Using Curiosity to Increase the Choice of "Should" Options

Evan Polman

University of Wisconsin-Madison

Rachel L. Ruttan

Northwestern University

Joann Peck

University of Wisconsin-Madison

Abstract

Understanding the antecedents to individuals' choices has led to the creation of innovative interventions, which help organizations create policies that steer people toward desired behaviors ("shoulds"). Drawing on people's curiosity, we tested a previously unexplored solution to increasing "shoulds." Past work has shown that people are motivated to satisfy their curiosity, and find enjoyment in doing so. Our work shows that piquing people's curiosity can also influence their choices, by steering them away from tempting "want" options (e.g., choosing unhealthy foods, watching lowbrow films, taking the elevator), and toward less-than-tempting, though normatively desirable "should" options. In two lab and two field studies, we created "curiosity gaps" – interventions that piqued people's curiosity with special fortune cookies, magic tricks, trivia, and jokes – and promised to fill the gaps provided people choose the "should" options over the "want" options. In all, our interventions were successful and highlight the external validity of our research; notably in our field studies, we observed a 9.8% increase in stairwell-use, and a 10% increase in fruits-and-vegetables purchases when our curiosity interventions were imposed.

Keywords: want/should conflicts; curiosity; curiosity gaps; self-control; field experiments

News and entertainment websites often increase online traffic by tantalizing readers with sensational headlines containing phrases such as: *YOU WON'T BELIEVE WHAT HAPPENED NEXT*, or *YOU'LL BE SHOCKED WHEN YOU SEE THIS*, or *17 SECRETS YOU DON'T WANT TO KNOW*. Called clickbait, these headlines typically aim to exploit a "curiosity gap," by providing just enough information to make readers curious, but not enough to satisfy their curiosity without clicking through to the linked content. In a similar vein, many television episodes end on a cliffhanger – a plot device featuring a precarious dilemma or shocking revelation at the end of an episode – which spurs the audience to watch the next episode in order to find out how the story will continue.

These examples highlight the potential for curiosity to grab people's attention and subsequently motivate behavior. In this article, we take a different approach to this topic: We focus on curiosity as a means to improve decision making. Given the enormous value of curiosity as an outcome (Berlyne 1960), it is not surprising that insights and research on the conditions that foster curiosity continue to accumulate at an ever increasing rate (Manguel 2015). Yet, curiosity need not be viewed solely as a dependent variable. In a significant departure from most existing research, we investigate curiosity as a psychological experience that can have a causal impact on outcomes, such as the choices people make.

There are many examples of how people make relatively poor decisions that leave them with less money or more weight. As a result, recent research has called for interventions designed to improve people's decisions, and subsequently their lives (Haws 2016; Lynch 2011; Milkman, Chugh, and Bazerman 2009; Pham 2013; Thaler and Sunstein 2009). Broadly speaking, we are interested in the motivational strength of curiosity and whether it can be

leveraged to steer people toward one option over more tempting others. To do so, we pique people's curiosity and satisfy it, provided they choose the less tempting option.

Past calls for research on steering people toward making better decisions imply understanding the biases people have when making decisions, and then generating solutions to overcoming them (Allcott and Mullainathan 2010; Milkman et al. 2009; Thaler and Sunstein 2009; Weber and Stern 2011). In this vein, we attempt to address both these objectives in the current research: (1) by contributing to the understanding of want/should conflict, which describes people's tendency to favor relatively indulgent and tempting "want" options (such as over-spending, consuming unhealthy foods, watching lowbrow films) over normatively desirable yet less tempting "should" options (such as saving money, consuming healthy foods, and watching highbrow films); and (2) by identifying a potential psychological state, curiosity, that can be used to curb this tendency and steer people toward choosing "should" options over "want" options. Considering that people often favor immediately desirable "wants" – which has been associated with a wide range of problems, including obesity, unethical behaviors, environmental pollution, and over-spending (for a recent review, see Bitterly, Mislavsky, Dai, and Milkman 2015) – discovering persuasive (and relatively inexpensive) factors that might help tip the balance in favor of "shoulds" is an important research endeavor (Rothschild 1999). By offering easy-to-use interventions that draw on the basic, psychological drive state of curiosity, our research fits with these recent calls for public policy to take psychology into account when designing interventions to help people make better and healthier choices (Reibstein, Day, and Wind 2009). Before presenting a series of studies testing our intervention, we first review literature on the conflict between "wants" and "shoulds" and then theorize why curiosity can be used to facilitate the increased selection of "shoulds."

Want/Should Conflict

People regularly face a tension between what they want to do and what they believe they should do. After a long day at work, it might seem more desirable to watch television on the couch, even though you know you should go to the gym. Similarly, we may be aware that it is in our long-term interests to preserve the environment, but succumb to the convenience of driving to work in the moment. Researchers have long studied the internal conflict involved in choosing between options that provide immediate gratification and options that are less desirable in the short-term, but provide more long-term benefits (e.g., Ainslie 1975; Baumeister, Bratslavsky, Muraven, and Tice 1998; Bazerman, Tenbrunsel, and Wade-Benzoni 1998; Loewenstein 1996; Thaler and Shefrin 1981). Bazerman et al. (1998) dubbed these common struggles the "want/should conflict" whereby people face two competing selves. The "want" self focuses on the here and now, and prefers those options that are viscerally and impulsively desired in the moment. By contrast, the "should" self focuses more on choices that will be beneficial in the long-term (Milkman, Rogers, and Bazerman 2008, 2010). Research examining the want/should conflict has found that, unfortunately, the deck is often stacked against the "should" choice. People have limited self-control resources (Baumeister et al. 1998), and the immediate benefits of indulgences are often more salient than are their long-term negative consequences (O'Donoghue and Rabin 2000). Consequently, people are more prone to over-indulge in "wants" as compared to "shoulds" (Milkman et al. 2008), which can contribute to grim individual- and societal-level problems (Bitterly et al. 2015).

Numerous studies have examined the situational factors that affect people's choice of "shoulds" versus "wants." One line of research has demonstrated how limited self-control capacities impact the selection of "wants" versus "shoulds" (Muraven and Baumeister 2000).

According to this perspective, self-control capacities (i.e., the ability to make "should" choices) are a limited resource, depleted with use. Thus, the more that people resist tempting "wants," or engage in other activities that require self-control, the less likely they will be to select "shoulds" over "wants" (e.g., Baumeister et al. 1998). Another line of work has focused on instability in preferences when making choices for now versus later (i.e., for the present self versus the future self). In general, people are more likely to choose "want" options when making choices for the present or near future, and are more likely to choose "should" options when choosing for the more distant future (e.g., Nordgren, van der Pligt, and van Harreveld 2008; Read, Loewenstein, and Kalyanaraman 1999; Rogers and Bazerman 2008; Rogers, Milkman, and Bazerman 2007; Thaler 1981; Thaler and Bernartzi 2004). In this vein, research has sought to reconcile the want/should conflict by bringing the interests of the present and future selves in line. For example, Hershfield et al. (2011) found that increasing participants' connection to their future self (via age-progressed images of themselves) increased their reported willingness to save for retirement.

Another perspective holds that, rather than there being multiple selves, there is one self that experiences intrapersonal conflicts. These conflicts stem from changes in the internal conditions under which decisions are made (Loewenstein 1996). That is, although people often express "should" preferences (e.g., "I should take the stairs"), visceral states, i.e., emotions and drive states, such as hunger and fatigue, often overwhelm people at the moment a decision is made (e.g., "I'm tired, I'll take the elevator"). As temporal or physical proximity to a tempting "want" option increases, the more likely it is that visceral states will make it more difficult for people to resist choosing "want" options (Lambert et al. 1991; Shiv and Fedorikhin 2002; Stroebe et al. 2013). In a classic example, Read and Van Leeuwen (1998) had either hungry or

satiated participants choose between a healthy and unhealthy snack (i.e., fruit and junk food) to be consumed one week later. Critically, participants were told that the snack would be consumed at a time when they were hungry and they should therefore consider what they would want when hungry. When participants arrived one week later, participants who were in a state of satiation during the initial decision were more likely to switch their food selection (from healthy to unhealthy), ostensibly because they failed to appreciate the impact that hunger would have over their behavior.

A common thread across these streams of research is how visceral states can undermine people's ability to make "should" choices at the moment a choice is made – a conflict that has proven to be difficult to resolve (Loewenstein, 1998; Van Boven, Loewenstein, Dunning & Nordgren, 2013). For example, in contrast to other decision making domains, having ample cognitive resources does not seem to help, and instead exacerbates the negative effects of visceral states on making "should" choices (Nordgren and Chou 2013; Van Dillen, Papies, and Hofmann 2013). Still, researchers have identified strategies to help people make "should" choices in the face of immediate temptations. For example, using *implementation intentions* (where people carefully plan their "shoulds" with, for example, if-then prompts) has been found to nudge people to vote and receive vaccinations (Milkman, Beshears, Choi, Laibson, and Madrian 2011, Nickerson and Rogers 2010; Rogers, Milkman, John, and Norton 2013). Alternatively, *commitment devices* have been offered as another way to tip the balance in favor of "shoulds" (e.g., Rogers, Milkman, and Volpp 2014). Taking on many forms, commitment devices restrict "wants" by, for example, turning on a computer program to make certain, desirable (time-wasting) websites inaccessible in order to curb procrastination (Ariely and

Wertenbroch 2002; Rogers, Milkman & Volpp 2014), or by automatically depositing pay raises to a savings account to curb over-spending (Thaler and Benartzi 2004).

An encouraging suggestion offered by Loewenstein (1996) is that the negative impact of a given visceral state may be best fought with other visceral states. For example, a dieter overwhelmed by the appeal of indulgent, fattening foods in the moment of choice might instead try to rally vivid imagery of his or her own weight gain to elicit feelings of disgust or shame that might compete with the cravings. This tactic resonates with the idea of "matching" in the persuasion literature. If attitudes are rooted in affect (versus cognition), persuasion attempts rooted in affect (versus cognition) are more likely to succeed (e.g., Fabrigar and Petty 1999; Petty and Wegener 1998). Like persuasion, managing visceral states may require other visceral states.

While the use of negative visceral states to facilitate "should" choices is an interesting and promising suggestion, some potential pitfalls exist. For example, negative affective states such as shame and guilt can lead to impulsive over-eating and over-spending because they trigger emotion-oriented coping strategies (e.g., Spoor, Bekker, Strien, and Heck 2007). Moreover, attempts to prompt compliant "should" behaviors have been found to backfire because they elicit psychological reactance (e.g., Shen 2011). Thus, here we draw on Loewenstein's (1996) suggestion, but instead explore whether a positive, intrinsically motivating visceral state (curiosity) could be used to guide people toward "should" options.

Curiosity

Variously described as "the wick in the candle of learning" (William Arthur Ward), the "lust of the mind" (Thomas Hobbes), and the "greatest virtue of man" (Anatole France), curiosity is the complex feeling and cognition that accompanies the desire to learn the unknown (Berlyne

1949, 1960; Litman and Spielberger 2003; Loewenstein 1994). Research has found that curiosity is a powerful predictor of behavior, playing an important role in motivating learning, mastery, and facilitating scientific discovery (Koestler 1964; Menon and Soman 2002; Simon 1992), but also in dangerous, non-normative behaviors, such as drug use and certain types of crimes (Loewenstein 1996; Kolko and Kazdin 1989).

