



Behavioral Economics and Psychology of Incentives

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Abstract

Monetary incentives can backfire while nonstandard interventions, such as framing, can be effective in influencing behavior. I review the empirical evidence on these two sets of anomalies. Paying for inherently interesting tasks, paying for prosocial behavior, paying too much, paying too little, and providing too many options can all be counterproductive. At the same time, proper design of the decision-making environment can be a potent way to induce certain behaviors. After presenting the empirical evidence, I discuss the relative role of beliefs, preferences, and technology in the anomalous impacts of incentives. I argue that inference, signaling, loss aversion, dynamic inconsistency, and choking are the primary factors that explain the data.

1. INTRODUCTION

Contrary to what you would expect based on a standard introductory text in microeconomics, if you pay a person more for doing a task, she might be less willing to work on it, she might be less productive given her efforts, and she may enjoy the task less. If you start charging a fee for something, more people might start doing it. If you want your employees to save more for retirement, you may want to give them fewer investment options. If you want them to engage more in a task, you might want to offer them an additional alternative to that task. Moreover, to induce particular actions, you might have to think not only about the underlying incentives, but also about the defaults, the presentation, the labels, the frame—about the choice architecture.

In this article I review empirical findings on anomalous impacts of incentives and argue that, rather than being a disconnected string of idiosyncratic exceptions to the standard model, these findings constitute convergent evidence about a coherent set of principles that can help improve the design of incentive structures in a variety of settings.

To organize the literature, I carve the set of observed anomalies in two different ways. First, I divide the empirical findings into those that suggest that there is no free disposal (of options or of money) and those that demonstrate that framing matters. This categorization, however, does not coincide with the categorization based on the mechanisms behind the effects. Some of the observed effects are driven by contextual inference, some are a consequence of loss aversion and dynamic inconsistency, and some reflect psychological factors such as choking.

The free disposal of money seems like a noncontroversial proposition. Yet some of the empirical findings mentioned above bring it into question. Suppose that in the absence of any monetary incentives you would solve two crossword puzzles a week. If offered \$5 per puzzle solved, however, you would solve no puzzles. Some studies demonstrate precisely this type of effect (Gneezy & Rustichini 2000a, Heyman & Ariely 2004) even though this empirical pattern seems inconsistent with the free disposal of money—if under the incentivized regime you were to solve two puzzles and then discard the \$10 earned, this outcome, based on your behavior in the nonincentivized regime, should be preferable to solving no puzzles.

Another seemingly noncontroversial principle is that, in nonstrategic situations,¹ a decision maker prefers to have more options. A direct corollary of this principle is that, if you wish to induce someone to take an action, providing more ways in which she can do so is desirable. For example, if you wish your employees to invest in their 401(k) plans, providing them with more investment funds should help. Yet studies such as Iyengar et al. (2004) find the exact opposite, suggesting that employees do not have free disposal of their investment options.

These examples illustrate ways that standard incentives can fail. Complementary to these findings are results illustrating that seemingly irrelevant factors, such as the way the options are framed, can be quite effective in inducing people to take particular actions. For example, numerous studies show that designating a particular option as the default greatly increases the extent to which that option is selected (e.g., Madrian & Shea 2001). More broadly, Thaler & Sunstein (2008) argue that constructing the appropriate choice

¹In strategic settings, commitment can, of course, be valuable, which means that an agent can prefer to have fewer options.

architecture is a powerful tool for affecting behavior. Closely related to this work is an older literature on the psychology of persuasion. Cialdini (1993) reviews experiments in social psychology that demonstrate how small interventions can strongly influence the behavior of others. For example, in a classic experiment, Langer (1989) shows that asking people waiting in a line to use a photocopier, “Excuse me, I have five pages. May I use the Xerox machine?” is far less effective than the semantically redundant “Excuse me, I have five pages. May I use the Xerox machine because I have to make some copies?”

These two broad patterns, (a) less money and fewer options can be more effective and (b) framing matters, succinctly describe many of the anomalies in incentives. This description, however, provides no insight into the underlying mechanisms. Because these anomalies are far from ubiquitous—monetary incentives typically have the intended consequence of getting people to work harder—identifying the underlying mechanisms is particularly important; doing so will help predict when these anomalies are likely to appear. I argue that there are three main explanations behind the data: (a) contextual inference, (b) loss aversion and dynamic inconsistency, and (c) choking.

The idea behind contextual inference is that people are often unsure about what the best course of action is and consequently seek clues from the environment. This mechanism can explain many of the aforementioned anomalies. For example, if you are unsure whether solving puzzles is fun and someone offers you \$5 per puzzle solved, you might reasonably infer that this activity is not enjoyable and thus forgo it, even though you might have tried and enjoyed solving a couple of puzzles in the absence of a monetary incentive (Bénabou & Tirole 2003a). If an employee is given many investment options, she might not know which ones are suitable for her and therefore may be less likely to invest than if she had only a few options (Kamenica 2008, Iyengar & Kamenica 2010). If she is unsure of the appropriate fraction of income to invest, the default option may be an appealing suggestion (Madrian & Shea 2001). These are examples of perfectly rational inference, but individuals might be influenced by environmental clues even when these clues do not actually carry informational content. The use of the word “because” in Langer’s experiment superficially suggests urgency and logic to the request even though it does not convey any information.²

Not all the anomalies in incentives result from contextual inference, whether rational or not. Some effects are driven by loss aversion and other nonstandard preferences, whereas others are caused by the adverse effects of stress induced by unusually high stakes. The goal of this article is to review the empirical literature and discuss the extent to which the observed effects can be explained through assumptions on beliefs (the role of inference and signaling), preferences (the role of loss aversion and dynamic inconsistency), and technology (the role of choking and nudges).

I should also mention an important topic that this review does not cover. There are anomalies in incentives that are primarily driven by social preferences, with fairness, trust, and reciprocity playing particularly important roles (Fehr & Falk 2002, Fehr & List 2004). Although those factors are certainly as important as the ones I consider here, I do not discuss them since Fehr et al. (2009) review the relevant literature in the first volume of this journal. Gneezy et al. (2011) also provide a review of related literature, but they focus

²Similarly, decisions can be influenced by numerical anchors even when those are explicitly randomized (Tversky & Kahneman 1974).

primarily on the impact of monetary incentives in education, contributions to public goods, and changes in people's lifestyles.

2. WHEN STANDARD INCENTIVES BACKFIRE

The most obvious way to get a person to do something is to pay her for doing it. There are at least four ways, however, that this prescription can fail. First, if the task is inherently interesting, introducing temporary monetary incentives can reduce subsequent willingness to do the task. Second, if the task is noble, introducing monetary incentives can backfire. Third, paying a very high wage contingent on the successful completion of a task can lead the worker to become so nervous that she is unable to get the task done. Fourth, paying a very low wage or charging a very low fee might be counterproductive.

