancet* 376(9754): 1775–84. doi:http://dx.doi.org/10.1016/S0140-6736(10)61514-0.
- CDC (Centers for Disease Control). 2013. “CDC Vital Signs - Progress on Childhood Obesity: Many States Show Declines.” *CDC Vital Signs*. Available at: <http://www.cdc.gov/VitalSigns/ChildhoodObesity/>.
- Charness, G and U.Gneezy. 2009. “Incentives to Exercise.” *Econometrica* 77:909-931.
- Christakis, N.A., and J.H. Fowler. 2007. “The Spread of Obesity in a Large Social Network over 32 Years.” *New England Journal of Medicine* 357(4): 370–79. doi:10.1056/NEJMsa066082.
- Christensen-Szalanski, J. 1984. “Discount Functions and the Measurement of Patient Values: Women’s Decisions During Childbirth.” *Medical Decision Making* 4:47–58.

- Cialdini, R.B. 1993. *Influence: The Psychology of Persuasion*. New York, United States: Morrow.
- Cochrane, J.H. 1991. "A Simple Test of Consumption Insurance." *Journal of Political Economy* 99(5): 957–976. doi:10.2307/2937654.
- Cohen, D. 2014. *A Big Fat Crisis - The Hidden Forces Behind the Obesity Epidemic - And How We Can End It*, 1st ed.. New York, New York: Nation Books.
- The reference above has recently been published as:
- Datta, S., and S. Mullainathan. 2014. "Behavioral Design - A New Approach to Development Policy." *The Review of Income and Wealth* 60(1):7-35.
- DellaVigna, S. 2009. "Psychology and Economics: Evidence from the Field." *Journal of Economic Literature* 47:315–72.
- Downs, J. S., G. Loewenstein and J. Wisdom. 2009. "Strategies for Promoting Healthier Food Choices." *American Economic Review: Papers and Proceedings* 99(2): 159–64.
- Dupas, P. 2009. "Do Teenagers Respond to HIV Risk Information? Evidence from a Field Experiment in Kenya." NBER Working Paper No. 14707, February. Cambridge, MA, United States: National Bureau of Economic Research. Available at: <http://www.nber.org/papers/w14707>.
- E, R.C. 2012. "Report 6 of the Council on Science and Public Health (A-12)." Available at: <http://www.ama-assn.org/resources/doc/csaph/a12-csaph6-screeningmammography.pdf>.
- WHO Regional Committee for Europe. 2008. "Behaviour Change Strategies and Health: The Role of Health Systems." WHO. Available at: [http://www.euro.who.int/\\_\\_data/assets/pdf\\_file/0003/70185/RC58\\_edoc10.pdf](http://www.euro.who.int/__data/assets/pdf_file/0003/70185/RC58_edoc10.pdf)
- Fernald, L.C.H., P.J. Gertler and X. Hou. 2008. "Cash Component of Conditional Cash Transfer Program Is Associated with Higher Body Mass Index and Blood Pressure in Adults." *The Journal of Nutrition* 138(11): 2250–57. doi:10.3945/jn.108.090506.
- Finkelstein, E.A., Linnan, L., Tate, D. et al. 2007. "A Pilot Study Testing the Effect of Different Levels of Financial Incentives on Weight Loss among Overweight Employees." *Journal of Occupational and Environmental Medicine* 49(9): 981–89.
- Finkelstein, E.A., Strombotne, K.L., Chan, N.L. et al. 2011. "Mandatory Menu Labeling in One Fast-Food Chain in King County, Washington." *American Journal of Preventive Medicine* 40(2): 122–27. doi:http://dx.doi.org/10.1016/j.amepre.2010.10.019.
- Forde, I., Chandola, T., Garcia, S. et al. 2012. "The Impact of Cash Transfers to Poor Women in Colombia on BMI and Obesity: Prospective Cohort Study." *International Journal of Obesity* 36(9): 1209–14. Available at: <http://dx.doi.org/10.1038/ijo.2011.234>.
- Geneau, R., Stuckler, D., Stachenko, S. et al. 2010. "Raising the Priority of Preventing Chronic Diseases: A Political Process." *The Lancet* 376(9753): 1689–98. doi:10.1016/S0140-6736(10)61414-6.
