

## The Hot–Cold Decision Triangle: A framework for healthier choices

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**Abstract** People often behave in ways that are clearly detrimental to their health. We review representative research on unhealthy behaviors within a parsimonious framework, the Hot-Cold Decision Triangle. Through this framework, we describe how when people embrace colder state reasoning—instead of risking the pitfalls of heuristics and visceral reactions—they are more likely to behave healthily. We also illustrate how some heuristics and visceral urges can be leveraged to encourage healthier choices. We conclude by discussing unexplored research directions, as well as substantive implications for individuals, marketers, and policymakers.

**Keywords** Judgment and decision making · Health goals · Healthier decisions · Self-regulation · Self-control

Many health problems are, ironically, self-inflicted—people frequently behave in ways that are known to be detrimental to their long-term wellbeing. For example,

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people forsake future health for the immediate gratification provided by indulgent eating, cigarette smoking, alcohol consumption, and unprotected sex, as well as to avoid the effort required for regular exercise, a healthy diet, and routine medical checkups. Such behaviors can have dire consequences including premature death, skyrocketing healthcare costs, and lower quality of life (World Health Organization 2002).

We propose a framework, the Hot–Cold Decision Triangle, which builds on research about cognitive systems (e.g., Kahneman and Tversky 2000; Stanovich and West 2000) and visceral influences (e.g., Loewenstein 1996). We review health-related research in the context of this framework and discuss how people can behave more healthily by embracing colder-state reasoning and by either avoiding pitfalls of heuristics and visceral reactions or leveraging them to foster healthier choices. This review supplements insightful perspectives on why people’s behavior is often at odds with their long-term goals (e.g., Batra et al. 2011; Baumeister et al. 1994; Fujita et al. 2006; Hoch and Loewenstein 1991; Thaler and Shefrin 1981).

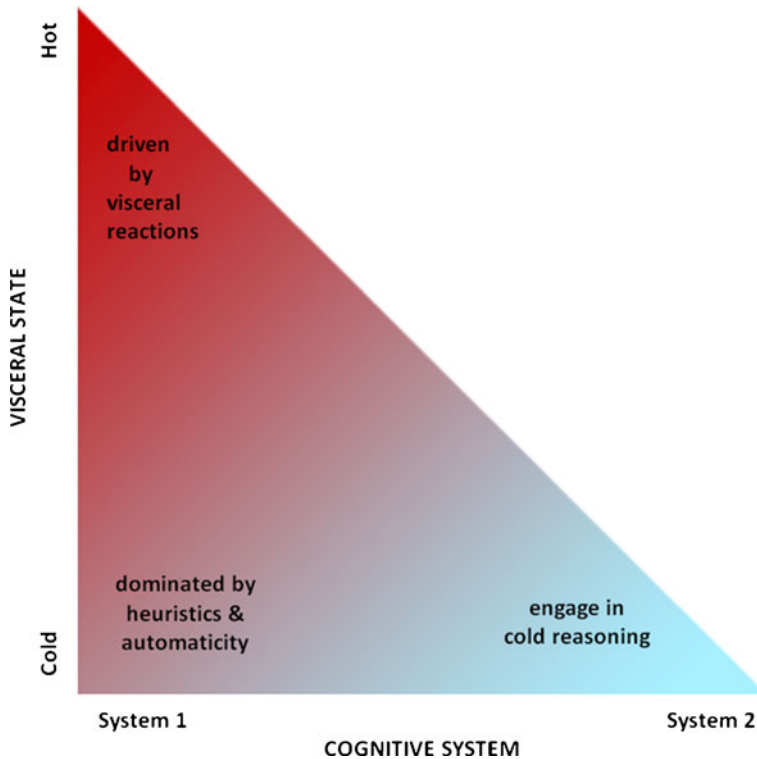
In what follows, we first present our framework, then review select research on improving health-related decision-making and discuss underexplored research areas and gaps in the literature. We conclude with a discussion of substantive implications for individuals, marketers, and policy makers.