An alternative way to induce people to engage in an activity is to provide them with more options for doing so. For instance, if we want more people to drive hybrid cars, we might want to subsidize the introduction of additional models to cater to a wider breadth of preferences. Or if we wish for someone to spend more time on a project, we might give her more flexibility about when to finish it. Trying to stimulate an activity in this manner, however, can backfire for a couple of reasons. First, if individuals are uncertain about their preferences over the available options, a more limited choice set can be more effective. Second, if individuals have time-inconsistent preferences, a smaller choice set can eliminate the prospect of endless procrastination.

2.1. Intrinsic and Extrinsic Incentives

The possibility that monetary incentives can crowd out intrinsic motivation was first demonstrated by Deci (1971). Subjects in both the control and the treatment group came to the lab for three hour-long sessions. During each session, subjects had an opportunity to solve puzzles. In the first and the third session, subjects were not paid for their performance on this task. During the second session, however, the subjects in the treatment group were paid \$1 for each puzzle solved within the allotted time; the subjects in the control group were not. During each session, the experimenter left the room for eight minutes and secretly measured how much of that time subjects spent trying to solve a puzzle that, unbeknownst to the subjects, was unsolvable. On the table in front of each subject, along with the puzzle, were the most recent issues of *The New Yorker*, *Time*, and *Playboy*, so not all the subjects spent the entire eight minutes on the impossible puzzle, thus providing Deci with suitable variation in the outcome measure. The effect that Deci found and emphasized, the effect that gave birth to an entire subfield within social psychology, is that during the third, unincentivized session, the subjects in the treatment group spent less time working on the puzzle than the subjects in the control group. The common interpretation of this finding is that the exposure to extrinsic monetary incentives crowds out intrinsic motivation and thus reduces subsequent interest in the task. This experiment has been replicated many times: Deci et al. (1999) review 128 experiments with the same basic design.³ Almost all the replications, however, follow

³In addition, Meier (2007) conducts a field experiment in which some students were told that an anonymous donor would match part of their donation to a social fund. The introduction of a match raised donations, but when the match was removed, donations fell below their initial level. The overall, long-run effect of the temporary match was

Deci (1971) in examining the outcomes once the monetary incentives have been removed. In Deci's initial experiment, as in 9 of the subsequent 11 psychology experiments reviewed by Wiersma (1992), subjects produce more output while they are exposed to a contingent monetary reward. In other words, the main lesson from the psychology literature on intrinsic motivation is simply that it is a bad idea to *temporarily* pay people for an inherently interesting task; there is no systematic evidence from this literature that indicates long-term monetary incentives can backfire.⁴

2.2. Prosocial Behavior and Extrinsic Incentives

Titmuss (1970) argues that offering payment for blood donation might reduce the number of people willing to give blood.⁵ Mellström & Johannesson (2008) provide one experimental test of this conjecture. They recruited undergraduate students for an experiment, purportedly about attitudes toward blood donation. All subjects were then given an opportunity to undertake a physical exam that would be necessary for them to become blood donors. The outcome measure was the subject's willingness to undergo this exam. Subjects were randomized into three conditions. In the control condition, they were not offered any compensation. In the first treatment condition, subjects were given \$7 if they agreed to the physical exam. In the second treatment condition, subjects who agreed to the physical exam could choose between a \$7 payment or a \$7 donation to a charity. In contrast to Titmuss' conjecture, the authors find no significant difference in outcomes across the three conditions, although their standard errors are large enough to allow for the possibility that the \$7 payment substantially reduces the willingness to agree to the exam. Moreover, the authors separately analyze the data on male and female subjects. Among men, payment does not substantially affect behavior. Among women, however, the fraction of subjects who agree to the exam drops from 52% without compensation to 30% when a \$7 payment is introduced ($p = 0.024$). Under the second treatment, where the \$7 could be designated for charity, the fraction of women who agree to the exam is 53%, quite similar to the control group.⁶ Because from the ex ante perspective there was little reason to expect the effect to hold only for women, however, these results should be interpreted with

negative. Pittman et al. (2008) find that offering a bonus for completing a task by a given deadline increases the number of people who do so, but it also decreases the number of people who subsequently complete the task if they miss the deadline. If the bonus is small, the overall effect is a reduction in the completion rate.

⁴That said, as I discuss in Section 2.4, in another context in which a monetary payment changes the nature of the social interaction, a small financial incentive can be counterproductive even in the long run.

⁵The impact of financial incentives on prosocial behavior has, of course, also been studied in contexts other than blood donation. Frey & Oberholzer-Gee (1997) survey Swiss citizens on whether they would permit the construction of a nuclear waste repository in their community. Respondents to whom no compensation was mentioned were far more likely to approve of the construction than those who were told that the Swiss Parliament would compensate the residents of communities where nuclear waste would be deposited. Ashraf et al. (2012) conduct a field experiment in Zambia where hairdressers are hired by an NGO to sell female condoms to their customers. They randomize the hairdressers to four conditions: (a) volunteers, (b) a small financial incentive per condom, (c) a high financial incentive per condom, and (d) social recognition in the form of "stars" displayed on a "thermometer" in the salon for each condom sold. They find that financial incentives, whether large or small, do not impact the sales, contrary to Titmuss' conjecture. In contrast, the social recognition treatment greatly increased the sales. Kosfeld & Neckermann (2011) report a similar result that symbolic awards can increase performance.

⁶Because the subjects in the first treatment could do whatever they wished with their \$7, including giving it to a charity, the difference between the first and the second treatment indicates that subjects behave as if there is no free disposal of money.

caution.⁷ Moreover, Lacetera & Macis (2010b) and Lacetera et al. (2012) offer contrary evidence from the field.⁸ Lacetera & Macis (2010b) analyze the effect of a legislative provision that grants a one-day paid leave of absence to blood donors who are employees in Italy. By utilizing the interaction between this provision and the job market status of the donor, the authors establish that the incentive leads existing donors to make one extra donation per year, an increase of approximately 40%. Lacetera et al. (2012) utilize both naturally occurring variation in whether a blood drive by the American Red Cross offered rewards and a field experiment in which the authors randomized incentives in the form of gift cards. Both methods suggest that the presence of incentives increases the number of donors by approximately 15%–20%.⁹

2.3. Paying Too Much

In Peter Bogdanovich’s film *What’s Up, Doc?*, as Howard Bannister heads out to an important meeting, his fiancée reminds him, “Now, don’t be nervous Howard, just remember: Everything depends on this.” The audience typically laughs, presumably because, when stakes are high, emphasizing the stakes can be detrimental to a person’s performance.