- Gine, X., D. Karlan and J. Zinman. 2010. "Put Your Money Where Your Butt Is: A Commitment Contract for Smoking Cessation." *American Economic Journal: Applied Economics* 2(4): 213-235.
- Glassman, A., Gaziano, T.A., Bouillon Buendia, C.P. et al. 2010. "Confronting the Chronic Disease Burden in Latin America and the Caribbean." *Health Affairs* 29(12): 2142–48. Available at: <http://content.healthaffairs.org/content/29/12/2142.abstract>.
- Gneezy, U., S. Meier and P. Rey-Biel. 2011. "When and Why Incentives (Don't) Work to Modify Behavior." *Journal of Economic Perspectives* 25(4): 1–21.
- Grossman, M. 1972. "On the Concept of Health Capital and the Demand for Health." *Journal of*

- Political Economy* 80(2): 223–55.
- Hanks, A., D. Just and B. Wansink. 2013. “Preordering School Lunch Encourages Better Food Choices by Children.” *JAMA Pediatrics* 167(7): 673–74.
- Haynes, L., Service, O., Goldacre, B. et al. 2012. “Test, Learn, Adapt: Developing Public Policy with Randomised Controlled Trials.” Cabinet Office Behavioural Insights Team, London, United Kingdom. Available at: [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/62529/TLA-1906126.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/62529/TLA-1906126.pdf).
- Howell, J. L., and J.A. Shepperd. 2013. “Reducing Health-Information Avoidance Through Contemplation.” *Psychological Science*, July 10.
- Hoyer, W. D. 1984. “An Examination of Consumer Decision Making for a Common Repeat Purchase Product.” *Journal of Consumer Research* 11(3): 822–29. doi:10.2307/2489071
- Huffington Post. 2011. “San Francisco Happy Meal Toy Ban Takes Effect, Sidestepped by McDonald’s.” *Huffington Post*, November 30. Available at: [http://www.huffingtonpost.com/2011/11/30/san-francisco-happy-meal-ban\\_n\\_1121186.html](http://www.huffingtonpost.com/2011/11/30/san-francisco-happy-meal-ban_n_1121186.html).
- Jacobson, P., and J. Wasserman. 1999. “The Implementation and Enforcement of Tobacco Control Laws: Policy Implications for Activists and the Industry.” *Journal of Health Politics, Policy and Law* 24(3): 567–98.
- John, L.K., G. Loewenstein, G., and K.G. Volpp. 2012. “Empirical Observations on Longer-Term Use of Incentives for Weight Loss.” *Preventive Medicine*, supplement, 55:S68–74. doi:10.1016/j.ypmed.2012.01.022.
- Johnson, E., and D. Goldstein. 2004. “Defaults and Donation Decisions.” *Transplantation* 78:1713–16.
- Just, D.R., and B. Wansink. 2009. “Smarter Lunchrooms: Using Behavioral Economics to Improve Meal Selection.” *Choices* 24(3): 1-7.
- Just, D.R., and J. Price. 2011. “Using Incentives to Encourage Healthy Eating in Children.” *Iowa State Working Paper*. Available at: [http://www.econ.iastate.edu/sites/default/files/schoollunchincentives\\_with\\_tables.pdf](http://www.econ.iastate.edu/sites/default/files/schoollunchincentives_with_tables.pdf)
- Kahn, E.B., Ramsey, L.T., Brownson, R.C. et al. 2002. “The Effectiveness of Interventions to Increase Physical Activity: A Systematic Review.” *American Journal of Preventive Medicine*, supplement 1, 22(4): 73–107. doi:http://dx.doi.org/10.1016/S0749-3797(02)00434-8.
- Kahneman, D. 2011. *Thinking, Fast and Slow*, first ed. New York, United States: Farrar, Straus and Giroux.
- Kahneman, D., and A. Tversky. 1979. “Prospect Theory: An Analysis of Decision under Risk.” *Econometrica* 47(2): 263–91.
- Kahneman, D., J.L. Knetsch and R.H. Thaler. 1990. “Experimental Tests of the Endowment Effect and the Coase Theorem.” *Journal of Political Economy* 98(6): 1325–48. Available at: <http://www.jstor.org/stable/2937761>.