## 1 The Hot–Cold Decision Triangle

Voluminous research about decision making suggests that human behavior is guided by two types of processes (see, e.g., Kahneman and Frederick 2002), referred to as System 1 and System 2. Whereas System 1 tends to operate quickly, effortlessly, and automatically, the operations of System 2 are typically slower, more effortful, and deliberate. System 1 judgments are based on percepts, intuitions, and emotions, while System 2 judgments reflect more in-depth logical analysis and reasoning. While how people utilize either system depends on the context, System 1 tends to be efficient and effective, and often guides much of our behavior. System 2 loosely monitors the output of System 1 (Kahneman and Frederick 2002; Stanovich and West 2000). Engaging in additional mental activities, for example, attenuates System 2’s ability to monitor and modify the output of System 1 (Gilbert 2002).

Loewenstein’s (1996) pioneering work on visceral influences also sheds light on why people may behave unhealthily. Visceral urges such as hunger, thirst, pain, and sexual arousal can result in unhealthy behaviors even when the detrimental consequences are predictable. This is because hot visceral states impel people to myopically fixate on satisfying their immediate urges.

Our framework draws on research on cognitive systems and visceral influences to suggest that, *ceteris paribus*, the likelihood of choosing healthier options is influenced by the extent to which the person is in a viscerally hot state and the extent to which Systems 1 versus 2 is utilized in the decision. The impact of rational thinking and visceral urges can be visualized using, what we refer to as the Hot–Cold Decision Triangle. As Fig. 1 illustrates, in a hot state (red, upper-left area of the Triangle), people’s decisions predominantly reflect visceral reactions (e.g., deciding whether to engage in unsafe sex when a person is aroused); unhealthy options satisfying visceral urges tend to be preferred over healthier options congruent with long-term goals. The



**Fig. 1** The Hot–Cold Decision Triangle

twilight area (bottom-left part of the Triangle) involves choice contexts in which visceral influence is limited and decisions are based on System 1 processing (e.g., continuing to consume the food in one's plate even when one is sated). While decisions produced in this area of the Triangle are not necessarily poor, unhealthy options are often not carefully scrutinized and heuristics and automaticity that are detrimental to health can be left unchecked. Finally, in the blue area (bottom-right part of the Triangle) where decisions are guided by System 2 processes (e.g., verifying the calories and fat content of entrée items before ordering), healthier options are more likely to be selected as the result of cold reasoning and deliberation.

The triangular structure of the framework portrays the relationship between cognitive processes and visceral influences. System 2 processing and the hot visceral state are two extremes of a conceptual continuum: Experiencing hot visceral reactions (e.g., sexual arousal, hunger) inhibit System 2 processing that could promote healthier choices. Conversely, using cold reasoning and trade-off analysis through System 2 *before* visceral reactions kick in (e.g., contemplating specific health drawbacks of consuming fatty foods before entering a restaurant) can help circumvent the onset of visceral urges, reducing the likelihood that a hot state will take over.

Furthermore, we propose that, as being under the spell of visceral urges inhibits System 2 processing, individuals may rely more on System 1 to make decisions. That is, a hot state can increase the use of heuristics and automatic processes (e.g., opting for a default, high-calorie entrée item when sleep deprived), because taking this path

is relatively effortless and does not require activating and engaging System 2. Conversely, operating at System 1 level entails less deliberation on long-term consequences, leaving the decision maker more susceptible to the onset of visceral urges—pulled into a hot state (e.g., Hinson et al. 2003; Shiv and Fedorikhin 1999).

The framework discussed above advances two general notions. First, healthier choices are more likely when people avoid pitfalls of hot visceral urges, automaticity and heuristics, and engage in colder reasoning. Second, there are opportunities for decision-makers themselves, marketers, or policymakers to leverage the same visceral urges, automaticity, and heuristics that hamper good decision making to foster healthier decisions without limiting people's freedom to choose (cf. Ratner et al. 2008; Thaler and Sunstein 2008).

In the following sections, we review findings from different research streams in the context of our framework and the two general notions we propose.