This possibility stands in sharp contrast with the standard models in contract theory in which higher stakes lead to greater effort and in turn induce higher output. However, the idea that overly high stakes can lead to lower performance has a long history in psychology (Baumeister 1984). Beilock (2010) provides a recent book-length treatment of the cognitive psychology underlying “choking” in high-stakes situations.¹⁰

Whereas the research in psychology has primarily focused on choking in circumstances that are inherently stressful, of greatest interest to economists is the possibility that high-powered incentive schemes might degrade performance. Ariely et al. (2009b) demonstrate this possibility in a series of laboratory experiments. One of their experiments was conducted in India. Subjects played six games and were randomized to three conditions. The conditions varied by the maximum amount of money the subject could earn per game. The maximum was 4, 40, and 400 Indian rupees¹¹ per game in the low-, mid-, and high-stakes conditions, respectively. The incentive scheme was a step function with two game-specific performance cutoffs, y_l and y_h . Outcomes below y_l generated no earnings, outcomes between y_l and y_h earned half of the maximum amount, and outcomes above y_h earned the maximum amount. Consequently, a subject who performed above y_h in each game would earn 2,400 rupees, which is approximately 20 times more than the daily wage mandated by the National Rural Employment Guarantee Act. Such high-powered incentives did not improve performance. Pooling the six games together, the fraction of the

⁷That said, in a survey with hypothetical responses, Lacetera & Macis (2010a) also find that, compared with men, women are more likely to be adversely affected by an offer of a monetary incentive for blood donation.

⁸Goette & Stutzer (2008) also conduct a field experiment on incentives for blood donation. They examine two types of incentives: a lottery ticket and a free cholesterol test. The former significantly increases donations, whereas the latter has no substantial impact.

⁹The authors also establish that about half of this effect results from donors shifting their donations from nonincentivized drives to neighboring incentivized drives. In contrast, intertemporal substitution seems to be less of an issue in this context.

¹⁰One of the seemingly robust findings from this literature is that the performance of individuals with high working memory is particularly susceptible to stress.

¹¹400 rupees was approximately \$8.34 at the time of the experiment.

maximum earnings that the subjects obtained was substantially lower in the high-stakes condition (19.5%) than in the mid-stakes (36.7%) or the low-stakes (35.4%) conditions. Subjects might have tried harder when more money was at stake, but their output was substantially lower.

Ariely et al. (2009b) also conduct a second experiment, with MIT college students. Unlike the first experiment, the second experiment was a within-subject design. Each student was paid for performance on two tasks, a typing task and an addition task, under a low-stakes and a high-stakes regime. The typing task was mindless; it simply required subjects to alternate pressing two keys on the keyboard during four minutes. Under low stakes, the subjects were paid nothing if they pressed 599 alternations or fewer, \$15 if they pressed 600 alternations, and an additional 10¢ for each additional alternation. The addition task required subjects to identify two numbers, out of a matrix with twelve numbers, that add up to 10. Subjects were given four minutes to solve as many as 20 problems. Under low stakes, the subjects were paid nothing if they solved 9 problems or fewer, \$15 if they solved 10 problems, and an additional \$1.50 for each additional problem. For both tasks, the high-stakes regime had payments that were 10 times higher, so subjects could earn as much as \$600 overall. The impact of such high stakes varied across the two tasks. In the addition task, subjects performed relatively poorly, i.e., earned a lower fraction of maximum possible earnings,¹² when the stakes were high. In contrast, performance in the typing task was greater in the high-stakes regime.¹³ Although the experimental design unfortunately introduces some confounds in the comparison of the two tasks,¹⁴ the different impact of increasing the stakes for typing and addition is sensible and illustrative. Unlike in the addition task, effort in the typing task mechanically translates into output so that stress could not reduce output conditional on effort.

The experiments above clearly demonstrate that high-powered incentive schemes can reduce some people's ability to perform a task. These experiments do not establish, however, that such effects play a role in any real-world labor market. A criticism of behavioral economics associated with Gary Becker (e.g., see an interview with Becker in Stewart 2005), applies with particular force in this setting: It could be the case that *some* people choke under pressure when performing a given task, but that does not mean that any person actually hired for a particular job would choke while doing it. A number of papers attempt to address this concern by looking at the performance of paid professionals in sports. On one hand, this is an attractive setting for this purpose because the structure of sports games often induces natural variation in the stakes. On the other hand, these papers must grapple with the fact that the players they study are in strategic situations, so assessing performance is not straightforward.¹⁵

¹²The authors do not report the data on the number of alternations pressed or the number of problems solved in each condition.

¹³Here the authors again use the fraction of the "maximum possible earnings" as the measure of performance. Based on a pretest, they define this maximum as 750 alterations.

¹⁴The addition task involves a fixed number of problems while the typing task does not. Also, the incentive scheme in the addition task requires subjects to double the number of problems solved in order to double their earnings above the \$15/\$150 cutoff, while in the typing task they only need to do an additional 25% of alternations in order to double their earnings above the \$15/\$150 cutoff.

¹⁵One task that arguably has only a small strategic component is the free throw in basketball. Worthy et al. (2009) examine free throws in the NBA that take place during the final minute of the games when the score differential is within 5 points. They find that players are less likely to score than their career average if the score differential is -2 , -1 , 1 , or 3 . If the score is tied, they are actually somewhat more likely to score, although this effect is not statistically significant.

Paserman (2010) examines stroke-by-stroke data from several Grand Slam tennis tournaments. He considers a dynamic programming algorithm that recursively determines the importance of each point, i.e., the effect that the point will have on the probability of winning the overall match. He deals with the strategic aspect of the situation by introducing a structural model where players choose whether to play aggressively or not, with aggression increasing both the likelihood of a winning shot and the likelihood of an unforced error. He reports that players' performance declines greatly with the importance of the point: The average probability that a player wins a match would increase from 0.5 to 0.75–0.80 if the player could avoid choking under pressure. This is such a remarkably large effect that it would certainly be worthwhile to replicate this finding in a setting with more transparent identification.

Other authors examine whether a player under more pressure is less likely to score a penalty kick in professional soccer (Dohmen 2008, Apesteguia & Palacios-Huerta 2010, Kocher et al. 2011). The authors of these papers typically address the issue of strategic interaction by emphasizing that their results hold even if they focus on whether the player missed the goal rather than whether he scored. This argument fails to take into account the fact that if the goalkeeper becomes more focused and effective on a decisive shot, it may be optimal for a player to kick with more force and less precision. The papers find conflicting results. Dohmen (2008) finds that, if anything, a kicker is most likely to score when the importance of the kick is greatest, i.e., when the score difference is a goal or less and the end of the match is near. Apesteguia & Palacios-Huerta (2010) examine penalty kick shootouts and report that the team that shoots first wins the shootout 60.5% of the time.¹⁶ They interpret this as evidence for the claim that psychological pressure reduces the kicker's ability to score a goal.¹⁷ Kocher et al. (2011), however, fail to replicate their finding using a more extensive data set. Overall, to date there is no compelling empirical evidence that choking plays an important role in any real-world labor market.

Moreover, there is another reason to be skeptical about the relevance of choking for real-world outcomes: *ex ante* investments. In most settings, a high-stakes situation is not entirely unanticipated. Consequently, even if paying someone a million dollars to accomplish a task induces counterproductive stress, the anticipation of such an incentive will lead to the development of relevant human capital. For example, paying a student a million dollars to do well on an SAT exam might be detrimental to the student's focus while she is taking the exam, but it will also induce her to study more in the months prior to the exam. I cannot think of a setting where the latter channel does not dwarf the former one.