Much of the research on curiosity has focused on curiosity as a trait, captured by items such as "I enjoy exploring new ideas" and "I am fascinated by learning new information" (e.g., Litman 2005). In general, research has found that high levels of trait curiosity foster cognitive, physical, social, and emotional development over the lifespan by motivating exploratory behavior (e.g., Kashdan and Roberts 2004; Reio and Wiswell 2000; Rubin 2005; Swan and Carmelli 1996). For example, in the workplace, highly curious employees are described as more innovative, competitive, and resilient by their employers (Coutu 2002; Edmonson 2008; Goldenberg, Horowitz, Levav, and Mazursky 2003). That is, when employees are curious, they demonstrate greater cognitive flexibility, take greater risks, and are more open to complexity – which in turn expand their access to ideas and potential solutions (Gagne and Deci 2005; Grant and Berry 2011).

However, curiosity is also importantly viewed as a state. Like hunger, fatigue, and other visceral states, curiosity is classified as an appetitive drive associated with approach behavior and experiences of reward (Berlyne 1960, 1966; Loewenstein 1994; Maner and Gerend 2007). Curiosity involves positive feelings of interest, as well as feelings of uncertainty due to a perceived lack of knowledge (Litman and Jimerson 2004). An important theory of curiosity suggests that curiosity signals the presence of an "information gap" – that is, a lack of desired experience or knowledge (Loewenstein 1994; see also Litman 2005; Litman and Jimerson 2004;

Menon and Soman 2002). This feeling of deprivation instills a motivation to seek out the missing information in order to reduce or eliminate the feeling of deprivation (Kang et al. 2009; Maner and Gerend 2007), even if the missing information is unpleasant (Kruger and Evans 2009) or causes people physical pain when they try to resolve their curiosity (Hsee and Ruan 2015). Despite this feeling, curiosity is not typically seen as an aversive state; on the contrary, Loewenstein (1994) remarks that people like to make themselves curious precisely to satisfy their curiosity. Indeed, positive feelings such as novelty, surprise, and closure help define curiosity: a desire to know something (Gottlieb, Oudeyer, Lopes, and Baranes 2013).

Some studies hint that people will make different choices when their appetite for knowledge is whetted. In one study, participants in an experiment took a general knowledge quiz and could choose between a chocolate bar or seeing the quiz answers in exchange of their participation, only some participants made their choice of compensation *before* taking the quiz, whereas other participants made their choice *after* taking the quiz – i.e., after they saw the questions (Loewenstein, Prelec, and Shatto 1998). Participants who made their choice after taking the quiz were 50% more likely to choose to see the answers (over choosing the chocolate) compared to participants who made their choice before taking the quiz. In other words, invoking an information gap increased participants' motivation to obtain the answers, even when it required sacrificing another desirable incentive. In another study, sellers changed their decisions to sell versus keep their possessions according to an information gap (and the corresponding opportunity to fill the gap): When sellers were in possession of a special token that had an unknown value that ranged from 0.90 to 2.70 euros, they solicited more money in exchange of their token compared to sellers who possessed a token with a fixed value (1.80 euros). This pattern of behavior was explained by the fact that sellers got to find out the token's value when

(and only when) they decided to keep the token (van de Ven, Zeelenberg, and van Dijk 2005). Although these studies invoked motivations for immediate gratification and the endowment effect, their results could be partially explained by participants' curiosity about something unknown (quiz answers, token value), leading participants to change their preferences and choose an option they would not ordinarily choose (when curiosity is otherwise absent) in order to satisfy their curiosity.

Related research documenting when uncertainty can be motivating also offers support. Shen, Fishbach, and Hsee (2015) found that a reward of an uncertain magnitude was more motivating than a reward of a certain magnitude. For example, participants bid more for a bag that either contained 5 or 10 chocolate truffles than a bag that definitely contained 10 chocolate truffles. The authors suggest that this "motivating-uncertainty effect" occurs because uncertainty about positive experiences is exciting and generates a positive experience (see also Goldsmith and Amir 2010; Kupor, Tormala, and Norton 2014; Wilson, Centerbar, Kermer, and Gilbert 2005). Although not explicitly addressed by the authors, it is possible that curiosity is a fundamental part of this positive experience. Indeed, the motivating effects of curiosity accords with research that shows that people have a tendency to pursue irrelevant information before making their choices (Bastardi and Shafir 1998; Golman and Loewenstein 2012; Kruger and Evans 2009; Hsee, Yang, and Ruan 2015), and that the act of satisfying curiosity is intrinsically rewarding (Loewenstein 1994; Marvin and Shohamy 2016; Ryan and Deci 2000). For example, curiosity is an important part of theories of intrinsic motivation, such that people driven by curiosity are motivated to engage with and persist at difficult tasks in the absence of extrinsic incentives (e.g., money) because they find completing these tasks intrinsically rewarding (Deci and Ryan 1985; Reiss 2004).

Taken together, existing research on curiosity suggests that people are driven to seek out missing knowledge, and find satisfaction in doing so – a type of behavior that describes reconciling an information gap, or more precisely, what we call a "curiosity gap": An intervention that is designed to pique people's curiosity and subsequently satisfy it provided they choose one option (e.g., the "should") over another (e.g., the "want").

In the current research we leverage the motivational benefits of curiosity to test interventions designed to help steer people away from tempting "want" options like choosing tempting foods, watching lowbrow films, taking the elevator, and toward less-than-tempting, though normatively desirable "should" options. Our interventions leverage the curiosity gap by luring people with the information that fills a curiosity gap. To illustrate, imagine having the solution to a puzzling trivia question revealed to you if you choose to take the stairs rather than take the elevator. By promising relief of the curiosity gap (caused by the trivia question) with choosing the "should" option (taking the stairs), the "should" option is more likely to be chosen than when there is no curiosity gap (and corresponding motivation to fill it). This approach is similar to past interventions such as temptation bundling (Milkman, Minson, and Volpp 2013) and creating vice-virtue bundles (Liu, Haws, Lamberton, Campbell, and Fitzsimons 2015), which both describe that "should" behaviors are increased when they are paired with "wants" – like combining exercising (a relative "should" behavior) with listening to page-turner audiobooks (a relative "want" behavior). However, our approach differs insofar as it focuses on motivation (to fill curiosity gaps), rather than on making "shoulds" more pleasant. For example, "shoulds" remain relatively unaltered in curiosity gap interventions. In contrast to bundling interventions that unite "shoulds" with "wants" (effectively changing the make-up but also perception of "shoulds"; Chernev and Gal 2010), in our interventions the "should" options (e.g., eating healthy

items) are the same with or without a curiosity gap intervention. In other words, no corresponding "want" option (e.g., an unhealthy item) is mixed with the "should" and consequently transforming the "should" option. In this vein, another difference between curiosity gap and bundling interventions is that in the former, people can be steered toward "shoulds" in a way where they need not consume any amount of "want" options. Thus, in a departure from bundling interventions that make "shoulds" more appealing by lacing them with "wants," with curiosity gap interventions it is possible to choose "shoulds" without ever indulging in "wants." These differences between curiosity gaps and bundling are not meant to invalidate or replace interventions based on bundling. Instead, we point out these differences because they help complement past solutions by revealing other ways for people to resolve their want/should conflicts.

In sum, drawing on research supporting people's curiosity and the motivation that results thereof, we tested a previously unexplored strategy for steering behavior by creating interventions that discourage tempting behaviors ("wants") and instead encourage less-than-tempting but nonetheless normatively desirable behaviors ("shoulds"). We predict that in a choice between "want" and "should" options, a curiosity gap that can be filled by selecting a "should" option will increase the choice of "should" options over "want" options.

Overview of Studies

To test the efficacy of our interventions, we carried out four studies comprising two laboratory experiments (studies 1-2) and two field experiments (studies 3-4). In study 1, we sought to establish the basic effect that consumers' preferences for a "should" option will increase when choosing it is tied to satisfying their curiosity. Specifically, we predicted and found that participants were more likely to choose a less tempting snack over a more tempting

snack when we piqued their curiosity and promised to satisfy it should they choose the less tempting snack. In study 2, we investigated a different want/should conflict (choosing highbrow films over lowbrow films), and we measured participants' dispositional curiosity. Furthermore, we considered the role of alternative mechanisms related to curiosity, such as fun, novelty, and attention. We found that participants were more likely to choose a highbrow film over a lowbrow film when we piqued and promised to satisfy their curiosity if they choose the highbrow film, and that this tendency was stronger among participants with higher dispositional curiosity (while holding constant other curiosity-related feelings such as fun, novelty, and attention). Thus, in study 2 we found evidence of process via a moderation-of-process design whereby participants with higher dispositional curiosity showed more susceptibility to our intervention than did participants with lower dispositional curiosity. Then, in studies 3 and 4 we broadened the scope and ecological validity of our investigation by moving to the field. In study 3, we tested whether a curiosity gap can be used to curb people's energy consumption, and promote fitness. In a building on a large university campus, we designed a placard with an unanswered trivia question that we placed by the elevators and changed each day. Then in a nearby stairwell, we placed different placards with the answers to the question (thus satisfying curiosity). We found an increase in stairwell-use when our intervention was imposed compared with a control condition that contained different, non-trivia placards. Finally, in study 4 we partnered with a grocery store and conducted a study where we sought to increase consumers' purchases of fruits and vegetables. In this study, we created a curiosity gap by posting a friendly joke about different produce items and placing the punchline near the respective produce items on a bag closure, such that in order to find out the punchline, consumers were steered toward the produce bags, a positive step toward buying (more) produce – which we found to be the case. In all, the results of

our research shed light on whether curiosity can be used as a way to help consumers reconcile want/should conflicts, and more generally influence consumers' choices. Even for choices involving "should" options for which people often lack the motivation to choose, our results suggest that using interventions based on curiosity gaps have the potential to increase the selection of these hard-to-choose, yet normatively desirable options.

Study 1

In study 1, we presented participants with a choice between two snacks, where one snack is more tempting than the other snack. In line with our theoretical development, we predicted that when the less tempting snack is tied to satisfying consumers' piqued curiosity, consumers would choose it over the more tempting snack. Notably, the snack choices in this study were not hypothetical but real choices. Although it is popular to use hypothetical choices to index behavior, the measure of actual behavior provides necessary support for research intending to make claims about how people act (Baumeister, Vohs and Funder 2007).

Method

Two hundred participants were approached in a large university's library. We decided on this sample size because it provides us with one hundred participants per condition, which is enough to detect a small effect size (Simmons, Nelson, and Simonsohn 2013). The study was conducted over two consecutive days. On the first day, we ran our control condition where participants were asked to make a choice between two fortune cookies: a regular fortune cookie and a chocolate-dipped fortune cookie with colored sprinkles. In a pretest, we found that the latter cookie was rated more tempting than the former cookie. Specifically, in a separate sample of 100 Amazon Mechanical Turk (mTurk) participants (see Paolacci and Chandler 2014 for a description of this sample), where we provided pictures of both cookies, the chocolate-dipped

cookie was rated more indulgent; more tempting to eat; less healthy; and less "good for me" compared to the regular cookie in a counterbalanced within-subjects design. Participants responded from 1 (*strongly disagree*) to 7 (*strongly agree*) for all four items, $t(99)$s > 3.59, ps < .001, ds > .36.