## 2 The red area of visceral influence

Physical or temporal proximity to stimuli inducing visceral reactions (red, upper-left area of the Triangle) can greatly tax people's ability to make thoughtful decisions, putting them under the Sirens' spell of visceral urges (Loewenstein 1996). For example, compared with men who were not sexually aroused, men who were aroused reported greater willingness to practice unsafe, morally questionable sexual behaviors (Ariely and Loewenstein 2006), and lower estimates of the risk of contracting sexually transmitted diseases (Blanton and Gerrard 1997). As another example, participants who were sated purchased less food at grocery stores than those who were hungry (Nisbett and Kanouse 1968).

Many firms intentionally evoke consumers' visceral reactions to sell unhealthy goods. Some restaurants, for example, lure pedestrians by pumping seductive scents from their kitchens outside. Others have diners choose from a tray of tantalizing desserts that is brought to their table rather than having those patrons select from a menu. In such situations, policy-level interventions can help engineer "cooler" decision environments in which consumers will be under less influence of viscerally hot states and more likely to choose healthy options.

Research on what was named the "hot-cold empathy gap," sheds light on one reason that it is difficult for consumers to behave healthily—individuals in colder states incorrectly predict their own hot-state behaviors (Loewenstein 1996). For instance, men who were sexually aroused predicted that they would be more likely to engage in aggressive sexual behaviors (Loewenstein et al. 1997). As another example, compared with predictions of people who were about to exercise, people who had just finished exercising and were dehydrated and thirsty predicted that they would be more troubled by thirst if they were lost in wilderness (van Boven and Loewenstein 2003).

Such research findings support our first principle: Individuals can be better off making decisions when they are psychologically distant (e.g., temporally or physically removed; Fujita et al. 2006) from hot visceral states. Without seductive visual, olfactory, or tactile cues, people are less likely to experience visceral reactions and thus more likely to select healthier options. For instance, ordering from a menu

without alluring images of decadent options may help increase the psychological distance and hence reduce the urge to make unhealthy choices. Another example is to have decision makers pre-commit to healthier courses of action before they are exposed to situations that trigger visceral reactions (Hoch and Loewenstein 1991; Thaler and Shefrin 1981). To illustrate, people sometimes strategically ration access to unhealthy goods on their own (e.g., Wertenbroch 1998); people seeking to curb drinking and eating may bring just enough money for a single drink when going to a bar, or stock only healthy foods at home so that temptation cannot be easily given in to. Pre-commitment to a healthier course of action can be further leveraged by the pain of paying. For instance, in a recent field study, smokers were asked to sign up for a “Committed Action to Reduce and End Smoking” contract that required them to deposit money into a savings account and allowed the bank to forfeit their entire balance to charity if they failed to quit smoking in 6 months. Compared with smokers who were not offered the pre-commitment contract, those who committed to the contract were about 30% more likely to have quit smoking at the 6-month mark (Giné et al. 2009).

The power of visceral reactions can perhaps be harnessed to help consumers behave healthily. While the evidence for this possibility is mostly anecdotal, we find this an interesting area for future research. For example, over time, policy- and societal-level drives have imbued some unhealthy goods with negative visceral reactions: Cigarettes were once touted as a symbol of glamour and sophistication, but now elicit immediate disgust from large sections of the population. For some, fast food images do the same. Conversely, positive visceral reactions can perhaps be utilized to reinforce healthy choices, helping to sustain healthy behaviors. People can also placate their visceral urges without giving in to them entirely. For example, hungry people may do well to start meals by eating vegetables and fruits or drinking water to take the edge off their hunger and allow subsequent consumption decisions to be less viscerally driven. Furthermore, obtaining pleasure in a domain that is not detrimental to health may also help satiate unhealthy desires in other domains. For instance, it might be possible that experiencing strong emotions such as joy and contentment can reduce the influence of visceral urges such as cravings for fatty food or binge drinking. Systematic investigation of ways to facilitate positive visceral reactions to curb unhealthy behaviors could yield useful strategies for individuals and insights for policy makers.

### 3 The twilight area of heuristics and automaticity

In addition to adopting approaches that help them to steer clear of the Triangle’s red-hot area, people must be mindful of pervasive pitfalls of heuristics and automaticity in the twilight area of the Triangle (bottom-left part of Fig. 1). This is difficult because cognitive resources are scarce, and people tend to minimize mental efforts by taking the path of least resistance. Thus, the heuristics and automatic judgments and decisions produced by System 1, even when they are clearly detrimental to health, are often left unchecked (Kahneman and Frederick 2002). In this section, we review some heuristics and automaticity that hamper good decision making and discuss how System 1 can be leveraged to help people make more healthy choices.