- Kane, R. L., Johnson, P. E., Town, R. J. et al. 2004. “A Structured Review of the Effect of Economic Incentives on Consumers’ Preventive Behavior.” *American Journal of Preventive Medicine* 27(4): 327–52.
- Kast, F., S. Meier and D. Pomeranz. 2012. “Under-Savers Anonymous : Evidence on Self-Help Groups and Peer Pressure as Savings Commitment Device.” NBER Working Paper No. 18417 Available at: [http://www.nber.org/papers/w18417.pdf?new\\_window=1](http://www.nber.org/papers/w18417.pdf?new_window=1).

- Kelley, K., Clark, B., Brown, V. et al. 2003. "Good Practice in the Conduct and Reporting of Survey Research." *International Journal for Quality in Health Care* 15(3): 261–266. Available at: <http://intqhc.oxfordjournals.org/content/15/3/261.abstract>.
- Khwaja, A., F. Sloan and S. Chung. 2007. "The Relationship Between Individual Expectations and Behaviors: Mortality Expectations and Smoking Decisions." *Journal of Risk and Uncertainty* 35, 179–201.
- Khwaja, A., Silverman, D., Sloan, F. et al. 2009. "Are Smokers Misinformed?" *Journal of Health Economics* 28:385–97.
- Kiesel, K., and Villas-Boas, S. B. 2013. "Can Information Costs Affect Consumer Choice? Nutritional Labels in a Supermarket Experiment." *International Journal of Industrial Organization* 31(2): 153–63. doi:<http://dx.doi.org/10.1016/j.ijindorg.2010.11.002>.
- Kitzinger, J. 1995. "Introducing Focus Groups." *British Medical Journal* 311:299–302.
- Kremer, M., and D. Levy. 2008. "Peer Effects and Alcohol Use among College Students." *The Journal of Economic Perspectives* 22(3): 189.
- Krummel, D.A., D. Humphries and I. Tessaro. 2002. "Focus Groups on Cardiovascular Health in Rural Women: Implications for Practice." *Journal of Nutrition Education and Behavior* 34(1): 38–46. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/11917670>.
- Lagarde, M., A. Haines and N. Palmer. 2007. "Conditional Cash Transfers for Improving Uptake of Health Interventions in Low- and Middle-Income Countries: A Systematic Review." *JAMA* 298(16): 1900–1910. Available at: <http://dx.doi.org/10.1001/jama.298.16.1900>.
- Laibson, D. I. 1997. "Golden Eggs and Hyperbolic Discounting." *Quarterly Journal of Economics* 112(2): 443–477.
- Lester, R.T., Ritvo, P., Mills, E.J. et al. 2010. "Effects of a Mobile Phone Short Message Service on Antiretroviral Treatment Adherence in Kenya (Weltel Kenya1): A Randomised Trial." *The Lancet* 376(9755): 1838–45. doi:10.1016/S0140-6736(10)61997-6.
- Levav, J., and G.J. Fitzsimons. 2006. "When Questions Change Behavior: The Role of Ease of Representation." *Psychological Science* 17(3): 207–213. doi:10.1111/j.1467-9280.2006.01687.x.
- Leventhal, H., R. Singer and S. Jones. 1965. "Effects of Fear and Specificity of Recommendation upon Attitudes and Behavior." *Journal of Personality and Social Psychology* 34:20–29.
- Levine, D.K. 2009. "Is Behavioral Economics Doomed?" Max Weber Lecture, June 8.
- Lewis, M.A., and C. Neighbors. 2006. "Social Norms Approaches Using Descriptive Drinking Norms Education: A Review of the Research on Personalized Normative Feedback." *Journal of American College Health* 54(4): 213–218. doi:10.3200/JACH.54.4.213-218.
- Luoto, J., Levine, D.I., Albert, J. et al. 2014. "Nudging to Use: Achieving Safe Water Behaviors in Kenya and Bangladesh." *Journal of Development Economics*, forthcoming. DOI: 10.1016/j.jdeveco.2014.02.010
- Luoto, J, Quick, R., Levine, D. et al. 2013. "Integrating Health Products and Behavior Change with Antenatal Services in Kenya." Available at: <http://www.rand.org/labor/centers/rapid/projects/kenya-antenatal-care.html>.