On the second day, we ran our curiosity-intervention condition, where we used the same two cookies as in the control condition except we told participants that if they choose the regular fortune cookie, the fortune they receive will tell them something we know about them (all participants in this condition were different from participants in the control condition). In reality, all of the fortunes contained in the cookies (in both the control and intervention conditions) were the same, "you are not illiterate." We predicted that participants would be more likely to choose the less tempting, regular fortune cookie in the intervention condition on account of the curiosity generated.

Results and Discussion

In the control condition, we found that 80% of the participants chose the more tempting cookie (while the remaining 20% chose the regular cookie), indicating that the more tempting cookie is indeed more tempting – a result that belies chance, $\chi^2(1) = 34.82$, $p < .001$. In contrast, the results nearly flipped among participants in the intervention condition (see figure 1). We found that 29% of the participants chose the more tempting cookie (while the remaining 71% chose the regular cookie). As predicted, the proportion of participants choosing the less tempting cookie was higher in the intervention condition (71%) than in the control condition (20%), $\chi^2(1) = 52.45$, $p < .001$. Thus, in a relatively strong way – the effect size (odds ratio) was 9.79 – we found that by creating a curiosity gap, we could change participants' choices by steering them to one option over another option, even when the alternative option is considerably more tempting.

Despite these results, there are two possible limitations to bear in mind. First, we conducted our study such that one condition was run on one day (Tuesday) and the other condition was run on another day (Wednesday). It would have been more precise had we run both conditions simultaneously because our study design leaves open the possibility for a "day effect" – e.g., that on a Tuesday people have a higher preference for tempting snacks, but on a Wednesday people have a higher preference for less tempting snacks. However, we find this claim relatively implausible – at least we cannot think of a convincing reason (e.g., the weather was relatively the same on both days) for why these particular days would change preferences to the extent that people's preferences reverse (in a relatively strong manner). Second, it is possible our curiosity manipulation generated more than curiosity, such as other feelings like novelty, fun, paranoia – or that the manipulation might have simply piqued participants' attention. We do not doubt that by telling participants that the fortune will reveal something we know about them generated some possible intrigue or heightened attention – however, instead of considering these feelings as different from curiosity, we contend that they are necessary parts to the omnibus feeling of what it means to be curious (Gottlieb et al. 2013; Loewenstein 1994). In consideration of this limitation, however, we carried out the next study with a more precise way of manipulating curiosity, by using the same, exact stimuli across conditions. Each condition therefore contains the same level of novelty, attention-grabbing, and fun (i.e., all of the stimuli in the conditions are identical) – the only difference is whether we positioned a curiosity gap as a "lure" to entice participants to choose a "should" option over a "want" option.

Study 2

In the previous study, we found that a curiosity gap motivated participants into choosing a less tempting snack over a more tempting snack. In study 2, we extend these results in three central ways.

First, study 1 relied on snack choices to measure the effect of curiosity on reconciling want/should conflicts. Because both of those snacks were cookies, they could each be viewed as "want" options (belonging to the "cookie" category). Despite this, the cookies varied in how much they tempted participants: the chocolate-dipped cookie was rated significantly more indulgent; more tempting to eat; less healthy; and less "good for me." To extend the breadth of our investigation, we used a different context in study 2, one that contains one "want" option and one "should" option, derived from (and operationalized in) previous research on want/should choices: the choice between a highbrow clip and a lowbrow film (Milkman 2012; Milkman et al. 2009). Moreover, consistent with study 1, our measure is not hypothetical.

Second, we examined the potentially moderating role of dispositional curiosity. By measuring participants' dispositional curiosity, we can test the proposed process (via moderation), that a need for satisfying curiosity steers people to one option over others (Spencer et al. 2005). We chose to test process by moderation (in lieu of using statistical mediation) because unlike most variables that aim to environmentally motivate a desired behavior, our variable *is* a motivator: satisfying curiosity is like satisfying a need – like food is to satisfying hunger, and water is to satisfying thirst, people need the rejoinder to their curiosity and are motivated to get it (Webster and Kruglanski 1994). As an appetitive and visceral state, a need to satisfy curiosity is inexorably linked with basic, fundamental behavior (Ryan and Deci 2000). In terms of the causal chain, this locates needs such as curiosity as proximal causes that tend to bear a *direct* effect on behavior (and outcomes). In support of its proximity on the causal chain (to

outcomes), research has found that curiosity mediates the relation between construal level and information processing, revealing evidence for a direct effect of curiosity (Förster and Becker 2012; Shani, Igou, and Zeelenberg 2009) rather than an *in*direct effect whereby curiosity is mediated by a putative mediator. Viewing curiosity as a need – in Maslow's words (1963), a "need to know" (p. 64) – we contend that psychological measures may not (meaningfully) mediate relations between curiosity and its outcomes (in contrast, physiological measures may prove candidate mediators). Consider that whatever mediates curiosity *has* to be different and separable from the construct of curiosity itself (Zhao, Lynch, and Chen 2010). For example, measuring something such as desire for information would not be considered an adequate mediating variable because it is too closely tied to what it means to be curious. Thus, we employed the moderation-of-process approach to further probe the role that curiosity has in motivating desirable behavior in environments containing curiosity gap interventions. Among participants who are more curious, our intervention should be stronger than among participants who are less curious, on account of the former participants' greater need to satisfy their curiosity. In particular, this need is captured by the items that comprise the Melbourne Curiosity Inventory (e.g., "I feel like searching for answers;" Naylor 1981). That is, this inventory does not solely measure how curious someone is but also the extent to which they behave in ways that allay their curiosity.

Third, we made use of a different curiosity intervention than in study 1, namely a magic trick where we revealed the secret of the magic trick provided participants choose the "should" option, the highbrow film. This allowed us to test possible competing mechanisms such as novelty, attention-grabbing, and fun – because in this study, the experimental stimuli are the same between conditions, meaning the levels of novelty, attention-grabbing, and fun should be

the same irrespective of participants' condition. To keep these feelings equal between conditions, we showed the magic trick before participants made their want/should decisions in each condition and we promised participants in both conditions that we would subsequently show them the magic trick reveal; however in only the curiosity condition did we make that promise conditional on choosing the "should" option (the highbrow clip). In this way, we can compare the "lure" of curiosity (the curiosity gap) against all other feelings that accompany curiosity. Said simply, seeing a magic trick is usually fun (and maybe even novel or attention-grabbing), and possibly these other feelings stir people to choose "shoulds" over "wants" (in lieu of curiosity). In this study, however, the curiosity-creating stimulus (the magic trick) is featured in both conditions.

Method

Five hundred and ninety seven undergraduates participated in exchange for extra credit. The size of the sample was based on the number of enrolled students in an introductory marketing course – which we knew in advance to be 636 students. Based on past extra credit studies that we have conducted in previous semesters, we estimated approximately 85% of students would choose to participate – a sample large enough to detect a small effect size.

We told participants the study was about film clips, and that they would choose between two film clips to watch (Milkman 2012). Clip 1 was from *Citizen Kane* and furnished our highbrow option – we described it as "a clip from a film about a fairly esoteric topic that has been called 'a bit dull, but highly culturally educational and enlightening.'" Clip 2 was a clip from *Superbad* and furnished our lowbrow option – we described it as "a clip from a film with popular movie stars that has been called 'empty but highly entertaining.'" Before choosing which clip participants wanted to watch, we showed participants in both conditions a clip of a magic

trick. Following that clip, participants in the control condition chose between Clip 1 and Clip 2, and watched their choice of clip – and then we showed those participants a clip that demonstrates the secret behind the magic trick. Likewise, in the intervention condition, we first showed participants a clip of a magic trick, and then participants chose between Clip 1 and Clip 2. In contrast, however, when presented with the choice between Clip 1 and 2, we specified that if they choose Clip 1 (the highbrow clip), they would subsequently view a clip demonstrating the secret behind the magic trick. Thus, in both conditions participants saw the magic trick before making their choice between Clip 1 and 2, but in only the intervention condition did participants get to see the reveal provided they choose the highbrow clip (all participants in the control condition saw the reveal regardless of their choice). Finally, participants responded to a 20-item scale measuring dispositional curiosity ($\alpha = .93$) – the C-Trait scale by Naylor (1981), and then responded to two open-ended questions asking what they thought the study was about and what (if anything) was unclear in the study.

Results and Discussion

In the control condition, we found that 70.0% of the participants chose the lowbrow clip (while the remaining 30.0% chose the highbrow clip), indicating that the lowbrow clip is indeed more tempting – a result that belies chance, $\chi^2 (1) = 23.13$, $p < .001$. In contrast, in the intervention condition, we found that 45.5% of the participants chose the lowbrow clip (while the remaining 54.5% chose the highbrow clip). As predicted, the proportion of participants who chose the highbrow clip was higher in the intervention condition (54.5%) than in the control condition (30.0%), $\chi^2 (1) = 36.03$, $p < .001$, odds ratio = 2.81. Thus, we found further support for our prediction – curiosity can be used to steer participants to choose one option over another more tempting option. Notably, because the stimuli were the same between conditions, we

observed this difference while holding constant other feelings such as fun or attention that might themselves (divorced from a feeling of curiosity) account for the effect.

For more support for the role of curiosity, we next measured whether the effect of curiosity on want/should choices would be altered according to participants' dispositional curiosity. If so, we can be more confident that curiosity operates as the process underlying our intervention. To find out, we conducted a chi-square test that follows from the previous analysis where we compared the proportion of participants choosing the highbrow clip in the intervention and control conditions (the two-way contingency table), with the extension that we will examine these same two variables with the introduction of a third variable (curiosity), which will test what is known as a three-way contingency table. For this analysis we will still be able to examine the relation between condition and clip choice (the previous two-way contingency table) however we are going to do this by taking into account a third variable, curiosity. Because our test is a three-way contingency table, our curiosity variable is binary (we conducted on it a median split and divided participants into two groups: low curiosity and high curiosity). Despite the disadvantages to conducting median splits (Fitzsimons 2008), we chose this test because a three-way contingency table supplements our previous two-way contingency table test by both fully comprising it and extending it – i.e., our three-way contingency test includes all of the same statistics as the two-way contingency table (reported above), and then segments those same proportions by curiosity disposition (participants' curiosity score).

Table 1 presents the proportions of participants choosing Clip 1 and 2 in all of the cells. We found that participants' curiosity predicted clip choice, irrespective of condition. While just over a third of participants *low* on curiosity chose the highbrow clip (34.4%), slightly over half of participants *high* on curiosity chose the highbrow clip (50.2%), χ^2 (1) = 13.11, p = .0003, odds

ratio = 1.84. This is consistent with past research finding that curiosity is positively associated with need for cognition, i.e., the tendency to engage in and enjoy thinking (Litman and Silvia 2006; Olson, Camp, and Fuller 1984). Next, we compared the proportions that each curiosity group picks the highbrow clip in the intervention condition. Consistent with our hypothesis, the low curiosity group chose the highbrow clip 47.9% of the time in the intervention condition, whereas the high curiosity group chose the highbrow clip significantly more of the time *in the same condition*, at 60.0%, χ^2 (1) = 4.59, p = .04, odds ratio = 1.63. Altogether, this is precisely the pattern that we would expect between curiosity gaps and participants' dispositional curiosity: Participants with higher curiosity are more susceptive to our curiosity intervention than participants with lower curiosity. This provides evidence that our intervention operates by generating curiosity.