### 3.1 External cues vs. physiological signals

Judgments and decisions are reference-dependent (Tversky and Kahneman 1974). For example, people tend to use the size of food package or serving dish as a guide to assess how much food they should consume, as package sizes are implicit indicators of consumption norms—presumably what other people typically consume (Herman and Polivy 2008). In one study, participants were asked to pour, from either a small package or a larger one, the amount of pasta they would use to prepare a dinner for two. Participants in the large-package condition poured significantly more pasta than those in the small-package condition (Wansink 1996). The same effect of packaging was observed with different product categories (e.g., oil, chocolate) and different types of packaging (e.g., bottle, bag). Similarly, people consume more with larger kitchenware (e.g., plates, bowls; Wansink 2010).

Perceptual distortions are also a major cause of excessive consumption. For example, because the taller of two equi-volume objects appears larger (Piaget 1969), people drink more when using a short and wide glass versus a tall and slender one (e.g., Raghubir and Krishna 1999). Even professional bartenders, with years of pouring experience, could not overcome the influence of this elongation bias—they mistakenly poured, on average, 20.5% more alcohol in short, wide glasses than in tall, slender glasses of equal volume (Wansink and van Ittersum 2003). Furthermore, other perceptual distortions such as perceived variety of food assortment can also lead to excessive consumption (Kahn and Wansink 2004).

External references are sometimes derived from social contexts (see Herman et al. 2003 for a review). For instance, people tend to consume more food when those whom they dine with eat more. This social referencing effect has been shown to be largely unconscious and occur irrespective of individual differences such as whether participants are obese or normal-weight (Rosenthal and McSweeney 1979).

People sometimes rely so heavily on external cues that they pay little attention to internal, physiological signals such as feelings of satiation. For example, Wansink et al. (2005) designed a soup bowl that slowly refilled itself from the bottom. Participants who unknowingly ate from these “bottomless” bowls consumed 73% more on average than those eating from regular bowls with a fixed amount of soup. More generally, rather than monitoring physiological signals to assess satiety, people often rely more on simple external cues such as whether their plate is empty. There are, of course, individual differences. For example, Parisians reported being more likely to rely on internal cues (e.g., when they were no longer hungry, or food no longer tasted good) to decide whether they had eaten enough, whereas Chicagoans were more likely to rely on external cues (e.g., when they emptied their plate; Wansink et al. 2007).

The size of food portions and dishes has steadily increased over the years (Wansink 2006). There is a strong correlation between growth of portion sizes and the increased prevalence of obesity in the United States. For example, in the 1950s, McDonald’s offered one size of fries, equivalent in size to what is now considered a ‘small’ and is about one third the size of a large order today (Young and Nestle 2002). Given the extant findings that the impact of external cues is often unconscious (Vartanian et al. 2008), a simple means to help promote healthy behaviors is to preemptively modify and design external references, making them work for, rather

than against consumers' wellbeing (cf. Thaler and Sunstein 2008). Note that fostering healthy choices need not conflict with firms' bottom line. In fact, offering healthy products (e.g., those by Weight Watcher) can be highly profitable.

Our understanding of the complex effects of external references on decision making is far from complete. For example, using smaller plates for meals was shown to help people lose about 2 lb of weight per month (Wansink 2010). However, it is unknown how sustainable such effects are and whether when, for example, the cafeteria one eats lunch in adopts smaller portion sizes the person would eat more for breakfast and dinner at home. It is also unknown how much synergy there is between adopting multiple approaches simultaneously (e.g., smaller portions and changing cafeteria layout).

Complicating the matter further, extant studies also show that when food comes in small rather than large package sizes, people deliberate less before consumption and thus eat more (e.g., Coelho do Vale et al. 2007). Future research could thus investigate, for example, how people's focal goals (e.g., highlighting health goals vs. balancing multiple goals; cf. Dhar and Simonson 1999) at the time of decision making interact with external references. Future research could also explore how individual predispositions (e.g., locus of control, self-efficacy, self-esteem, self-monitoring, etc.) affect use of external references, as such research findings could help personalize the design of decision environments, improving the effectiveness of interventions.