- Lussier, J., Heil, S., Mongeon, J. et al. 2006. "A meta-analysis of voucher-based reinforcement therapy for substance use disorders." *Addiction* 101: 192–203.
- Macdonald, E.K., and B.M. Sharp. 2000. "Brand Awareness Effects on Consumer Decision Making for a Common, Repeat Purchase Product: A Replication." *Journal of Business Research* 48(1): 5–15. doi:[http://dx.doi.org/10.1016/S0148-2963\(98\)00070-8](http://dx.doi.org/10.1016/S0148-2963(98)00070-8).

- Marteau, T.M., Ogilvie, D., Roland, M. et al. 2011. "Judging Nudging: Can Nudging Improve Population Health?" *BMJ*, 342:d228.
- Marteau, T.M., R.E. Ashcroft and A. Oliver. 2009. "Using Financial Incentives to Achieve Healthy Behaviour." *BMJ*, 338(7701): 983-985.
- McClure, S.M., Laibson, D.I., Loewenstein, G. et al. 2004. "Separate Neural Systems Value Immediate and Delayed Monetary Rewards." *Science* 306(5695): 503-07. doi:10.1126/science.1100907.
- McLafferty, I. 2004. "Focus Group Interviews as a Data Collecting Strategy." *Journal of Advanced Nursing* 48(2): 187-94. doi:10.1111/j.1365-2648.2004.03186.x.
- McNeil, B., Pauker, S., Sox, H.J. et al. 1982. "On the Elicitation of Preferences for Alternative Therapies." *New England Journal of Medicine* 306:1259-62.
- Meyerowitz, B., and S. Chaiken. 1987. "The Effect of Message Framing on Breast Self-Examination Attitudes, Intentions, and Behavior." *Journal of Personality and Social Psychology* 52(3): 500-510.
- Moran, W., Nelson, K., Wofford, J. et al. 1996. "Increasing Influenza Immunization among High-Risk Patients: Education or Financial Incentive?" *American Journal of Medicine* 101:612-20.
- Mullainathan, S., and R.H. Thaler. 2000. "Behavioral Economics." NBER Working Paper No. 7948, October. Cambridge, MA, United States: National Bureau of Economic Research. Available at: <http://www.nber.org/papers/w7948>.
- O'Donoghue, T., and M. Rabin. 1999. "Doing It Now or Later." *American Economic Review* 89:103-24.
- . 2000. "The Economics of Immediate Gratification." *Journal of Behavioral Decision Making* 13(2): 233-50.
- Oliver, A. 2012. "Whither Behavioural Economic Policy?" *Health and Social Care*. Available at: <http://blogs.lse.ac.uk/healthandsocialcare/2012/04/12/whither-behavioural-economic-policy/>.
- Pauker, S., S. Pauker and B. McNeil. 1981. "The Effect of Private Attitudes on Public Policy: Prenatal Screening for Neural Tube Defects as a Prototype." *Medical Decision Making* 1:103-14.
- Pederson, S., J. Kang and G. Kline. 2007. "Portion Control Plate for Weight Loss in Obese Patients With Type 2 Diabetes Mellitus." *Archives of Internal Medicine* 167(12): 1277-83.
- Pop-Eleches, C., Thirumurthy, H., Habyarimana, J.P. et al. 2011. "Mobile Phone Technologies Improve Adherence to Antiretroviral Treatment in a Resource-Limited Setting: A Randomized Controlled Trial of Text Message Reminders." *AIDS* 25(00): 1-10. doi:10.1097/QAD.0b013e32834380c1.
- Powell, L.M., J.A. Tauras and H. Ross. 2005. "The Importance of Peer Effects, Cigarette Prices and Tobacco Control Policies for Youth Smoking Behavior." *Journal of Health Economics* 24(5): 950-968. doi:http://dx.doi.org/10.1016/j.jhealeco.2005.02.002.
- Public Health Service. 1964. "Smoking and Health: Report of the Advisory Committee to the Surgeon General of the Public Health Service." DHEW publication No PHS64-1103.