One limitation worth considering is whether our findings could be due to demand effects. Participants may have guessed that the experimenter is testing to identify who chooses to see the secret to the magic trick and who does not; however, among the 579 responses we received to the open-ended question asking participants what they thought the study was about, only 4 participants indicated the correct answer (that we were interested in who chooses the highbrow clip in order to see the reveal). In fact, among the 543 responses we received to the open-ended question asking participants what (if anything) was unclear in the study, more participants (8) indicated that they were confused by the purpose of the magic trick clips. It therefore seems unlikely that demand effects influenced our results. Nonetheless, should there still be some doubt, the subsequent studies were conducted in the field among participants who did not know that their behaviors were being monitored, thus demand effects are untenable in the subsequent

studies. That is, people cannot behave strategically or differently or change their behavior to (mis)match an experimenter's possible hypothesis if they do not know they are in an experiment.

Study 3

Having established that curiosity motivates people to choose "should" options over "want" options, study 3 broadens the scope of our investigation by testing our effect in the field, and in a different domain than in the previous studies. Specifically, we tested whether curiosity can be used to curb people's energy consumption. With 40% of greenhouse gas emissions resulting from behaviors people do every day – such as driving, showering, and cooking – promoting energy efficiency is an urgent environmental priority (Dietz, Gardner, Gilligan, Stern, and Vandenbergh 2009). Further, in light of skyrocketing pollution, climate change, and depleting natural resources, programs designed to encourage saving energy are of tremendous interest to organizations and governments (Dietz, Stern, and Weber 2013). Yet despite the many benefits that saving energy provides, millions of Americans are unmoved and refuse to adopt effective ways to save energy (Attari, DeKay, Davidson, and Bruine de Bruin 2010). Thus, given the challenge of energy consumption in today's society, we tested if an intervention based on creating curiosity can help reduce energy consumption.

Method

In this study, we generated curiosity with trivia questions (cf. Kang et al. 2009). For our intervention condition, we designed a placard that included one trivia question (e.g., "what animals preceded man into space?") and placed it by the elevators on each floor (near one stairwell; our so-called *intervention stairwell*) in a business school at a large university. The placard contained a message that communicated to people to take the stairs in order to find out the answer. Then in the intervention stairwell, we placed different placards with the answers to

the question, in such a way that we placed two correct answers to the question (e.g., frog, guinea pig) on one flight of stairs, and two different, yet still correct answers (e.g., rabbit, fruitfly) on another flight of stairs. In all, the intervention stairwell has four flights of stairs – so we posted four pairs of (correct) answers to each question, one pair per flight. Finally, we changed the question and corresponding answers every day, and ran our experiment for 28 days.

The first 14 days made up our pretest phase. In this phase, we measured foot traffic in the intervention stairwell without our placards. In addition we measured foot traffic in a separate stairwell on the other side of the building (our so-called *control stairwell*)[1]. Our study then is a classic pretest/posttest control group design, where we measured the change (in stairwell use) from pretest to posttest in the control condition against the change from pretest to posttest (in stairwell use) in the intervention condition. This is how a range of interventions, from educational innovations to health interventions, are typically tested.

During the pretest phase, placards espousing the benefits of saving energy by taking the stairs over the elevator were posted by both the intervention and control stairwells, and by the elevators near each respective stairwell. In order to count how many people took the stairs, we installed a SenSource battery-powered people counter (PC-TB12-R) in both the intervention and control stairwells. This device transmits an invisible laser beam and counted how many times the beam was interrupted (passed through by someone taking the stairs), in one hour periods. During

[1] It is worth noting that because the intervention and control stairwells were located in different parts of the building, they also are used by different subjects being that the intervention stairwell is located in the MBA wing of the building, whereas the control stairwell is located in the undergraduate wing of the building, thus our subjects did not likely use both stairwells with the same frequency (i.e., the subjects probably had one stairwell they used more often, with MBA students using primarily the intervention stairwell, and undergraduate students using primarily the control stairwell). Still, it is possible for subjects to use both stairwells, however, this behavior makes our test more internally valid because it means our comparison groups (control and intervention) are more alike (in statistical terms, more equivalent) because they can contain the same subjects.

this phase, the beam was interrupted 31,662 times in the intervention stairwell, and 16,272 times in the control stairwell. After 14 days of collecting the pretest traffic, the posttest phase began and we posted our daily question placards by the elevators near the intervention stairwell and corresponding answer placards in the intervention stairwell (this schedule of days allowed us to collect data on the same days that comprised our pretest phase; i.e., in both the pretest and posttest phases we collected data on the same number of Mondays, Tuesdays, etc.). In the posttest phase, we made no changes to the control stairwell; thus, our test is an interaction between phase (pretest v. posttest) and stairwell (control v. intervention), where we compared the change in stairwell use in the intervention stairwell between each phase with the change in stairwell use in the control stairwell between each phase.

Results

During the posttest phase, the beam was interrupted 34,774 times in the intervention stairwell, indicating a 9.8% increase in frequency from the pretest phase (up from 31,662 times in the pretest phase). By contrast, during the same posttest phase period, the beam was interrupted 15,992 times in the control stairwell, indicating a small non-significant 1.7% decrease in frequency from the pretest phase (down from 16,272 times in the pretest phase). To examine the impact of the intervention on stair usage, we conducted a repeated measures ANOVA with a 2 (phase: pretest v. posttest) × 2 (stairwell: control v. intervention) design, where phase was a within-subjects factor and stairwell was a between-subjects factor, and we compared the counts at each one hour period during the pretest phase with each one hour period during the posttest phase. This test revealed a significant interaction, $F(1, 1222) = 4.36$, $p = .037$, such that the number of counts in the intervention stairwell during the posttest phase ($M = 51.75$, $SD = 66.46$) exceeded the number of counts during the pretest phase ($M = 47.12$, $SD = 62.87$), $F(1,$

671) = 8.34, p = .004, d = .13. In contrast, the number of counts in the control stairwell during the posttest phase (M = 28.97, SD = 48.37) was not significantly different from the number of counts during the pretest phase (M = 29.48, SD = 47.85), F < 0.072. Thus, our intervention was successful – people used the stairs more when we posted placards with trivia questions and placed the answers in the stairwell compared to when we posted placards that espoused the benefits of taking the stairs.

Qualified by the above interaction, the main effects of phase and stairwell were respectively marginally significant and significant. There was slightly more traffic in the posttest phase (M = 41.48, SD = 60.05) than in the pretest phase (M = 39.16, SD = 57.25), F(1, 1222) = 2.81, p = .094; and more stair traffic in the intervention stairwell (M = 49.43, SD = 64.68) than in the control stairwell (M = 29.23, SD = 48.11), F(1, 1222) = 42.93, p < .001.

Discussion

This study provides the first evaluation of a new intervention that uses curiosity to encourage people to save energy. Altogether, these findings establish that our intervention has the potential to induce behavior change in a naturalistic setting. Even better, our intervention has the potential to solve two problems at once – saving energy by not taking the elevator, and promoting fitness by taking the stairs. Notably, our intervention has several other benefits. First, our intervention simultaneously encourages something policy makers want people to do (exercise more) and discourages something policy makers do not want people to do (consume too much energy). Second, our intervention prompts people with something they can do every day. And third, it is leveraged on findings from positive psychology being that our intervention generates a positive feeling (curiosity), in contrast to using a lever that relies on generating an aversive feeling in order to steer behavior.

It is worth noting we had a large sample size in this study, and it is tempting to argue that the power of our sample guaranteed delivering a significant finding, however, our prediction was based on finding both a significant and non-significant result (the difference in stairwell use in the control condition during the pretest phase and posttest phase). It is therefore untenable to argue that the power in our sample generated the significant result because our data contain an equally informative null result.

Moreover, because the intervention and control stairwells were in different parts of the building, it is possible that subjects who used the control stairwell in the pretest phase switched to the intervention stairwell during the posttest phase. If so, this would cast doubt on the efficacy of our intervention because it implies that people simply switched stairwells (with more switching to the intervention stairwell from the control stairwell, than vice versa). Besides that the stairwells would be poor substitutes, because subjects switching from one to the other would very likely be extending their travel time and be making relatively inefficient trips (by switching stairwells, subjects would be likely moving away from their destinations before getting closer to them), it is unlikely that the increase in traffic we observed in the intervention stairwell is because subjects who were already taking the stairs in the control stairwell switched to taking the stairs in the intervention stairwell. If this claim was true, we would have to observe a significant *decrease* in stairwell traffic in the control stairwell (from pretest to posttest). However, we found that the usage of the control stairwell did not significantly differ by phase (i.e., did not significantly decrease from pretest to posttest).

Finally, the design of study 3 helps address demand characteristics that are potentially present in studies 1-2. In the current study, we compared a curiosity intervention with another intervention (using placards that communicate the benefits of saving energy by taking the stairs

over the elevator), and in the latter case, the demand-resulting behavior ought to be higher since its placards unambiguously communicate to passers-by to take the stairs, yet we find that our curiosity intervention is more successful despite the latter case's demand characteristics.

Study 4

From a policy perspective, the results of study 3 are encouraging. Study 4 continues our investigation by highlighting another curiosity intervention that can be used for developing desirable "should" behaviors in another domain. In this study, we partnered with a grocery store and tested whether an intervention based on curiosity would encourage consumers to buy more fruits and vegetables. With nearly 70% of people in the United States overweight, grocery stores have an important role in public health policy. Over 50% of all food purchases occur in grocery stores (United States Department of Agriculture 2014), and in this study we focus on a solution that encourages consumers to buy more fruits and vegetables at their local grocery store. Specifically, we chose to target fruits and vegetables because they have one of the highest profit margins (up to 75%), and are among the most perishable product categories – representing 10% of all grocery store sales and 16% of overall store profits (Food Marketing Institute 2013). Thus, applying a curiosity intervention to this product category could spur increased profit margins for grocery stores, while simultaneously increasing consumers' purchases and consumption of fruits and vegetables – precisely the healthy behavior that we aim to accomplish.

Method

We partnered with a locally-owned grocery store that has three locations in a midsize city (with a population of over 250,000 people) in the Midwest. Our research plan comprised of posting placards containing a joke about a produce item and then posting the punchline on a nearby bag closure tag. Specifically, we created a list of 40 produce items, and for each of those

produce items (e.g., beets) we created a placard with a joke on it (e.g., "why did the beets blush?") and posted the placard by the produce item's regular sign that contained its details like price and origin. Then, close to the placard, we placed a plastic cup containing bag closures with the respective punchline printed on them (e.g., "because the beets saw the salad dressing"). The placard indicated the punchline is on the nearby bag closures (for an example of a placard and corresponding bag closures, see Appendix). We used bag closures because steering consumers to bag closures has the same effect of steering consumers closer to the fruits and vegetables, an important input (closeness) in decision making (e.g., the closer contact consumers have with products, the more they will acquire them; Peck and Childers 2006).

With the help of an employee from the grocery store, we created a schedule where we would post ten different placards/jokes in one week and run our study for four weeks (over the course of 43 days – i.e., there were days between the weeks when our placards were not posted), thus our set of produce items contained 40 different items. Further, the employee provided us with the sales (quantity sold) for the 40 items during the course of our intervention (posttest), as well as the sales for the 40 items during the same days as our intervention, but during the previous year when our intervention was not conducted (pretest). Also, we received the sales of the 40 items during both of these times for a second store where we did not run our intervention. This other store furnished our control condition. Thus, our design is the same as in study 3: a classic pretest/posttest control group design, where we measured the change (in sales) from pretest to posttest in the control condition against the change from pretest to posttest (in sales) in the intervention condition. In other words, we are predicting an interaction between store and phase, such that we predict the change in sales will be greater at the intervention store from pretest to posttest than at the control store from pretest to posttest. In addition, we recorded and

controlled for price in our analyses, because the prices of the individual items at each store and time can (and did) vary.