### 3.2 Prominence of the negative

Decision makers are generally more sensitive to negative changes than to equivalent positive ones. For example, giving up an object hurts more than acquiring the same object feels good (Kahneman and Tversky 1979). That is, the prospect of a loss is often a stronger motivator than that of equivalent gains. This offers a powerful approach to stimulate people to make more healthy choices by pitting one visceral response (pain of loss) against another (e.g., craving for cigarettes; Giné et al. 2009). Similarly, the greater sensitivity to losses can be leveraged to increase the choice likelihood of healthier options. For example, in one experimental study, consumers were asked to either build up a basic pizza by adding [potentially unhealthy] ingredients such as sausage and pepperoni, or scale down from a fully loaded product by removing ingredients; consistent with loss aversion, consumers in the subtractive condition ended up with pizzas that had significantly more ingredients than those in the additive condition (Levin et al. 2002).

### 3.3 Defaults and habits

The power of inertia—the tendency to stick with defaults—can improve health-related decisions. For example, in countries where organ donation was the default and the alternative was to opt out, the percentage of citizens who volunteered to be donors was much higher than in countries where the default was not to donate and the alternative was to opt in (Johnson and Goldstein 2003). Thus, setting up default options that are healthier and more beneficial to individuals and society can encourage people, without significantly affecting the freedom of choice, to select better



options (Loewenstein et al. 2007; Halpern et al. 2007; Ratner et al. 2008; Thaler and Sunstein 2008). For instance, if health checkups were automatically scheduled and charged by default so that patients not wishing to be tested would have to cancel them and ask for a refund, more may be saved from devastating diseases.

The robust effects of inertia are also manifested in habits, which are largely effortless and automatic and are often a stronger predictor of future behavior than established antecedents of behavior such as attitudes and intentions (Fishbein and Ajzen 2010). For example, many people consume more food at dinner than at lunch or breakfast, simply because they have done so in the past (Khare and Inman 2006). Many also always finish the food on the plate—a habit ingrained since childhood. Helping people form healthier habits would be a key ingredient to improving health but may not be easily attained. For example, developing a habit of “using stairs not escalators or elevators” may be difficult for people to adopt. On the other hand, habitually “drinking water before eating” might be more realistically achievable by a high proportion of people.

Despite the importance of habits in helping people become healthier, research in this domain has been limited. Future research could investigate, for example, how externally posed rules (e.g., eat a large portion of vegetables at the beginning of a meal; exercise 30 min every morning) can be internalized and habituated. Financial incentives could be helpful in increasing the likelihood that people initially adopt such behaviors, though determining how to design incentives to maximize the likelihood of habit formation is very much work in progress (Charness and Gneezy 2009). Furthermore, the likelihood of success may be higher in domains like smoking where there are many external negative reinforcements such as bans on smoking in public places or employment sites; in stark contrast, in the case of obesity, external temptations abound and maintenance of weight loss is incredibly difficult (John et al. 2011; Volpp et al. 2008, 2009). Understanding this process can help address such issues as which types of rules are better adhered to and more likely to be adopted as habits, when an external impetus (e.g., vegetable dishes sold at discounted prices, free gym membership) can be removed without reducing healthy behaviors, and how rules and habits can be effectively utilized to thwart visceral reactions.

### 3.4 Presentation

Presenting information about unhealthy goods in a negative rather than a positive light (due to regulations, marketers' decisions, or consumers' own framing) can influence consumption. For example, the same ground beef was evaluated as more tasty when it was labeled as “75% lean” rather than “25% fat” (Levin and Gaeth 1988). Thus, if food products were required to indicate *prominently* the percentage of fat they contain, people may be more likely to avoid foods with high fat content.