2.4. Paying Too Little

The research discussed in the previous subsection identifies the potential peril of paying too much. Paying too little can also be counterproductive relative to paying nothing. In a suitably titled paper "Pay Enough or Don't Pay at All," Gneezy & Rustichini (2000b) demonstrate this with a simple experiment. College students were asked to answer a set of

¹⁶Which team shoots first is determined by a coin flip. The teams alternate taking kicks, and the winner is determined by the best-three-out-of-five rule.

¹⁷To me, this does not seem like the most natural test. One might expect that pressure is the highest when a kicker is in a do-or-die situation where failing to score ends the game. One could use the coin flip to instrument for whether a player is in a do-or-die situation and thus identify the impact of pressure on the outcome.

IQ questions and were paid nothing, 0.1 Israeli new shekels (NIS), 1 NIS, or 3 NIS for every question answered correctly.¹⁸ The subjects who received only one-tenth of an NIS for each correct answer performed substantially worse on the test than any of the other subjects, including those who faced no monetary incentives. In closely related work, Gneezy & Rustichini (2000a) introduced a fine for parents coming late to pick up their children in Israeli day-care centers. The number of parents who showed up late increased. When the fine was later removed, the tendency to show up late remained the same.

These experiments suggest that a small reward or a small fine can have a counterproductive effect. Heyman & Ariely (2004) replicate this finding in a setting with fixed, noncontingent compensation and also add a condition that clarifies the nature of the effect. In one of their experiments, subjects were asked to repeatedly drag a computerized ball to a specific location on the screen. Some subjects were not compensated in any way for the task. Other subjects received one of two *forms* of payment (either cash or an equivalent amount of jelly beans) crossed with two *levels* of payment, low (10¢ or 5 jelly beans) or high (\$4 or half a pound of jelly beans). The findings are quite instructive. In the conditions with cash payment, the effort exerted (the number of balls dragged across the screen) was greater when subjects were paid \$4 than when they were paid 10¢, but it was much lower when they were paid 10¢ than when they received no compensation. In the conditions with candy payment, conversely, effort was similar under high payment, low payment, and no compensation. The authors thus replicate, in a gift-giving environment, the finding that low monetary payment decreases effort relative to no payment but also show that a similar effect does not obtain if one provides a nonmonetary form of payment such as candy.¹⁹

The authors also conduct an additional illustrative experiment. Subjects were asked to work on a set of puzzles. A puzzle was solved by selecting a subset of 12 numbers that add up to 100. Subjects were told to push a button labeled “I give up” if they wanted to quit the experiment. The first four puzzles had a solution while the final, fifth puzzle did not. The dependent measure the authors use is the amount of time that subjects spent trying to solve the last, unsolvable puzzle.²⁰ The design was very similar to the ball-dragging experiment except that the subjects were told the price of the candy they were given. For example, in the low-candy-payment condition, subjects were told “You will receive a 50¢ candy bar.” Now that the candy payment was “monetized,” its effect was the same as that of cash: Subjects worked more if they were given no compensation than if they were given the low payment.

One way to organize these results is with the idea that the use of cash or a monetized gift changes the mode of the social relationship between the principal and the agent

¹⁸All subjects also received a 60-NIS show-up fee.

¹⁹Lacetera & Macis (2010a) find a similar effect in response to incentives for blood donations. They conduct a survey of blood donors in Italy and find that a substantial share of respondents declare they would stop being donors if donations were compensated with 10 euros in cash, but there is no such response to compensation with a voucher of the same nominal value.

²⁰Even though this outcome measure (how much time subjects spend on an impossible puzzle) is quite common in psychology, it introduces a potential confound. Suppose that we observe that subjects spend more time on an impossible puzzle in condition X than in condition Y. The standard interpretation, the one that Heyman & Ariely use, is that subjects were more motivated in condition X. But what if subjects in condition Y actually exerted more effort and were therefore quicker to realize, or at least subconsciously intuit, that the puzzle cannot be completed or that they will not be able to solve it? This criticism applies not only to Heyman & Ariely’s experiment, but also to the use of unsolvable tasks in psychology more generally.

(Fiske 1991).²¹ Under this view, it would be interesting to know what would happen if one offered a contingent nonmonetized incentive—for example, giving the subject a small candy bar for every puzzle solved. The lack of a monetary equivalent for the payment might cue some nonmarket mode of interaction, but a piece-rate scheme might cue precisely the market-pricing mindset. Answering this question would provide a more complete picture of the special nature of money in incentives. The answer could be generated by a simple merging of the designs in Gneezy & Rustichini (2000b) and Heyman & Ariely (2004).

A different interpretation of the data in this subsection is that people simply find it demeaning to work for a small amount of money. This would be consistent with the results of Ariely et al. (2008) who find that subjects exhibit a much higher reservation wage if the fruit of their labor is visibly undone by the experimenter. More broadly, the questions of what role identity plays in labor supply (Akerlof & Kranton 2000) and how identity is affected by the incentive scheme are worthy topics for future research.

2.5. Providing Too Many Options

Taking monetary incentives as given, if a principal wishes to induce an agent to engage in a particular activity, such as writing a paper or saving for retirement, one possibility would be to provide the agent with more options. For instance, the principal could be flexible on when the paper is due or could offer more funds for the agent to invest in. It turns out, however, that such indirect incentives can backfire.

Ariely & Wertenbroch (2002) conduct an experiment where subjects are paid for proofreading three texts and are given either a deadline of turning one text in every week or a deadline of turning in all three texts at the end of three weeks.²² In both conditions, subjects paid a penalty of \$1 for each day of delay past the assigned deadline. Even though the subjects in the latter condition had more options for when to work on their task, they reported spending less time on the task, and they detected fewer errors in the texts.

Iyengar et al. (2004) examine the relationship between participation in a 401(k) plan and the number of funds available. They analyze records of roughly 800,000 employees in a cross section of companies whose 401(k) plans are administered by Vanguard. They find that every 10 additional funds in a 401(k) plan decrease participation by approximately 1.5–2 percentage points. Iyengar & Kamenica (2010) examine the same data but focus on the employees' participation in the stock market. They find that, even though the fraction of funds that are equity funds increases in the overall number of funds, for every 10 additional funds in a 401(k) plan, an employee is roughly 3 percentage points less likely to invest any money at all in equities.

3. WHEN NONSTANDARD INTERVENTIONS WORK

The previous section identifies various ways that standard incentives can fail. In this section, I review the empirical evidence that illustrates how nonstandard interventions can

²¹Prendergast & Stole (2001) also point out that nonmonetary gifts, unlike money, communicate to the receiver how well the giver knows her preferences.