The dependent measure in this study is the quantity of each produce item sold per transaction, across all relevant stock keeping units (SKUs). Individual produce items (e.g., strawberries) typically have many unique SKUs because, for example, a box of strawberries that comes from one producer has a different SKU from a box that comes from another producer. So we combined SKUs to generate the quantity sold of each of the 40 produce items (i.e., all the strawberry SKUs were combined into one variable: strawberries; all the ginger root SKUs were combined into one variable: ginger root; etc.). The dependent measure is also measured in two ways: counts (e.g., boxes of strawberries) or weight (e.g., pounds of ginger root). It is for this reason that we included produce item as a separate factor in order to account for the different measures, but also to account for the different quantities that consumers buy of each produce item (e.g., consumers typically buy more pounds of bananas than pounds of ginger root). This means our dependent measure does not have a unit such as counts or pounds – instead it is an omnibus measure of counts and pounds.

In all, we had 17081 cases over the two stores and two phases. As in study 3, our sample size is large, which could deliver a significant result on account of its high power, however, just like in study 3 we are predicting both a significant and null result, therefore the large sample size should not be seen as a way of increasing power to find a significant result, but rather as a high powered, reliable sample.

Results

We carried out an ANOVA with store, phase, and produce item as factors, and price of produce item as a covariate, which revealed the significant two-way interaction between store

and phase, $F(1, 16922) = 4.408$, $p = .036$. Decomposing the interaction, we found that the quantity of produce sold at the intervention store during the posttest phase ($M = 40.92$, $SD = 64.86$) was greater than during the previous year when no intervention was conducted – i.e., during the pretest phase ($M = 37.18$, $SD = 65.13$), $F(1, 7264) = 6.21$, $p = .013$, $d = .06$. In contrast, the quantity of produce sold at the other, non-intervention store during the posttest period ($M = 31.97$, $SD = 63.84$) was not significant from the quantity of produce sold during the previous year, the pretest period ($M = 33.31$, $SD = 68.21$), $F < 1.01$. Thus, our intervention was successful – consumers bought more fruits and vegetables when we posted jokes (and punchlines) about the produce items than when we did not post jokes.

Other results were significant too, but these results are qualified by the significant interaction between store and phase. The effect of store was significant, $F(1, 16922) = 9.324$, $p = .002$, and so were the effects of price, $F(1, 16922) = 470.05$, $p < .001$, and produce item, $F(39, 16922) = 153.80$, $p < .001$ – as to be expected since lower prices generate more sales, and some produce items are more popular than others.

Discussion

To better serve consumers and steer them toward more produce purchases, grocery retailers have deployed several strategies such as posting the nutritional information of their products, changing their product offerings to include healthier foods, and reducing produce prices. Yet, despite these multifaceted efforts, there is little evidence to suggest improvement in one of the key indicators identified by the United States' Institute of Medicine for evaluating obesity and overweight prevention efforts: The purchase and consumption of fruits and vegetables, which also has health benefits beyond those of weight control. In this study, we found support for using a curiosity gap to target fruit and vegetable purchases that not only

benefits economic concerns of retailers (more sales), but the nutritional concerns of consumers (more produce).

These findings are consistent with those in the previous studies. In particular, we found that piquing consumers' curiosity led to an increase in produce purchases. Perhaps more importantly, we found evidence of our effect in an incentive-compatible context that involves spending money, which lends further ecological support to the idea that curiosity gaps can be used to steer people's choices. Finally, this study provided the opportunity to extend our effects to the health and obesity domain, which is undoubtedly an area that is replete with want/should conflicts.

General Discussion

Curiosity exerts powerful effects on people's behavior. In one of the largest undertakings in the field of psychology, researchers found that curiosity is one of the five most influential human qualities that is associated with life fulfillment and happiness (Peterson and Seligman 2004). And management scholars are taking notice – in the *Harvard Business Review*, writers extoll the benefits of curious employees: they are more innovative, competitive, resilient (Coutu 2007, Edmonson 2008, Goldenberg et al. 2003), and scholars argue that curiosity is as important as intelligence (Chamorro-Premuzic and Furnham 2014). In Albert Einstein's words, "I have no special talents. I am only passionately curious." In short, curiosity is motivating, and relieving it is satisfying (Berlyne 1969).

The present findings suggest that piquing curiosity can also have far-reaching effects on what choices people make. According to Bastardi and Shafir (1998), "the mere arousal of curiosity seems enough to lead people to focus on the missing information and act in accord with it once it is obtained" (p. 29). While remaining consistent with this notion of curiosity (across our

four studies), the current findings contribute to research on curiosity by testing the extent of people's motivation to satisfy their curiosity – and whether this motivation could increase participation in normatively desirable behaviors for which people often lack the motivation. Study 1 showed that piquing participants' curiosity with a curious fortune inside an ordinary fortune cookie led participants to choose the ordinary fortune cookie over a less healthy, but more tempting and indulgent chocolate-dipped fortune cookie. Furthermore, this effect was not small, with over three and a half times as many participants choosing the ordinary fortune cookie when it piqued their curiosity compared to when it did not. Study 2 then supported the role of curiosity in driving the effectiveness of our intervention in steering participants' choices, while holding constant other feelings such as novelty, fun, and attention. Not only did we find that participants were more willing to watch a highbrow film clip when it meant that they could see the secret behind a magic trick, but that choice for the highbrow clip varied according to people's dispositional curiosity. Specifically, participants with higher dispositional curiosity were even more likely to select the highbrow clip when it meant that they would see the magic trick secret.

Studies 3 and 4 provided further evidence for the role of curiosity gaps in motivating choices. Study 3 was concerned with sustainable behavior such as energy consumption and fitness, and demonstrated the capacity of people's curiosity to motivate desirable, sustainable behaviors. By posting trivia questions by the elevator, and corresponding answers in the stairwell, we were able to steer people away from the elevator to the stairwell. Complementing these findings, in study 4 we found that posting jokes about fruits and vegetables in the produce section of a grocery store, and placing the corresponding punchlines nearby those items, led people to buy more produce – a healthy behavior for consumers, with a favorable return for grocery retailers. Both studies 3 and 4 were field studies, and one can assume the external

validity of our studies is fairly high because the people in these studies were not informed about the goals of our research. For example, no explanations of the trivia questions in study 3 and jokes in study 4 were given before the respective studies to avoid hypothesis guessing or unwanted salience of research motives. Instead we observed actual behavioral reactions and choices made in real-life environments.

In all, our effects were robust across several changes in procedure, design, and sample characteristics. We tested the effect of curiosity across different outcomes such as resisting indulgent, tempting cookies (study 1), choosing smart film clips over lowbrow film clips (study 2), fitness and energy consumption (study 3), and among fruit and vegetable purchases (study 4). Moreover, we tested the hypotheses on student and adult subject populations, and indexed the strength of curiosity using both laboratory and field studies. The consistencies in our findings across outcomes, measures, and samples provides a strong degree of confidence in our findings. People like to use the "carrot and stick" aphorism to describe motivation – hang a carrot and dangle it as a reward. Taken together, our findings suggest that satisfying people's curiosity is a particularly effective carrot.

Practical Implications

In a recent *Forbes* poll, Americans indicated they want to eat and be healthier (Forbes 2015). In another poll, Americans reported that they intended to improve their energy consumption (Leiserowitz, Maibach, and Roser-Renouf 2009). These poll results suggest an opportunity for bolstering health and reducing energy consumption in people's lives. More than that, as evidenced by the polls, consumers are evidently interested in consuming healthy, green products suggesting that consumers support interventions that help them choose more "should" options. And because consumers' actual behavior sometimes falls short of their stated goals

(Epley and Dunning 2000), interventions such as ours can help consumers address this problem, by steering them toward that what they know they should do. The psychologically ingrained concept of curiosity and its powerful impact on behavior can be realized in something as seemingly trivial as a trivia question. Indeed, the influence of our curiosity interventions could be viewed as benign, since people enjoy satisfying their curiosity, while at the same time it increases "should" behaviors like choosing healthy options, and decreases "want" behaviors like taking the elevator.

It is important that our interventions' success is put into perspective. Although the effect sizes in our laboratory studies were relatively high, our effect sizes in our field studies may appear low. However, the improvements we found are actually quite high compared to other interventions. As discussed by Allcott and Mullainathan (2010), an intervention that reduces energy consumption by a few percent can have remarkable implications when scaled nationwide. Indeed, our results are significant not only in statistical terms, but in practical terms as well. That said, we cannot say how effective curiosity interventions will be in the long-run. Little research in general has investigated the long-term effects of nudges. It is encouraging though that research on habit formation shows that repeating a behavior for approximately two months is sufficient to make a behavior sustainable (Lally, Van Jaarsveld, Potts, and Wardle 2010). And unlike other nudges, our interventions examine recursive behavior that people can do every day (e.g., taking the stairs), which can have substantial long-term effects both through cumulative effects over time and by facilitating positive habit formation, precisely the sort of desired end result of nudging according to the *Practitioner's Guide to Nudging* (Ly, Mazar, Zhao, and Soman 2013). Even if curiosity interventions (and other interventions, more generally speaking) are only effective so long as they are maintained, it should be encouraging that our curiosity

interventions are extremely inexpensive, especially compared to other alternative means of saving energy and promoting healthy lifestyles (Stern, Gardner, Vandenbergh, Dietz, and Gilligan 2010; Vandenbergh, Stern, Gardner, Dietz, and Gilligan 2010). Our interventions' only costs were the fees for photocopying trivia questions and jokes onto thick stock paper. This is a remarkably small price to pay for easy-to-use interventions with the potential to increase a range of beneficial behaviors.

In addition, our interventions draw attention to where new everyday interventions could take place. Our interventions make use of a relatively empty space – for example, the stairwell. We see no reason why other similarly frequented yet bare spaces could not also be used to nudge people, much less educate them. While billboards and television advertisements are sometimes easy to overlook because of their routineness, information disclosed in new locations is harder to overlook because of those locations' eye-catching novelty. We are reminded of the new drinking cups at *Chipotle* restaurants, where stories by Toni Morrison, Malcolm Gladwell, and Michael Lewis now adorn the previously bare cups. Deeper exploration of such interventions that account for social and physical lacuna are ripe and warranted, not least because they enable targeting people's everyday behaviors: When everyday behaviors are multiplied by a global population of seven billion they can have an enormous influence.