Similarly, health promotion information can also be presented more impactfully. For example, women who viewed loss-framed information (e.g., “if a cancer has spread, it is more likely to be fatal”) were more likely to obtain a mammogram examination within 12 months than those who received gain-framed information (e.g., “if a cancer has not spread, it is less likely to be fatal,” Banks et al. 1995). In contrast, other research shows that beach-goers who were given gain-framed health information (e.g., “using sunscreen increases your chances of maintaining healthy,



young-looking skin”) were more likely to use sunscreen than those who read loss-framed information (e.g., “not using sunscreen increases your risk for skin cancer and prematurely aged skin;” Detweiler et al. 1999). Future research could thus improve our understanding of the mechanisms and applications of presentation in changing unhealthy behaviors. For example, future studies could examine conditions under which framing information negatively triggers reactance that decreases, rather than increases, desired behaviors.

#### 4 The blue area of cold reasoning

The blue area of cold reasoning (lower-right part of the Triangle in Fig. 1) allows people to more carefully consider health-related decisions. Being in this area of the Triangle, people are removed from viscerally hot states and are using System 2 to reason logically; they are thus better at considering long-term self-interests, scrutinizing consequences of short-term gratification, and reducing myopic tendencies. One of the big opportunities is to systematically test ways to help people who make well-reasoned decisions in cold states, such as how recovering addicts who want to take control of their lives can avoid viscerally hot states where temptation will be difficult to resist. An interesting example of application that uses a pre-commitment device is the development of the Addiction Comprehensive Health Enhancement Support System at the University of Wisconsin (<http://www.chess.wisc.edu/chess/projects/AddictionChess.aspx>) in which individuals can enroll in a program (in a cold state) in which their mobile device automatically signals a counselor whenever they are approaching a pre-identified area that has been identified as a danger zone for drug activity and relapse. This triggers immediate communication from a counselor that can help to intervene to prevent the addict from getting closer to an area that may put them into a hot state. While data on the effectiveness of this intervention are not yet available, this type of approach could hold great promise.

While people tend to behave more healthily in cold states, the blue area of the Triangle can also be fraught with challenges to healthy behavior and in some cases, produce decisions that are not better than those evoked by System 1 and visceral reactions. We review some of these challenges below.

##### 4.1 Single-mindedness

An important characteristic of System 2 is that sufficient cognitive resources are needed to fuel the operations of its mental machinery. When such resources are otherwise engaged, System 2 may not be able to properly process new input (Gilbert 2002), leaving judgments and decisions produced by System 1 and visceral reactions unchecked. For example, when consumers’ cognitive resources are constrained (even by simple tasks such as memorizing a seven-digit number), they are more likely to choose options with higher immediate affective rewards (e.g., decadent snacks). Conversely, when processing resources are less constrained, people are more likely to select options with more favorable cognitions (e.g., healthier desserts; Shiv and Fedorikhin 1999). Research also shows that the more working memory is constrained, the more people discount the value of delayed rewards (Hinson et al. 2003). These

findings suggest that choosing healthier options requires decision makers to minimize mental distractions and focus their mental resources on the task at hand. In fact, results of a recent field study suggest that reducing distractions at eating time (e.g., turning off TV), enabled participants to lose over 1.5 lb per month (Wansink 2010). Furthermore, consumers also tend to behave more healthily if selecting unhealthy options is made less convenient and more cognitively demanding (e.g., Wisdom et al. 2010). Despite its importance and practical implications, research on how to help decision makers cope with cognitive resource constraints is limited. Given the increasing prevalence of handheld electronic communication and entertainment devices, it seems likely that individuals have and will continue to have increased demand on their limited cognitive resource capacity, making research that could help people offset these distractions important. Future studies could investigate, for example, whether self-enforced blackout periods on using handheld devices can help reduce distractions in the environment and lead to more healthy decisions.

#### 4.2 Conserving mental fuel

The operation of System 2 has been likened to that of a muscle—once expended and tired, it is less able to operate properly. In other words, prior operations of the mental machinery can significantly impair its regulatory capability (e.g., Baumeister et al. 1994). For instance, people who completed tasks such as making decisions involving difficult trade-offs that depleted their cognitive resources were more likely to choose unhealthy self-indulgent options (e.g., chocolate cake) over healthy ones (e.g., fruit salad; Bruyneel et al. 2006). Thus, to ensure that decisions are made in the blue area of the Triangle where System 2 has sufficient resources to deliberate rationally and regulate behavior effectively, individuals could, for example, prioritize upcoming decisions according to their impact on health. Given the widespread use of smartphones and tablet computers, convenient decision aid apps can be developed to help consumers prioritize acquisition decisions, track their purchases, and alert them to unhealthy choices. Knowing that their willpower is likely to be depleted, foresighted individuals can also utilize a preemptive strategy at the beginning of a month or at the beginning of a day, pre-committing to a healthier course of action before System 2 tires out. For instance, pre-ordering lunch at the beginning of a day should increase the likelihood of selecting healthier items than if food decisions are made after half a day of work and under the visceral influence of hunger.