²²There was also a third condition with self-imposed deadlines.

work. In a seminal paper, Thaler & Benartzi (2004) introduce a program called Save More Tomorrow, or SMarT, that has four key ingredients. First, employees are asked to increase their contribution rates starting at some point in the considerable future. Second, the plan increases the savings rate only after a nominal raise, so the paycheck amount is not lower than it was in the past. Third, the savings rate continues to increase with each raise until it reaches a preset maximum. Finally, the employees can opt out at any time. Most of these ingredients do not fit the standard notion of an incentive—they do not offer a higher interest rate or a higher matching rate by the employer. Rather, they simply create a choice architecture (Benartzi et al. 2012) conducive to higher savings rates. Yet, when SMarT program was introduced, it was quite effective: The average savings rate for the participants increased from 3.5% to 13.6% over the course of 40 months.²³

For most of the results in this section, it will be somewhat difficult to interpret the magnitude of the effect. For example, the impact of the SMarT program seems very large, but it would be easier to interpret if we knew that it is equivalent to, say, doubling the interest rate. Bertrand et al. (2010) conduct a field experiment that varies both the choice architecture and the interest rate for consumer loans in South Africa. They find that framing interventions indeed have large effects compared to standard incentives. For example, showing a single example of a possible loan instead of four examples increases take-up by as much as a 2–percentage point reduction in the interest rate. Hence, even though we typically do not have a clear scale for interpreting the magnitude of framing effects, Bertrand et al.’s (2010) results demonstrate that such effects can be large.

3.1. Default Effects and Choice Fatigue

One of the simplest ways to nudge is through the choice of the default option. A large literature demonstrates that cross-sectional and temporal variation in the default correlates with outcomes ranging from organ donation (Johnson & Goldstein 2003) to 401(k) participation and asset allocation (Madrian & Shea 2001, Choi et al. 2004). Also, a number of papers establish that subjects’ hypothetical choices are affected by the experimentally manipulated default option (Park et al. 2000, Johnson & Goldstein 2003). To my knowledge, there has not yet been a study that examines the impact of experimentally manipulated defaults on real-world behavior with substantial consequences,²⁴ but the confluence of the existing laboratory data and correlational evidence from the field suggests that default effects are likely to be real and pervasive.²⁵

Moreover, there is compelling evidence from the field that the tendency to select a default option increases if the decision maker has had to make many choices in the near

²³Thaler & Benartzi (2004) were not able to randomize eligibility for the program. Hence, this estimate is based on the assumption that SMarT participants’ savings rate would have been unchanged in the absence of the program. This is a reasonable assumption because the savings rate of all other employees, including those that were not eligible for SMarT, did not change over this period. Nonetheless, some residual possibility of selection bias remains.

²⁴Levav et al. (2010) conduct the only field experiment I am aware of in which the default option was experimentally manipulated, but the authors focus on order effects and do not report the relative likelihood that the default versus a nondefault option was selected. Moreover, it is not possible to back this out from the data they do report.

²⁵That said, defaults are not going to affect behavior when people have well-defined and strong preferences. Just & Wansink (2009) conduct an experiment in which elementary school students were given lunch with either french fries or apple slices as the default side dish. Each group was asked whether they wanted to switch to the other option. The propensity to select french fries was 95% when it was the default and 96% when it was not.

past. Levav et al. (2010) conducted a field experiment in collaboration with a European car manufacturer. The subjects were customers who had come to the dealership to buy a new car. Subjects were told by the salesperson that the manufacturer was testing the use of its configurator at its dealerships and that they could configure the car they had come to purchase on the computer. The configuration process consisted of 67 decisions about car attributes, such as the choice of the engine and the choice of wheel rims. Each decision was presented on a single screen with one option already checked off by the manufacturer as the default. For all but one attribute, the default was the cheapest option and appeared at the top of the list. Out of the 67 decisions, 8 were selected for the study and placed at the beginning of the configuration sequence. Subjects were randomized to three conditions. In the high-to-low condition, configuration began with the 8 selected attributes and decreased in the number of options, from 56 possible interior colors to 4 possible gearshift knobs. In the low-to-high condition, the initial 8 attributes appeared in the opposite order. In the control condition, the attributes appeared in a random order. The key finding is that, in the high-to-low condition, consumers were more likely to pick the default option for attributes that appeared later in the sequence, but in the low-to-high condition there was no such trend. The authors interpret this finding as support for the idea that the ability to make choices is depleted over time, so defaults become more attractive, particularly if the decision maker has had to make taxing decisions in the recent past.²⁶

A more straightforward demonstration of how choice fatigue increases the appeal of default options is provided by Augenblick & Nicholson (2011). As a result of ballot ordering rules, voters in California who live in the same county can see the same issue at different positions on the ballot, depending on the number of local issues in their precinct. For example, a state-wide issue that all voters face will appear earlier in the ballot for voters in precincts with fewer local issues and later in the ballot in precincts with more local issues. Moreover, the authors have data on ballots over the course of 14 years, so they can include precinct fixed effects and thus eliminate any confounds due to time-unvarying omitted variables that would cause a precinct to have many local issues *and* a proclivity to vote a particular way. Augenblick & Nicholson find that placing an issue later on the ballot (a) increases the fraction of abstentions, (b) increases the number of “no” votes on propositions (which, in California, are always votes for the status quo), and (c) increases the tendency to vote for the first candidate listed in a multicandidate decision. Moreover, some of these effects are economically significant. For example, out of the 352 propositions in the data set, 22 would have passed rather than failed if they had been presented to the voters as the first issue on the ballot. These results clearly demonstrate that choice fatigue plays a role in voters’ decisions. That said, it is not clear that choice fatigue increases the appeal of the status quo per se; perhaps fatigued and thus grumpy decision makers would say no over yes, regardless of the question.

This possibility is particularly relevant for interpreting the findings of Danziger et al. (2011). They report that the likelihood a parole judge rules in favor of the prisoner decreases over the course of the day, as the judge experiences choice fatigue. This pattern, however, continues only until the judge has a food break: Following lunch, the judge’s likelihood of approving parole exhibits a discrete increase (which then again deteriorates

²⁶It seems that a sensible interpretation of depletion theory would predict that the fraction of consumers choosing the default option would also increase over time in the control condition, but the authors do not report those results.

as the day goes on).²⁷ The authors argue that this remarkable pattern of parole decisions cannot be explained by the variation in the characteristics of the cases presented over the course of the day.

The results in this subsection suggest that one way to induce more individuals to take a particular action is to simply make that action the default. Moreover, this method is likely to be particularly effective when the choice in question follows a number of other mentally taxing decisions and the decision maker is hungry.

3.2. Other Framing Effects

Designating a particular option as the default is only one of many ways to modify the choice environment in a manner that can influence the decision.²⁸ Closely related to default effects is the tendency to select options that are presented first in the list. A large literature demonstrates that candidates listed first on a ballot are more likely to win an election (Meredith & Salant 2011). Order effects might also be present in settings with more substantial consequences, such as choosing what to eat for lunch, but despite the simplicity of the requisite design, I am not aware of a study that demonstrates this.