Theoretical Implications

Beyond practical matters, we believe our research makes important theoretical contributions by extending existing knowledge on the effects of curiosity. First, the majority of prior research has demonstrated that curiosity can function as a personality trait, by describing people as either high or low in curiosity. For example, research has shown that consumers with high and low curiosity tend to seek out more or less information (e.g., Raju 1980). Yet, curiosity

need not be viewed solely as a personality trait. In a significant departure from most existing research, we investigated curiosity as a situational variable – which points to a promising new direction for research on visceral states. Research has identified a broad range of visceral states that are constant through all human cultures and time periods (Sheldon, Elliot, Kim, and Kasser 2001), and just as we have shown that people are motivated to choose "should" options by satisfying their curiosity, it is plausible that people can be motivated toward desired behavior in favor of satisfying other visceral states. For example, future research might compare a consumer's motivation to try all of the ice cream flavors when she has already tasted 7 of the 10 flavors to when she has already tasted 9 out of the 10 flavors. Quite possibly, the motivation to complete a set – not unlike a motivation for satisfying curiosity – is an especially motivating factor in consumer behavior. Importantly, these results would fill a large gap in the literature, whereby researchers have struggled to uncover a means by which the negative effects of visceral states on impulsive "want" behaviors can be reduced (Loewenstein 1998; Van Boven et al. 2013). Our work suggests that visceral states may be best fought with other (positive) visceral states.

Second, when researchers aren't measuring curiosity as a disposition, they are typically focused on the numerous factors that help foster or change people's curiosity (e.g., Howard and Kerin 2004; Menon and Soman 2002). Here, rather than viewing curiosity as a goal – or scientifically speaking, a dependent variable – we found that the experience of curious pursuit can itself be a cause for different outcomes (i.e., an independent variable in contrast to an end-result). In this vein, our work points to a promising new direction in research on curiosity. Rather than view curiosity as a dependent variable to understand the conditions that stimulate it, we suggest that the opportunity to be curious may also be an important psychological experience

that can lead to many other outcomes that have yet to be explored. Thus, this study might be a starting point for a new stream of research on curiosity as an outlet rather than an outcome. For example, although we found that curiosity gaps led people to choose "should" options over "want" options, we see no reason for why curiosity gaps cannot be used more generally to sway people and goad them to choosing one option over another. Because we focused on testing the effects of curiosity on choosing "should" options, our research can be seen as providing a conservative test because "shoulds" are typically harder to choose than most other options. This provides a strong degree of generalizability to our findings, because if an invention increases the choice of "shoulds," it almost certainly can increase the choice of other, ordinary options too. In fact, we do not doubt that curiosity in some cases could, irrespective of want/should conflicts, lead to undesirable "want"-like outcomes. For example, unethical behavior is sometimes described as a "want" behavior (Tenbrunsel, Diekmann, Wade-Benzoni, and Bazerman 2010), and heightening curiosity might occasionally lead to less ethical behavior because such behavior could pique their curiosity. In support of this idea, researchers have found that curiosity is one of the reasons for why people begin smoking (Lawton 1962).

Perhaps the research most relevant to the current findings has examined the motivational and psychological benefits of uncertainty (Laran and Tsiros 2013; Shen et al. 2015). For example, research has shown that people experience more positive feelings when a prize they could win is unknown, compared to when it is known (Lee and Qiu 2009; Wilson et al. 2005). Moreover, research has shown that a gift containing known and desirable items (e.g., Godiva truffles) is no better (i.e., is as attractive) than a gift containing unknown items that vary in their desirability – such as a gift that might contain some desirable Godiva truffles or some less-than Hershey's kisses (Goldsmith and Amir 2010). In some cases then, people seem to enjoy

uncertainty even when the known and unknown outcomes have unequal expected values that favor the known outcomes. Our findings are consistent with these documented results on motivation and uncertainty. On the surface, however, our findings might appear inconsistent with other research on want/should conflicts – specifically Milkman's (2012) finding that uncertainty about the future increases choices for "want" options. To the extent that uncertainty is depleting (Glass, Singer, and Friedman 1969), it follows that uncertainty would lead to increased "want" choices. However, the difference between our findings and Milkman's helps elucidate the difference between a curiosity gap and a more general feeling of uncertainty. For a curiosity gap, uncertainty can be erased – e.g., the answer to a trivia question can be found out; the secret of a magic trick can be revealed; the value of a token can be discovered – however not all uncertainty can be understood as a contract where resolve to uncertainty is something people can acquire. Sometimes, uncertainty is the result of something unpredictable with no obvious or quick resolve (like how long the annoying construction noise across the street will last), and it is in these cases that we believe uncertainty is generally aversive. In this vein, our research helps shed light on when uncertainty is positive and when it is negative.

Conclusion

The question of how to shape human behavior to desired ends has been a question of enduring interest for both researchers and practitioners. It is not surprising, then, that nudge-based interventions have garnered such attention in the research community. In the present article, we have highlighted the power of curiosity to shape behavior and reconcile want/should conflicts, and tested curiosity-piquing interventions that circumvent these conflicts. Recent research has demonstrated that although people want to do "good," they often fail to follow their intentions (e.g., Mazar, Amir, and Ariely 2008). Our results suggest that using interventions

based on curiosity gaps has the potential to increase participation in desirable behaviors for which people often lack the motivation. It also provides new evidence that curiosity-interventions come at an incredibly small cost and could help facilitate a wide range of desirable behaviors. Given the challenge of adopting “should” behaviors in today’s society, we hope our research will inspire other interventions that can successfully reconcile want/should conflicts.

References

Ainslie, George (1975), "Specious Reward: A Behavioral Theory of Impulsiveness and Impulse Control," *Psychological Bulletin,* 82 (4), 463-96.

——— (1992), *Picoeconomics: The Strategic Interaction of Successive Motivational States Within the Person.* Cambridge University Press.

Allcott, Hunt and Sendhil Mullainathan (2010), "Behavioral Science and Energy Policy," *Science,* 327 (5970), 1204-5.

Ariely, Dan and Klaus Wertenbroch (2002), "Procrastination, Deadlines, and Performance: Self-Control by Precommitment," *Psychological Science,* 13 (3), 219-24.

Attari, Shahzeen Z., Michael L. DeKay, Cliff I. Davidson, and Wandi Bruine de Bruin (2010), "Public Perceptions of Energy Consumption and Savings," *Proceedings of the National Academy of Sciences of the United States of America,* 107 (Sep), 16054-9.

Bastardi, Anthony and Eldar Shafir (1998), "On the Pursuit and Misuse of Useless Information." *Journal of Personality and Social Psychology,* 75 (1), 19-32.

Baumeister, Roy F., Ellen Bratslavsky, Mark Muraven, and Dianne M. Tice (1998), "Ego Depletion: Is the Active Self a Limited Resource?" *Journal of Personality and Social Psychology,* 74 (5), 1252-1265.

Baumeister, Roy F., Kathleen D. Vohs, and David C. Funder (2007), "Psychology as the Science of Self-Reports and Finger Movements: Whatever Happened to Actual Behavior?" *Perspectives on Psychological Science,* 2 (4), 396-403.

Bazerman, Max H., Ann E. Tenbrunsel, and Kimberly Wade-Benzoni (1998), "Negotiating with Yourself and Losing: Making Decisions with Competing Internal Preferences," *Academy of Management Review,* 23 (2), 225-41.

Berlyne, Daniel E. (1949), "'Interest' as a Psychological Concept," *British Journal of Psychology,* 39 (4), 184-95.

——— (1960), *Conflict, Arousal, and Curiosity.* McGraw-Hill Book Company.

——— (1966), "Curiosity and Exploration," *Science,* 153 (3731), 25-33.

——— (1969), "Laughter, Humor and Play," in *Handbook of Social Psychology*, G. Lindzey and E. Aronson, eds. Reading, MA, Addison-Wesley, 291-97

Bernartzi, Shlomo and Richard Thaler (2004), "Save More Tomorrow: Using Behavioral Economics to Increase Employee Savings," *Journal of Political Economy,* 112 (1), 164-87.

Bitterly, T. Bradford, Robert Mislavsky, Hengchen Dai, and Katherine L. Milkman (2015), "Dueling with Desire: A Synthesis of Past Research on Want/Should Conflict," in *The Psychology of Desire,* W. Hofmann and L. Nordgren, eds.

Chamorro-Premuzic, Tomas and Adrian Furnham (2014), *Personality and Intellectual Competence.* Psychology Press.

Chernev, Alexander and David Gal (2010), "Categorization Effects in Value Judgments: Averaging Bias in Evaluating Combinations of Vices and Virtues," *Journal of Marketing Research,* 47 (4), 738-47.

Coutu, Diane L. (2002), "How Resilience Works," *Harvard Business Review,* 80 (5), 46-56.

Deci, Edward L. and Richard M. Ryan (1985), *Intrinsic Motivation and Self-Determination in Human Behavior.* Springer Science & Business Media.

——— (2000), "The 'What' and 'Why' of Goal Pursuits: Human Needs and the Self-Determination of Behavior," *Psychological Inquiry,* 11 (4), 227-68.

Dietz, Thomas, Paul C. Stern, and Elke U. Weber (2013), "Reducing Carbon-Based Energy Consumption through Changes in Household Behavior," *Daedalus,* 142 (1), 78-89.

Dietz, Thomas, Gerald T. Gardner, Jonathan Gilligan, Paul C. Stern, and Michael P. Vandenbergh (2009), "Household Actions can Provide a Behavioral Wedge to Rapidly Reduce US Carbon Emissions," *Proceedings of the National Academy of Sciences of the United States of America,* 106 (44), 18452-6.

Edmondson, Amy C. (2008), "The Competitive Imperative of Learning," *Harvard Business Review,* 86(7/8), 60-67.

Epley, Nicholas and David Dunning (2000), "Feeling" Holier than Thou": Are Self-Serving Assessments Produced by Errors in Self-Or Social Prediction?" *Journal of Personality and Social Psychology,* 79 (6), 861-875.

Fabrigar, Leandre R. and Richard E. Petty (1999), "The Role of the Affective and Cognitive Bases of Attitudes in Susceptibility to Affectively and Cognitively Based Persuasion," *Personality and Social Psychology Bulletin,* 25 (3), 363-81.

Fitzsimons, Gavan J. (2008), "Death to Dichotomizing," *Journal of Consumer Research*, 35 (1), 5-8.

Food Marketing Institute (2013), "Supermarket Facts," (accessed September 28, 2015), [available at http://www.fmi.org/research-resources/supermarket-facts].

Forbes (2015), "Consumers Want Healthy Foods--and Will Pay More for them," (accessed September 28, 2015), [available at http://www.forbes.com/sites/nancygagliardi/2015/02/18/consumers-want-healthy-foods-and-will-pay-more-for-them.].

Förster, Jens, and Daniela Becker (2012), "When Curiosity Kills No Cat—But Mediates The Relation Between Distant Future Thoughts and Global Processing Across Sensory Modalities," *European Journal of Social Psychology*, 42 (3), 334-341.

Gagné, Marylène and Edward L. Deci (2005), "Self-Determination Theory and Work Motivation," *Journal of Organizational Behavior,* 26 (4), 331-62.

Glass, David C., Jerome E. Singer, and Lucy N. Friedman (1969), "Psychic Cost of Adaptation to an Environmental Stressor." *Journal of Personality and Social Psychology,* 12 (3), 200-10.

Goldenberg, Jacob, Roni Horowitz, Amnon Levav, and David Mazursky (2003), "Finding Your Innovation Sweet Spot," *Harvard Business Review,* 81 (3), 120-9.

Goldsmith, Kelly and On Amir (2010), "Can Uncertainty Improve Promotions?" *Journal of Marketing Research,* 47 (6), 1070-7.

Golman, Russell and George Loewenstein (2012), "Expectations and Aspirations: Explaining Ambitious Goal-Setting and Nonconvex Preferences," Unpublished Manuscript, Carnegie Mellon University.