Though pioneering research has uncovered important insights on how to help people replenish the resources for System 2 (e.g., thinking about one's life values; Schmeichel and Vohs 2009), current understanding of mechanisms through which cognitive resources are rejuvenated is incomplete. Future research could study such mechanisms to identify practical strategies to help people recharge their “blue batteries.” For example, depletion may partly be due to a generalized licensing effect (Khan and Dhar 2006)—engaging in laborious prior tasks (e.g., working all day) allows the person to, consciously or unconsciously, grant herself a license to seek gratifying rewards. If this is the case, reward stimuli could be “tweaked” to fulfill the license yet not harm health (e.g., playing with a pet or watching a brief comedy video clip before ordering food and drink). Moreover, given that expectations can strongly influence consumer behavior (e.g., Shiv et al. 2005), future research could, for

example, investigate whether consuming a calorie-free placebo energy drink that supposedly replenishes self-regulatory resources may help empower people to choose healthier options (Wathieu et al. 2002).

#### 4.3 Motivated reasoning

Our discussion thus far assumed that people wish to become healthier and want to regulate their behavior. Without such a goal, available cognitive resources will be of little use. For instance, whereas dieters consumed significantly more food when their mental resources were depleted, non-dieters were largely unaffected (Vohs and Heatherton 2000). But how can people who do not have a goal to behave virtuously be motivated to do so? One approach is to use social marketing or educational programs to help people understand the risks associated with unhealthy behaviors and the benefits of staying healthy (see Grier and Bryant 2005 for a review). However, effectiveness of such endeavors has been limited. For example, though older adolescents know about the transmission of AIDS, few change their sexual behaviors (Roscoe and Kruger 1990). While recent research has yielded useful insights on moderating factors such as risk ambiguity and self-positivity bias (see Menon et al. 2008 for a review), additional research is needed to uncover other moderating and mediating variables and help improve the impact of risk/benefit awareness on modifying behaviors.

Another possibility is to channel extant intrinsic motivations, such as the wish to maintain a desirable social identity and aversion to being stigmatized, to improve health-related decisions. Indeed, many recent studies have shown that people tend to favor goods and behaviors associated with in-groups and aspirational groups, and avoid products and behaviors linked to dissociative out-groups (e.g., McFerran et al. 2010). For example, university students consumed significantly less alcohol after they were told that alcohol consumption is closely associated with a dissociative out-group. Similarly, restaurant patrons chose more healthy items when informed that junk food is a marker of a dissociative out-group (Berger and Rand 2008). Even motivations that are not entirely genuine can be leveraged. For instance, impression management—the tendency to control behaviors to appear normatively appropriate—was shown to reduce food consumption. In one study, diners in a cafeteria finished their meals more quickly and consumed less food when a life-sized statue of a human head was positioned to stare at them (Lee and Goldman 1979). Future research should supplement these encouraging findings, to better understand stigmatization and other types of motivations that can be leveraged to improve health-related decision making. For instance, successful stigmatization of smoking in some societies may offer opportunities for psychologists and sociologists to examine the process and determinants of stigmatization in the field.

External impetuses can also be utilized to motivate behavior. For example, relationships and social support can promote healthy behaviors (e.g., Uchino et al. 1996). Despite wide popularity of online social networks, blogs, and instant messengers, few studies have investigated how such ubiquitous communication tools can be leveraged to motivate healthy choices. Future research could explore, for instance, whether and how having an e-buddy who regularly checks up on an individual, reminding her to make thoughtful choices, may help sustain healthy behavior.