- Rasella, D., Aquino, R., Santos, C.A.T. et al. 2013. "Effect of a Conditional Cash Transfer Programme on Childhood Mortality: A Nationwide Analysis of Brazilian Municipalities." *The Lancet* 382(9886): 57-64. doi:http://dx.doi.org/10.1016/S0140-6736(13)60715-1.

- Rice, T. 2013. "The Behavioral Economics of Health and Health Care." *Annual Review of Public Health* 34:431–47. doi:10.1146/annurev-publhealth-031912-114353.
- Ruhm, C.J. 2012. "Understanding Overeating and Obesity." *Journal of Health Economics* 31(6): 781–796. doi:http://dx.doi.org/10.1016/j.jhealeco.2012.07.004.
- Ryan, R.M., and E.L. Deci. 2000. "Intrinsic and Extrinsic Motivations: Classic Definitions and New Directions." *Contemporary Educational Psychology* 25(1): 54–67.
- Shaw, K., O'Rourke, P., Del Mar, C. et al. 2009. "Psychological Interventions for Overweight or Obesity," review. *Cochrane Database of Systematic Reviews*, No. 1.
- Shiv, B., and A. Fedorikhin. 1999. "Heart and Mind in Conflict: Interplay of Affect and Cognition in Consumer Decision Making." *Journal of Consumer Research* 26, 278–82.
- Simon, H. 1955. "A Behavioral Model of Rational Choice." *The Quarterly Journal of Economics* 69(1): 99–118.
- Slovic, P., Finucane, M.L., Peters, E. et al. 2007. "The Affect Heuristic." *European Journal of Operational Research* 177(3): 1333–52. doi:http://dx.doi.org/10.1016/j.ejor.2005.04.006.
- Sorenson, H. 2009. *Inside the Mind of the Shopper*. Upsaddle River, NJ, United States: Pearson Education.
- Staff, C.W. 2011. "Salt Shakers Disappear from Buenos Aires Tables." *CNN World*. Available at: <http://www.cnn.com/2011/WORLD/americas/06/11/argentina.salt/index.html>.
- Swinburn, B.A., Sacks, K., McPherson, K. et al. 2011. "The Global Obesity Pandemic: Shaped by Global Drivers and Local Environments." *The Lancet* 378:804–14.
- Thaler, R., and C.R. Sunstein. 2009. *Nudge: Improving Decisions about Health, Wealth and Happiness*. New York, United States: Penguin.
- Thaler, R.H., and C.R. Sunstein. 2003. "Libertarian Paternalism." *The American Economic Review* 93(2): 175–79. doi:10.2307/3132220.
- Thaler, R.H., and H.M. Shefrin. 1981. "An Economic Theory of Self-Control." *Journal of Political Economy* 89(2): 392–406. doi:10.2307/1833317.
- Thaler, R.H., and S. Benartzi. 2004. "Save More Tomorrow™: Using Behavioral Economics to Increase Employee Saving." *Journal of Political Economy*, supplement 1, 112: S164–S187. doi:10.1086/380085.
- Thorgeirsson, T., and I. Kawachi. 2013. "Behavioral Economics: Merging Psychology and Economics for Lifestyle Interventions." *American Journal of Preventive Medicine* 44(2): 185–89. doi:10.1016/j.amepre.2012.10.008
- Treadwell, J.R., and L.A. Lenert. 1999. "Health Values and Prospect Theory." *Medical Decision Making*, 19(3): 344–52. doi:10.1177/0272989X9901900313
- Tversky, A., and D. Kahneman. 1974. "Judgment under Uncertainty: Heuristics and Biases." *Science* 185(4157): 1124–31.
- Vanslyke, J.G., Baum, J., Plaza, V. et al. 2008. "HPV and Cervical Cancer Testing and Prevention: Knowledge, Beliefs, and Attitudes among Hispanic Women." *Qualitative Health Research* 18(5): 584–96. doi:10.1177/1049732308315734.
- Variyam, J.N., and J. Cawley. 2006. "Nutrition Labels and Obesity." NBER Working Paper No. 11956. Cambridge, MA, United States: National Bureau of Economic Research. Available at: <http://www.nber.org/papers/w11956>.