Gottlieb, James, Oudeyer, Pierre-Yves, Lopes, Manuel, and Adrien Barnes (2013), "Information-seeking, curiosity, and attention: Computational and neural mechanisms," *Trends in Cognitive Sciences*, 17 (11), 585-593.

Grant, Adam M. and James W. Berry (2011), "The Necessity of Others is the Mother of Invention: Intrinsic and Prosocial Motivations, Perspective Taking, and Creativity," *Academy of Management Journal,* 54 (1), 73-96.

Green, David (1990), "Instrument for the measurement of individual and societal attitudes toward drugs," *International Journal of the Addictions*, 25, 141-157.

Haws, Kelly L. (2016), "Enhancing Self-Control in Consumer Decisions," *Current Opinion in Psychology*, 10, 118-123.

Hershfield, Hal E., Daniel G. Goldstein, William F. Sharpe, Jesse Fox, Leo Yeykelis, Laura L. Carstensen, and Jeremy N. Bailenson (2011), "Increasing Saving Behavior through Age-Progressed Renderings of the Future Self," *Journal of Marketing Research,* 48 (SPL), S23-37.

Howard, Daniel J. and Roger A. Kerin (2004), "The Effects of Personalized Product Recommendations on Advertisement Response Rates: The "Try this. It Works!" Technique," *Journal of Consumer Psychology,* 14 (3), 271-9.

Hsee, Christopher K. and Bowen Ruan (2015), "Curiosity Kills the Cat," Paper presented at the Association for Consumer Research Conference. New Orleans, LA.

Hsee, Christopher K., Yang Yang, and Bowen Ruan (2015), "The Mere Reaction Effect: Even Non-Positive and Non-Informative Reactions can Reinforce Actions," *Journal of Consumer Research.*

Kang, Min Jeong, Ming Hsu, Ian M. Krajbich, George Loewenstein, Samuel M. McClure, Joseph Tao-yi Wang, and Colin F. Camerer (2009), "The Wick in the Candle of Learning: Epistemic Curiosity Activates Reward Circuitry and Enhances Memory," *Psychological Science,* 20 (8), 963-73.

Kashdan, Todd B. and John E. Roberts (2004), "Social Anxiety's Impact on Affect, Curiosity, and Social Self-Efficacy during a High Self-Focus Social Threat Situation," *Cognitive Therapy and Research,* 28 (1), 119-41.

Koestler, Arthur (1964), *The Act of Creation.* London: Hutchinson.

Kolko, David J. and Alan E. Kazdin (1989), "Assessment of Dimensions of Childhood Firesetting among Patients and Nonpatients: The Firesetting Risk Interview," *Journal of Abnormal Child Psychology,* 17 (2), 157-76.

Kruger, Justin and Matt Evans (2009), "The Paradox of Alypius and the Pursuit of Unwanted Information," *Journal of Experimental Social Psychology,* 45 (6), 1173-9.

Kupor, Daniella M., Zakary L. Tormala, and Michael I. Norton (2014), "The Allure of Unknown Outcomes: Exploring the Role of Uncertainty in the Preference for Potential," *Journal of Experimental Social Psychology,* 55, 210-6.

Lally, Phillippa, Cornelia H. M. Van Jaarsveld, Henry W. W. Potts, and Jane Wardle (2010), "How Are Habits Formed: Modelling Habit Formation in the Real World," *European Journal of Social Psychology*, 40 (6), 998-1009.

Lambert, Kelly G., Tara Neal, Jill Noyes, Conway Parker, and Pamela Worrel (1991), "Food-Related Stimuli Increase Desire to Eat in Hungry and Satiated Human Subjects," *Current Psychology,* 10 (4), 297-303.

Laran, Juliano and Michael Tsiros (2013), "An Investigation of the Effectiveness of Uncertainty in Marketing Promotions Involving Free Gifts," *Journal of Marketing,* 77 (2), 112-23.

Lawton, M. Powell (1962), "Psychosocial Aspects of Cigarette Smoking," *Journal of Health and Human Behavior,* 3 (3), 163-70.

Lee, Yih H. and Cheng Qiu (2009), "When Uncertainty Brings Pleasure: The Role of Prospect Imageability and Mental Imagery," *Journal of Consumer Research,* 36 (4), 624-33.

Leiserowitz, Anthony, Edward Maibach, and Connie Roser-Renouf (2009), "Climate Change in the American Mind: Americans' Climate Change Beliefs, Attitudes, Policy Preferences, and Actions," Unpublished Manuscript. Yale University.

Litman, Jordan (2005), "Curiosity and the Pleasures of Learning: Wanting and Liking New Information," *Cognition & Emotion,* 19(6), 793-814.

——— (2010), "Relationships between Measures of I-and D-Type Curiosity, Ambiguity Tolerance, and Need for Closure: An Initial Test of the Wanting-Liking Model of Information-Seeking," *Personality and Individual Differences,* 48 (4), 397-402.

Litman, Jordan A. and Tiffany L. Jimerson (2004), "The Measurement of Curiosity as a Feeling of Deprivation," *Journal of Personality Assessment,* 82 (2), 147-57.

Litman, Jordan A. and Paul J. Silvia (2006), "The Latent Structure of Trait Curiosity: Evidence for Interest and Deprivation Curiosity Dimensions," *Journal of Personality Assessment,* 86 (3), 318-28.

Litman, Jordan A. and Charles D. Spielberger (2003), "Measuring Epistemic Curiosity and its Diversive and Specific Components," *Journal of Personality Assessment,* 80 (1), 75-86.

Liu, Peggy J., Kelly L. Haws, Cait Lamberton, Troy H. Campbell, and Gavan J. Fitzsimons (2015), "Vice-Virtue Bundles," *Management Science,* 61(1), 204-28.

Loewenstein, George (1994), "The Psychology of Curiosity: A Review and Reinterpretation." *Psychological Bulletin,* 116(1), 75.

——— (1996), "Out of Control: Visceral Influences on Behavior," *Organizational Behavior and Human Decision Processes,* 65 (3), 272-92.

Loewenstein, George, Drazen Prelec, and Catherine Shatto (1998), "Hot/cold Intrapersonal Empathy Gaps and the Under-Prediction of Curiosity," Unpublished Manuscript. Carnegie Mellon University.

Ly, Kim, Nina Mazar, Min Zhao, and Dilip Soman (2013), "A Practitioner's Guide to Nudging," Research Report. Rotman School of Management.

Lynch, John G. (2011), “Introduction to the Journal of Marketing Research Special Interdisciplinary Issue on Consumer Financial Decision Making,” *Journal of Marketing Research*, 48 (Special Issue), Siv–Sviii.

Maner, Jon K. and Mary A. Gerend (2007), "Motivationally Selective Risk Judgments: Do Fear and Curiosity Boost the Boons or the Banes?" *Organizational Behavior and Human Decision Processes,* 103 (2), 256-67.

Manguel, Alberto (2015), *Curiosity*. Yale University Press.

Maslow, Abraham H. (1963), "The Need to Know and the Fear of Knowing," *The Journal of General Psychology*, 68 (1), 111-125.

Mazar, Nina, On Amir, and Dan Ariely (2008), "The Dishonesty of Honest People: A Theory of Self-Concept Maintenance," *Journal of Marketing Research,* 45 (6), 633-44.

Menon, Satya and Dilip Soman (2002), "Managing the Power of Curiosity for Effective Web Advertising Strategies," *Journal of Advertising,* 31 (3), 1-14.

Milkman, Katherine L. (2012), "Unsure what the Future Will Bring? You may Overindulge: Uncertainty Increases the Appeal of Wants over Shoulds," *Organizational Behavior and Human Decision Processes,* 119 (2), 163-76.

Milkman, Katherine L., Dolly Chugh, and Max H. Bazerman (2009), "How can Decision Making be Improved?" *Perspectives on Psychological Science,* 4 (4), 379-83.

Milkman, Katherine L., Julia A. Minson, and Kevin G. Volpp (2013), "Holding the Hunger Games Hostage at the Gym: An Evaluation of Temptation Bundling," *Management Science,* 60 (2), 283-99.

Milkman, Katherine L., Todd Rogers, and Max H. Bazerman (2008), "Harnessing our Inner Angels and Demons: What we have Learned about want/should Conflicts and how that Knowledge can Help Us Reduce Short-Sighted Decision Making," *Perspectives on Psychological Science,* 3 (4), 324-38.

——— (2010), "I'll have the Ice Cream Soon and the Vegetables Later: A Study of Online Grocery Purchases and Order Lead Time," *Marketing Letters,* 21 (1), 17-35.

Milkman, Katherine L., John Beshears, James J. Choi, David Laibson, and Brigitte C. Madrian (2011), "Using Implementation Intentions Prompts to Enhance Influenza Vaccination Rates," *Proceedings of the National Academy of Sciences of the United States of America,* 108 (26), 10415-20.

Muraven, Mark and Roy F. Baumeister (2000), "Self-Regulation and Depletion of Limited Resources: Does Self-Control Resemble a Muscle?" *Psychological Bulletin,* 126 (2), 247-259.

Naylor, Frank D. (1981), "A State-Trait Curiosity Inventory," *Australian Psychologist,* 16 (2), 172-83.

Nickerson, David W., and Todd Rogers (2010), "Do You have a Voting Plan?: Implementation Intentions, Voter Turnout, and Organic Plan Making," *Psychological Science,* 21 (2), 194-9.

Nordgren, Loran F. and Eileen Y. Chou (2013), "A Devil on each Shoulder when (and Why) Greater Cognitive Capacity Impairs Self-Control?" *Social Psychological and Personality Science,* 4 (2), 233-7.

Nordgren, Loran F., Joop van der Pligt, and Frenk van Harreveld (2008), "The Instability of Health Cognitions: Visceral States Influence Self-Efficacy and Related Health Beliefs," *Health Psychology,* 27 (6), 722-727.

O'Donoghue, Ted and Matthew Rabin (2000), "The Economics of Immediate Gratification," *Journal of Behavioral Decision Making,* 13 (2), 233-250.

Olson, Kenneth, Cameron Camp, and Dana Fuller (1984), "Curiosity and Need for Cognition," *Psychological Reports,* 54 (1), 71-4.

Paolacci, Gabriele and Jesse Chandler (2014), "Inside the Turk Understanding Mechanical Turk as a Participant Pool," *Current Directions in Psychological Science,* 23 (3), 184-8.

Peck, Joann and Terry L. Childers (2006), "If I Touch it I have to have it: Individual and Environmental Influences on Impulse Purchasing," *Journal of Business Research,* 59 (6), 765-9.

Peterson, Christopher and Martin E. Seligman (2004), *Character Strengths and Virtues: A Handbook and Classification.* Oxford University Press.

Petty, Richard E. and Duane T. Wegener (1998), "Matching Versus Mismatching Attitude Functions: Implications for Scrutiny of Persuasive Messages," *Personality and Social Psychology Bulletin,* 24 (3), 227-40.

Pham, Michel T. (2013), "The Seven Sins of Consumer Psychology," *Journal of Consumer Psychology,* 23 (4), 411-23.

Pyone, Jin S. and Alice M. Isen (2011), "Positive Affect, Intertemporal Choice, and Levels of Thinking: Increasing Consumers' Willingness to Wait," *Journal of Marketing Research,* 48 (3), 532-43.