In the context of food choice, however, many other framing effects have been demonstrated (Wansink 2006). For instance, when people serve themselves out of a larger bowl, they tend to eat more, even if the total amount of food presented is fixed. In one experiment (Wansink & Cheney 2005), MBA students at the University of Illinois were invited to a Super Bowl party at a sports bar. They were randomized to one of two rooms to get their snacks for the game. In one room, there were two gallon-sized bowls of Chex mix. In the other room, there were four half-gallon sized bowls of the same snack. After the students served themselves, the experimenters asked them to fill out a brief survey. To do so, the students had to place their plates on a table under which a scale was hidden. The students who had served themselves from the larger bowls took 53% more snacks. Moreover, an hour later the experimenters cleared away the plates (which had identification codes on the bottom) and found that subjects who had served themselves from bigger bowls ate 59% more food over the course of the hour. Similarly, Wansink et al. (2006b) report that nutrition experts who were attending an ice cream social ate 31% more ice cream when they were given a large bowl than when they were given a smaller bowl.²⁹ Another important factor is the visibility of food. Wansink et al. (2006a) gave bowls of Hershey's Kisses as gifts to 40 secretaries. Some were given the candy in a transparent glass bowl and others in an identical opaque bowl that blocked the view of the candy when the lid was on.

²⁷ Roy Baumeister and his colleagues have argued that caloric energy influences decision making more broadly. For example, Gailliot et al. (2007) show that initial acts of self-control reduce blood glucose levels and impair performance on subsequent self-control tasks but that consuming a glucose drink eliminates these impairments.

²⁸ A large literature demonstrates that peer effects, i.e., the information about the behavior of others, can influence choice (e.g., Duflo & Saez 2002, Ayres et al. 2009, Costa & Kahn 2010, Beshears et al. 2011). Although peers effects are an example of the influence that aspects of the choice environment can have on decisions, I do not include a survey of the peer effects literature in this review. Most demonstrations of peer effects are probably driven by straightforward inference (see Section 4.1), but some results suggest other mechanisms are at play as well. For example, Goldstein et al. (2008) find that telling hotel guests that most other people who stayed *in their particular room* reused their towels is more effective than simply telling them that most other hotel guests did so.

²⁹ Unsurprisingly, it is the perception, not the actual size of the serving vessel, that matters. Teenagers at a weight-loss camp poured themselves 77% more juice into short wide glasses than into tall narrow glasses of the same volume (Wansink & van Ittersum 2003).

The secretaries with the transparent bowl on average ate 2.2 more candies, equivalent to approximately 77 additional calories, each day.

Even though the short-run effects observed in these experiments are large, it is unclear whether such interventions would have substantial consequences in the long run. Presumably, preferences for calories are not time separable. People who had been given a small bowl in a Wansink experiment are likely to be somewhat more hungry at dinner and thus eat more than those who had been given a larger bowl. How large is this substitution effect? The answer to this question is crucial for establishing the relevance of these framing effects. Many reviews of Wansink's work suggest that if we were to replace the dishes in people's cupboards with smaller ones, the prevalence of obesity would decrease. That may be the case, but the available data are also consistent with a view that such an intervention would have absolutely no effect on overall food consumption. The literature on mindless eating would greatly benefit from any study that examines whether permanent changes in the details of the environment have any impact on long-run outcomes.³⁰

3.3. Priming

A large literature in psychology examines how exposure to a particular stimulus (a prime) affects subsequent perception, judgment, and decisions. The primes can be explicit, implicit, or subliminal; for example, to prime the concept of old age, one might (a) show the subject the word "old" (explicit prime); (b) ask the subject to unscramble a sentence that involves words like "Florida," "lonely," or "bingo" (implicit prime); or (c) (very) briefly flash the word "old" or a picture of an old person (subliminal prime). Most work in this literature does not focus on economic decision making,³¹ but a few studies demonstrate that primes can influence how people vote, how they play economic games, and whether they cooperate.³²

Berger et al. (2008) analyze how polling locations impact voting behavior. The authors show that voters assigned to vote in schools rather than alternative polling locations are more likely to support a ballot initiative to raise taxes in order to increase the spending on education. The authors attempt to address the concerns about an omitted variable bias in various ways,³³ but some concerns about endogeneity remain. The authors also conduct an auxiliary lab experiment. First, in an image-rating task, they expose subjects to school images (e.g., lockers or classrooms) or control images (e.g., office buildings). Then, in an ostensibly unrelated study, they ask subjects to vote on an initiative to increase taxes to

³⁰Abaluck (2011) estimates that the introduction of labels with nutritional information lowered consumption by approximately 50–90 calories per day among label users. Provision of such information is, of course, not merely a change of frame. Kamenica & Gentzkow (2011) provide a general discussion of how the provision of information can influence behavior.

³¹Many priming studies utilize the lexical decision task in which subjects classify strings of letters as words or nonwords, and the speed of response (i.e., the reaction time) is the primary outcome of interest. For instance, Meyer & Schvaneveldt (1971) demonstrate that subjects are faster to classify a string of letters as a word if they are primed with an associated rather than an unassociated word (e.g., subjects are faster to recognize that "doctor" is word if primed with "nurse" than if primed with "bread").

³²Many studies on priming also have indirect relevance for economics as they examine social behavior. For example, Bargh et al. (1996) illustrate that primes can influence whether subjects behave in a rude or hostile manner.

³³For example, compared with precincts that use a school as a polling place, support for the initiative is lower even in the precincts that are within 0.2 miles of a school.

fund public schools. The support for the initiative was substantially stronger among subjects that had been exposed to school images.

Berger et al. (2008) do what most of the priming literature does: examine the impact of a specific prime (a school) on a closely related outcome (support for school funding). An alternative approach is to explore the impact of a socially pervasive prime, such as religion or money, on a broader set of behaviors.³⁴ A number of studies illustrate that exposure to a religious prime increases prosocial behavior. Shariff & Norenzayan (2007), for example, had some subjects unscramble sentences involving words “spirit,” “divine,” “God,” “sacred,” and “prophet.” In a subsequent Dictator game, those subjects on average gave \$4.22 out of \$10 compared with only \$1.84 given in the control condition. Other studies find that subjects primed with religion are less likely to cheat (Randolph-Seng & Nielsen 2007), reveal a greater willingness to work for charity (Pichon et al. 2007), and cooperate more in a Prisoner’s Dilemma game (Ahmed & Salas 2008). Religious primes, however, do not merely increase prosocial behavior, they also increase the willingness to punish those who misbehave. McKay et al. (2011) subconsciously primed some subjects with religious concepts and then let those subjects play the following two-player game: Player A chooses an allocation of (590, 60) or (150, 150).³⁵ Player B then chooses a contingent³⁶ punishment level $p \in [0, 50]$, which reduces her own payoff by p and reduces player A’s payoff by $3 \times p$. The authors report that exposure to a religious prime increases the extent to which player B punishes the unfair (590, 60) choice, but only for a subset of subjects—those who say they have donated money to a religious organization. This result should be interpreted with caution because the authors employed a number of other primes as well (which did not generate an effect) and because they did not find an effect of the religious-concepts prime for subjects that scored high on an alternative measure of religiosity. That said, taken together, the experiments above demonstrate that being reminded of religion influences people’s behavior.