Some forms of external motivation, such as financial incentives, have been shown to improve smoking cessation rates and weight loss (John et al. 2011; Volpp et al. 2008, 2009) and even abstinence from narcotics (Higgins and Silverman 1999). Within the United States, employers are rushing to adopt such programs at high rates due to the belief that this will help moderate increases in health care costs by fostering healthy lifestyles (Volpp et al. 2011). Overall, however, there is little research that carefully examined effects of large-scale programs incentivizing healthy behaviors. Future studies could explore such issues as what incentives are effective at changing particular behaviors in employer-sponsored or community-based health initiatives and how to make the changed behavior persist after incentives are removed. Large-scale field studies could offer the type of compelling evidence that policymakers need to support legislative efforts and encourage private sector firms to adopt well-designed effective programs.

Note that factors such as genetic predispositions (e.g., abnormal secretion of hunger-causing hormones) may make it difficult for some individuals to overcome self-control conflicts even if they wish to behave healthily. In such cases, medical treatment such as bariatric surgery may be called for. Furthermore, there are significant cross-cultural decision-making differences that pertain to health domains. For instance, the well-known finding that giving up an item, such as a decadent chocolate bar, hurts more than acquiring the same object feels good (Kahneman et al. 1990) is true for Westerners but not necessarily for East Asians (Maddux et al. 2010). Future studies could explore how factors such as genetics and culture interact with elements of the Triangle we discussed in this paper, to provide a more complete perspective of healthy decision-making.

## 5 Conclusion

Health-related decisions are clearly important to individuals and society as a whole. However, such decisions are inherently complex, often involving intricate combinations of situational, psychological, and physiological factors. In this paper, we review some research streams in the context of a proposed framework—the Hot-Cold Decision Triangle—and distill general principles underlying decision-making in health-related domains. We describe how when people avoid pitfalls of heuristics and visceral reactions but embrace colder hyperopic reasoning, or when visceral factors and heuristics are leveraged to foster healthier choices, people can behave more healthily.

Apart from its obvious personal and societal contributions, helping people make healthier choices can be very profitable. For instance, Weight Watchers offers a wide range of products and services related to dieting, weight loss, and weight maintenance, generating \$1.5 billion in revenue and \$194.2 million in net income in 2010. Moreover, creating products that assist consumers with pre-commitment and overcoming visceral urges can attract public attention, helping firms establish an innovative image and allowing purveyors and marketers to add value and charge correspondingly higher prices. Furthermore, new products that fulfill consumers' needs for healthy lifestyle can be immensely popular. For example, Nintendo's Wii Fit—video games that help people engage in a wide spectrum of entertaining physical

exercises at home—were purchased by over 40 million households worldwide and helped improve the firm’s standing. More generally, supporting consumer wellbeing may help firms prevent potential societal backlash and reduce the likelihood of punitive legislation (e.g., the temperance movement and subsequent prohibition of alcohol). Firms may also reduce their healthcare costs by implementing policies that improve the health of their employees.

Since pitfalls of visceral urges and heuristics can be difficult to overcome without external impetus, policy-level interventions may well help. By providing incentives for healthy behaviors (e.g., tax deductions for regular physical exercise, reduced taxation of healthy foods, cash rewards for smoking cessation) or penalizing unhealthy choices (e.g., heavy levy on decadent foods, tobacco, or alcohol), policy-makers can (paternalistically) help people make healthier and more socially beneficial choices. Policies not aligned with health interests of the public should be reconsidered. For example, farm subsidies should be applied to healthy fruits and vegetables rather than to corn that is used to produce low-cost high-fructose syrup.

Much of the existing academic research of health-related decisions has focused on internal validity that requires sterilizing the effect of all factors other than the focal one. Though this approach is critical for theory testing, it does not always produce sufficient evidence for policymakers. More large-scale field studies (à la the National Mindless Eating Challenge, Wansink 2010) are needed to validate our knowledge of changing unhealthy behaviors and provide unequivocal, convincing, and digestible evidence to support changes to policies and regulations. With future research bringing deeper and more practical insights on the Hot-Cold Decision Triangle, policymakers, marketers, and consumers themselves will be better able to make decisions that are beneficial to individuals’ health and society as a whole.

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