Raju, Puthankurissi S. (1980), "Optimum Stimulation Level: Its Relationship to Personality, Demographics, and Exploratory Behavior," *Journal of Consumer Research,* 7 (3), 272-82.

Read, Daniel, George Loewenstein, and Shobana Kalyanaraman (1999), "Mixing Virtue and Vice," *Journal of Behavioral Decision Making,* 12 (4), 257-73.

Read, Daniel and Barbara Van Leeuwen (1998), "Predicting Hunger: The Effects of Appetite and Delay on Choice," *Organizational Behavior and Human Decision Processes,* 76 (2), 189-205.

Reio, Thomas G. and Albert Wiswell (2000), "Field Investigation of the Relationship among Adult Curiosity, Workplace Learning, and Job Performance," *Human Resource Development Quarterly,* 11 (1), 5-30.

Reiss, Steven (2004), "Multifaceted Nature of Intrinsic Motivation: The Theory of 16 Basic Desires." *Review of General Psychology,* 8 (3), 179.

Rogers, Todd and Max H. Bazerman (2008), "Future Lock-in: Future Implementation Increases Selection of 'should' choices," *Organizational Behavior and Human Decision Processes,* 106 (1), 1-20.

Rogers, Todd, Katherine L. Milkman, and Max H. Bazerman (2007), "I'll have the Ice Cream Soon and the Vegetables Later: Decreasing Impatience Over Time in Online Grocery Orders," Unpublished Manuscript. Harvard University

Rogers, Todd, Katherine L. Milkman, and Kevin G. Volpp (2014), "Commitment Devices: Using Initiatives to Change Behavior," *JAMA,* 311 (20), 2065-6.

Rogers, Todd, Katherine L. Milkman, Leslie John, and Michael I. Norton (2013), "Making the Best-Laid Plans Better: How Plan Making Increases Follow-through," Unpublished Manuscript. Harvard University.

Shani, Yaniv, Eric R. Igou, and Marcel Zeelenberg (2009), "Different Ways of Looking at Unpleasant Truths: How Construal Levels Influence Information Search." *Organizational Behavior and Human Decision Processes*, 110 (1), 36-44.

Sheldon, Kennon M., Andrew J. Elliot, Youngmee Kim, and Tim Kasser (2001), "What is Satisfying about Satisfying Events? Testing 10 Candidate Psychological Needs." *Journal of Personality and Social Psychology,* 80 (2), 325-339.

Shen, Lijiang (2011), "The Effectiveness of Empathy-Versus Fear-Arousing Antismoking PSAs," *Health Communication,* 26 (5), 404-15.

Shen, Luxi, Ayelet Fishbach, and Christopher K. Hsee (2015), "The Motivating-Uncertainty Effect: Uncertainty Increases Resource Investment in the Process of Reward Pursuit," *Journal of Consumer Research,* 41 (5), 1301-15.

Shiv, Baba and Alexander Fedorikhin (2002), "Spontaneous Versus Controlled Influences of Stimulus-Based Affect on Choice Behavior," *Organizational Behavior and Human Decision Processes,* 87 (2), 342-70.

Simmons, Joseph P., Leif D. Nelson, and Uri Simonsohn (2013), "Life After p-Hacking." Unpublished Manuscript. University of Pennsylvania.

Simon, Herbert A. (1992), "Scientific Discovery as Problem Solving," *International Studies in the Philosophy of Science,* 6 (1), 3-14.

Spencer, Steven J., Mark P. Zanna, and Geoffrey T. Fong (2005), "Establishing a Causal Chain: Why Experiments are often More Effective than Mediational Analyses in Examining Psychological Processes." *Journal of Personality and Social Psychology,* 89 (6), 845-851.

Spoor, Sonja T., Marrie H. Bekker, Tatjana Van Strien, and Guus L. van Heck (2007), "Relations between Negative Affect, Coping, and Emotional Eating," *Appetite,* 48 (3), 368-76.

Stern, Paul C., Gerald T. Gardner, Michael P. Vandenbergh, Thomas Dietz, and Jonathan M. Gilligan (2010), "Design Principles for Carbon Emissions Reduction Programs," *Environmental Science & Technology,* 44 (13), 4847-8.

Stroebe, Wolfgang, Guido M. Van Koningsbruggen, Esther K. Papies, and Henk Aarts (2013), "Why most Dieters Fail but some Succeed: A Goal Conflict Model of Eating Behavior." *Psychological Review,* 120 (1), 110-138.

Swan, Gary E., Dorit Carmelli, and Lon R. Cardon (1996), "The Consumption of Tobacco, Alcohol, and Coffee in Caucasian Male Twins: A Multivariate Genetic Analysis," *Journal of Substance Abuse,* 8 (1), 19-31.

Tenbrunsel, Ann E., Kristina A. Diekmann, Kimberly A. Wade-Benzoni, and Max H. Bazerman (2010), "The Ethical Mirage: A Temporal Explanation as to Why we are Not as Ethical as we Think we are," *Research in Organizational Behavior,* 30, 153-73.

Thaler, Richard H. (1981), "Some Empirical Evidence on Dynamic Inconsistency," *Economics Letters,* 8, 201-7.

Thaler, Richard H. and Hersh M. Shefrin (1981), "An Economic Theory of Self-Control," *Journal of Political Economy,* 39 (April), 392-406.

Thaler, Richard H. and Cass R. Sunstein (2009), *Nudge: Improving Decisions about Health, Wealth, and Happiness.* Penguin Books.

Thaler, Richard H. and Shlomo Benartzi (2004), "Save More Tomorrow™: Using Behavioral Economics to Increase Employee Saving," *Journal of Political Economy,* 112 (S1), S164-87.

United States Department of Agriculture (2014), "Food Expenditures." (accessed September 28, 2015), [available at http://www.ers.usda.gov/data-products/food-expenditures.aspx.].

van de Ven, Niels, Marcel Zeelenberg, and Eric van Dijk (2005), "Buying and Selling Exchange Goods: Outcome Information, Curiosity and the Endowment Effect," *Journal of Economic Psychology,* 26 (3), 459-68.

Van Dillen, Lotte F., Esther K. Papies, and Wilhelm Hofmann (2013), "Turning a Blind Eye to Temptation: How Cognitive Load can Facilitate Self-Regulation." *Journal of Personality and Social Psychology,* 104 (3), 427-443.

Vandenbergh, Michael P., Paul C. Stern, Gerald T. Gardner, Thomas Dietz, and Jonathan M. Gilligan (2010), "Implementing the Behavioral Wedge: Designing and Adopting Effective Carbon Emissions Reduction Programs," *Environmental Law Reporter,* 40, 10547.

Weber, Elke U. and Paul C. Stern (2011), "Public Understanding of Climate Change in the United States." *American Psychologist,* 66 (4), 315-328.

Webster, Donna M. and Arie W. Kruglanski (1994), "Individual Differences in Need for Cognitive Closure." *Journal of Personality and Social Psychology,* 67 (6), 1049-1062.

Wilson, Timothy D., David B. Centerbar, Deborah A. Kermer, and Daniel T. Gilbert (2005), "The Pleasures of Uncertainty: Prolonging Positive Moods in Ways People do Not Anticipate." *Journal of Personality and Social Psychology,* 88(1), 5-21.

Zhao, Xinshu, John G. Lynch, and Qimei Chen (2010), "Reconsidering Baron and Kenny: Myths and Truths about Mediation Analysis," *Journal of Consumer Research*, 37 (2), 197-206.

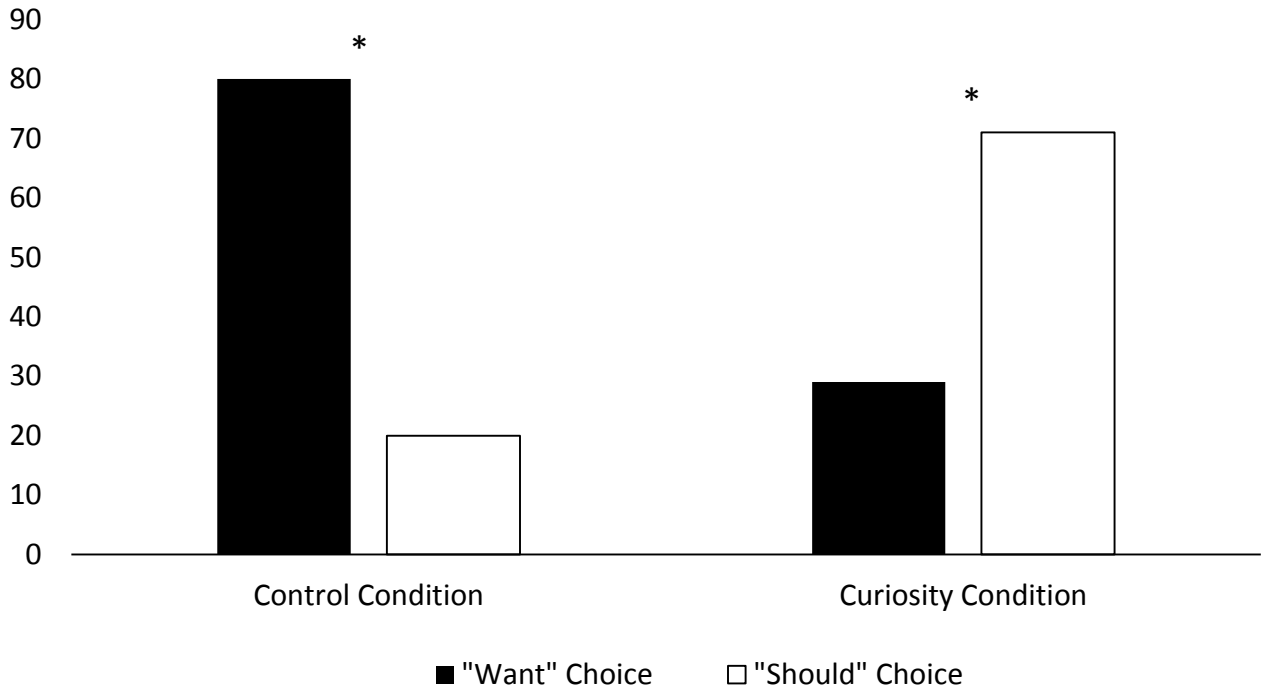
Table 1:

Choice of Clip by Control and Intervention Condition, Segmented By Low and High Curiosity Score (Study 2)

	Highbrow Clip (Clip 1)	Lowbrow Clip (Clip 2)
Low Curiosity Score		
Contol	22.9%	77.1%
Intervention	47.9%	52.1%
Total	34.4%	64.6%
High Curiosity Score		
Contol	37.6%	62.4%
Intervention	60.0%	40.0%
Total	50.2%	49.8%
All Curiosity Scores		
Contol	30.0%	70.0%
Intervention	54.5%	45.5%
Total	43.0%	57.0%

Figure 1:

Proportion of “Should” and “Want” Choices by Control and Curiosity Condition (Study 1)



Appendix:

Pictures of Signs with Jokes and Corresponding Tags with Punchlines

Note: The top of the signs say, “Let’s produce some laughs” and the bottom of the signs say, “Find the answer as you tag your fresh produce.” The tags containing the punchlines were placed nearby the signs. For these items, the punchline for the artichoke joke (left picture: “Why did the tin man from Oz eat artichokes?”) is … “He wanted a heart!”, and the punchline for the orange joke (right picture: “Why did the man at the orange juice factory lose his job?”) is … “He couldn’t concentrate!”.