The concept of money pervades modern societies. Does mere exposure to this concept affect our behavior? A number of studies suggest that it does, and not for the better. Vohs et al. (2006) report that exposure to a money prime reduces altruism and increases social distance. In one experiment, the authors use the sentence-unscrambling task to show that priming the concept of money reduces donations to a student fund. In another experiment, the authors prime the concept of money by leaving a large pile of Monopoly money next to the subject (all subjects got to play the game in the first part of the experiment); they show that such a prime reduces the subjects’ willingness to help a confederate who “accidentally” spills a box full of pencils. The authors also conduct experiments where subjects fill out questionnaires while seated in front of a computer whose screen saver eventually comes on, depicting either currency floating underwater (money prime) or fish swimming underwater (neutral prime). Exposure to floating bills reduces subjects’ willingness to work in a

³⁴ Simonsohn (2007, 2010) examines the impact of another pervasive prime: the weather. A laboratory study shows that priming subjects with images of clouds induces an academic mindset (Simonsohn 2007). Consequently, college admissions officers place more weight on academic credentials if they read applications on cloudy days (Simonsohn 2007), whereas prospective students are more likely to matriculate if they visit the school on a cloudy day (Simonsohn 2010).

³⁵ Each experimental point was worth 0.28 CHF; the Swiss franc was roughly on par with the US dollar at the time of the experiment.

³⁶ The authors employed the strategy method: Player B was asked what punishment she would choose for each potential action by player A.

team and leads subjects to put more physical distance between themselves and others. Overall, these experiments demonstrate that the very concept of money changes the nature of social interaction, a fact that echoes Fiske's (1991) ideas discussed in Section 2.4.

Priming interventions can have heterogeneous effects across groups of subjects. For example, priming the concept of race might differently affect subjects of different races. Benjamin et al. (2010) explore whether such an intervention could affect elicited preferences. They find that making the subject's race salient increases revealed patience among Asian Americans and (nonimmigrant) African Americans. They do not find an impact of their interventions on the behavior of whites and immigrant blacks nor on any subject's revealed risk aversion. Moreover, they do not find any evidence that making gender salient affects the intertemporal and risk preferences of men and women. Hence, although the reported findings are quite interesting and provocative, concerns about multiple hypothesis testing call for additional studies on this topic.

Finally, it is worth noting that, in a way, priming interventions are a quite common method of influencing behavior in the real world: Many marketing campaigns operate through a provision of an explicit or an implicit³⁷ prime intended to generate purchases of particular products. Such interventions can have substantial effects. North et al. (1997), for example, randomize whether customers were exposed to French or German music in a grocery store. They found that French wine outsold German wine by three to one when French music was playing, but German wine outsold French wine when the music was German.

3.4. Cognitive Dissonance, Sunk Cost Fallacy, and Implementation Intentions

A number of results from social psychology suggest that it might be possible to influence people by exploiting their desire to see their own behavior as coherent and consistent. First, research on cognitive dissonance (Brehm 1956, Festinger 1957) suggests that if a person chooses an alternative from a given choice set, this act of choice causes a subsequent preference for the previously chosen alternative. Second, the sunk cost fallacy (Thaler 1980) implies that paying more for a good increases the subsequent desire to use the good. Finally, the self-prophecy effect (Greenwald et al. 1987) states that simply asking people whether they expect they will perform a socially desirable action (e.g., vote) causes them to subsequently do so.

Each of these findings has important implications for nonstandard ways of influencing behavior.³⁸ Cognitive dissonance might be used to induce a consumer to subsequently buy a good from a large choice set by initially offering a worse choice set that includes that good. The sunk cost fallacy implies that giving health products like condoms away for free might *decrease* their use. The self-prophecy effect suggests a potential method for increasing voter turnout. These are potentially important channels of influence, but there is a

³⁷Although subliminal primes have been shown to influence choice (e.g., in some of the studies discussed above), there is limited evidence that subliminal advertising is effective (despite its appeal as a plot device in TV shows). Karremans et al. (2006) report that thirsty subjects who are subliminally exposed to words "Lipton ice" are more likely to select Lipton ice tea in a hypothetical choice situation, but other studies fail to find similar effects (e.g., Dijksterhuis et al. 2005).

³⁸A number of theory papers in economics formalize the desire for consistency. Yariv (2005) considers a model where agents have a taste for unchanging beliefs. Consequently, they exhibit a number of biases, including cognitive dissonance. Baliga & Ely (2011) establish that the sunk cost fallacy might be an optimal response to having a limited memory. Falk & Zimmermann (2011) examine how preferences for consistency can be used to manipulate choices.

rub: All the results from the previous paragraph have come into question over the past few years. Chen & Risen (2010) point out that a key experimental paradigm used to study cognitive dissonance commits a fundamental logical flaw. Ashraf et al. (2010) conduct a large field experiment in Zambia aiming to identify the role of the sunk cost fallacy in the use of a water-purification product; they find no evidence that paying more for the product increases its use.³⁹ Finally, Greenwald et al.'s (1987) result on the self-prophecy effect fails to replicate even when the same procedure is used and vastly greater samples are employed (Smith et al. 2003).

Although cognitive dissonance may not be a reliable tool for manipulating behavior, recent evidence shows that a closely related intervention, eliciting a so-called “implementation intention” (Gollwitzer 1999), may be a more promising route. An implementation intention intervention⁴⁰ involves prompting subjects to state a particular plan for how or when they will undertake a behavior. Nickerson & Rogers (2010) conducted a field experiment during the 2008 presidential primary in Pennsylvania. Using a sample of over a quarter million registered voters, they demonstrate that asking the voters three questions (what time they would vote, where they would be coming from, and what they would be doing beforehand) increased turnout by almost 10%. In contrast, a standard “get out the vote” intervention had a precisely estimated zero effect on turnout.⁴¹ Milkman et al. (2011) demonstrate a similar result in another context. The authors sent reminder mailings about a free flu-shot clinic to employees of a large firm. All employees were given information about the time and location of the clinic, but some were also prompted to write down on the mailing, for their own benefit, the date and time they planned to get the shot. The vaccination rate in the control group was 33.1%, whereas those employees who received the prompt to write down a planned date and time had a substantially higher vaccination rate of 37.1%.

The psychological basis for the efficacy of implementation intentions may be somewhat simpler than the fundamental need for a coherent sense of self, the notion that played a large role in the research on cognitive dissonance. Nonetheless, at least in practical terms, implementation intentions seem to be a more reliable way to influence behavior.

4. MECHANISMS

As is the case for every fact in economics, the empirical patterns above are driven by beliefs, preferences, and technology. In this section, I examine in turn the potential role played by each of these three factors.

4.1. Beliefs: Inference and Signaling

Many of the results discussed in this review are consistent with the view that decision makers are often imperfectly informed about what they should do or how hard they should

³⁹Prior to Ashraf et al. (2010), the main field evidence for the sunk cost fallacy was a widely cited but small-scale experiment by Arkes & Blumer (1985). Incentivized laboratory experiments also provide limited support for the sunk cost fallacy (Friedman et al. 2007). Despite all this, both introspection and my experience teaching MBA students tell me that the sunk cost fallacy must be a real force.