- Vohs, K., and T. Heatherton. 2000. "Self-Regulatory Failure: A Resource-Depletion Approach." *Psychological Science* 11(3): 249–54.
- Volpp, K.G., John, L.K., Troxel, A. et al. 2008. "Financial Incentive-Based Approaches for Weight Loss: A Randomized Trial." *JAMA* 300:2631–37.

- Volpp, K., Levy, A., Asch, D. et al. 2006. "A Randomized Controlled Trial of Financial Incentives for Smoking Cessation." *Cancer Epidemiology, Biomarkers and Prevention* : A Publication of the American Association for Cancer Research, Cosponsored by the American Society of Preventive Oncology 15:12–18.
- Volpp, K.G., Loewenstein, G., Troxel, A.B. et al. 2008. "A Test of Financial Incentives to Improve Warfarin Adherence." *BMC Health Services Research* 8:272. doi:10.1186/1472-6963-8-272.
- Walcott-McQuigg, J.A, and T.R. Prohaska. 2000. "Factors Influencing Participation of African American Elders in Exercise Behavior." *Public Health Nursing* 18(3): 194–203. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/11359621>.
- Wansink, B. 2004. "Environmental Factors That Increase the Food Intake and Consumption Volume of Unknowing Consumers." *Annual Review of Nutrition* 24, 455–79.
- . 2007. *Mindless Eating: Why We Eat More Than We Think*. New York, United States: Bantam Dell.
- Wansink, B., J. Painter and J. North. 2005. "Bottomless Bowls: Why Visual Cues of Portion Size May Influence Intake." *Obesity Research* 13(1): 93–100.
- Wansink, B., and J. Sobal. 2007. "Mindless Eating: The 200 Daily Food Decisions We Overlook." *Environment and Behavior* 39 (1): 106–23. doi:10.1177/0013916506295573.
- Waterlander, W.E., de Boer, M.R., Schuit, A.J. et al. 2013. "Price discounts significantly enhance fruit and vegetable purchases when combined with nutrition education: a randomized controlled supermarket trial." *The American Journal of Clinical Nutrition* 97(4): 886–95. doi:10.3945/ajcn.112.041632.
- Waterlander, W.E., Steenhuis, I., de Boer, M. et al. 2012a. "The Effects of a 25% Discount on Fruits and Vegetables: Results of a Randomized Trial in a Three-Dimensional Web-Based Supermarket." *International Journal of Behavioral Nutrition and Physical Activity* 9(11).
- Waterlander, W.E., Steenhuis, I.H.M., de Boer, M.R. et al. 2012b. "Introducing Taxes, Subsidies or Both: The Effects of Various Food Pricing Strategies in a Web-Based Supermarket Randomized Trial." *Preventive Medicine* 54(5): 323–30. doi:10.1016/j.ypmed.2012.02.009.
- Waterlander, W.E., Steenhuis, I.H.M., de Boer, M.R. et al. 2013. "Effects of Different Discount Levels on Healthy Products Coupled with a Healthy Choice Label, Special Offer Label or Both: Results from a Web-Based Supermarket Experiment." *International Journal of Behavioral Nutrition and Physical Activity* 10(59).
- Webb, T., and P. Sheeran. 2006. "Does Changing Behavioral Intentions Engender Behavior Change? A Meta-Analysis of the Experimental Evidence." *Psychological Bulletin* 132(2): 249–68.
- Wilkinson, N. 2008. *An Introduction to Behavioral Economics*, first ed. New York, United States: Palgrave Macmillan.
- WHO (World Health Organization). 2006. "Preventing Chronic Diseases - A Vital Investment." Geneva, Switzerland: World Health Organization.
- . 2013. "Noncommunicable Diseases Fact Sheet. March 2013 Fact Sheet." Geneva, Switzerland: World Health Organization. Available at: <http://www.who.int/mediacentre/factsheets/fs355/en/>.
- Zazonc, R. 1980. "Feeling and Thinking: Preferences Need No Inferences." *American Psychologist* 35(2): 151–75.

Zimmerman, F.J. 2009. "Using Behavioral Economics to Promote Physical Activity." *Preventive Medicine* 49(4): 289–91. doi:10.1016/j.ypmed.2009.07.008.