⁴⁰This is a method for influencing behavior and a formidable tongue twister.

⁴¹Turnout is a popular outcome to study not only because of its social relevance, but also because it provides a rare opportunity to gather administrative data on the real-world behavior of a large number of people: Whether a given individual voted or not is a matter of public record.

work, and consequently any aspect of their environment that might bear on these questions can change their behavior.

Even the most innocuous aspects of a situation can convey relevant information. Consider the canonical example of a frame: describing a cup as half full or half empty. At first glance, the choice of the two descriptions seems arbitrary. Yet McKenzie & Nelson (2003) demonstrate that speakers tend to describe a 4-ounce cup filled to the 2-ounce line as half full if it was previously empty but describe it as half empty if it was previously full. Moreover, listeners make accurate inference about the cup's past based on the two descriptions.

Given this observation, it should not be surprising that the selection of a particular frame can convey information that influences behavior. Designating a particular option as the default clearly might be interpreted as a suggestion that this option is appropriate for most people. Providing a person with a bigger bowl might suggest that a larger amount of food is more appropriate, whether socially or calorically. Moreover, individuals might react to the frame as if it conveyed information even when it does not. For instance, even if political candidates are listed in a random order, a careless uninformed voter might nonetheless be affected by her experience of a world in which the first option listed is frequently the one most commonly preferred.

Along with explaining why some nonstandard interventions might work, inference can also explain why standard incentives can backfire. Consider the possibility that monetary incentives crowd out intrinsic motivation. One reason this could happen is if the agent infers that she will not enjoy the task from the fact that she is being paid to do it. Bénabou & Tirole (2003a) present a model where both a principal and an agent have some private information about how much the agent would enjoy a task. The principal then might offer more compensation in cases in which the task will be less pleasant. Consequently, uninformed agents will rationally expect to enjoy the task less when they are paid for it and therefore will be less motivated to do it.

Similarly, consider the claim that monetary incentives can crowd out prosocial behavior. One reason this might happen is if the agent cares about the inferences that others make about her. Bénabou & Tirole (2006) present a model where there is heterogeneity in altruism, and individuals care about other people's beliefs about how altruistic they are. In such a setting, introducing a monetary incentive for a prosocial action reduces the extent to which engaging in it credibly signals altruism. Consequently, monetary incentives can reduce the willingness to do good. Ariely et al. (2009a) provide strong empirical support for this mechanism.

Signaling considerations have also been used to examine choking. Rauh & Seccia (2006) present a two-period model where agents are uncertain about their ability, and this uncertainty impacts their performance conditional on effort. Moreover, their choice of effort in the first period affects their information about their ability in the second period.⁴² In this setting, for certain parameter values, it is possible for the equilibrium effort to decline in payoff uncertainty.

Inference might also explain why small monetary payments can backfire. It might be that, in the absence of monetary payments, an agent believes that she will receive gratitude

⁴²Bénabou & Tirole (2003b) present an overview of how such self-signaling models can be used to understand a variety of psychological phenomena.

in exchange for her actions, but the presence of a monetary incentive suggests that gratitude will not be part of the compensation package. Similarly, fees might backfire because an agent might expect opprobrium for doing something socially costly in the absence of fees, but once a fee is introduced, she considers it acceptable to impose the social cost as long as she pays the fee. These explanations, however, beg the question of why even a small incentive or fee tends to decrease expected gratitude or opprobrium⁴³ and why nonmonetary gifts tend not to have this impact.

Finally, contextual inference can explain why providing too many options can be counterproductive. If agents are uncertain about their preferences, they might be better off with fewer options as those are less likely to include niche products not suitable for them (Kamenica 2008). To the extent that defaults also provide information on what options are broadly popular, however, the inference view predicts that providing many options will typically not be counterproductive when a default option is available.⁴⁴ I am not aware of any studies that examine this prediction.

4.2. Preferences: Loss Aversion and Dynamic Inconsistency

Defaults can have an impact even in the absence of any inference if individuals treat the default as their reference outcome and experience loss aversion when switching to some alternative (Thaler 1980). For instance, Sunstein (2001) surveys law students regarding their views on vacation time. Some students were told that the state law guaranteed two weeks of vacation time and were asked to state their willingness to pay (in reduced salary) for two extra weeks of vacation. The median willingness to pay was \$6,000. Other students were told the state law provided a mandatory, nonwaivable two-week vacation guarantee but that it also provided employees with the right to two additional weeks of vacation, a right that could be waived in exchange for a raise in salary. These students were asked how much employers would have to pay them to give up their right to the extra two weeks. The median response was \$13,000. Although one could try to tell an income-effect or an inference story here, the endowment effect seems like the most natural interpretation of this gap between the willingness to pay and the willingness to accept. Distinguishing between the instances in which defaults matter because of the information they convey and those in which they matter because they impact preferences through the reference point seems like an important consideration in this line of research.

Defaults could also matter for a third reason—they are costly to change. The cost may be nonmonetary but rather induced by the paperwork, attention, or cognitive effort needed to determine a superior option. Moreover, if this cost is paid immediately but yields only a future benefit, dynamically inconsistent individuals will be particularly sensitive to defaults (Sunstein & Thaler 2003). Carroll et al. (2009) consider a model where dynamically inconsistent individuals with $\beta\delta$ preferences (Laibson 1997) must choose in each period whether to pay a stochastic cost to change their savings rate from a given default to their optimal rate. The authors show that if agents are severely impatient in the short run (i.e., have a low β), a benevolent social planner would eliminate any defaults and require everyone to

⁴³Personally, I feel like I am doing the right thing when I turn in my referee reports on time even if the journal pays me a small monetary reward for doing so.

⁴⁴This would be the case unless the decision maker recognizes the default option as something she dislikes.

make an active decision. Thus, even though defaults provide a way to nudge people toward certain desirable outcomes, eliminating this lever can be optimal in certain settings.

Dynamic inconsistency can also explain why giving an agent too many options can backfire. In particular, giving people more options for when to turn in a project can induce procrastination: O'Donoghue & Rabin (1999) demonstrate that agents with $\beta\delta$ preferences will tend to procrastinate whenever the task involves an immediate cost and a delayed benefit. As an extreme example, suppose a naïve $\beta\delta$ agent with $\beta = \frac{1}{2}$ and $\delta = 1$ faces a task that can be completed at any time $t = 0, 1, 2 \dots$. When completed the task yields an immediate cost of \$300 and a delayed benefit of \$800. If the agent is given a deadline whereby if she wishes to ever do the task, she must do it today, she will complete the task right away as $\beta \times \$800 > \300 . If, however, the agent is told she can complete the task whenever she would like, each day she will plan to do it the next day, generating $\beta(\$800 - \$300) = \$250$, which is more than the $\beta\$800 - \$300 = \$100$ she would generate today. Consequently, she never completes the task. This example illustrates that even if the principal does not care about when the task gets done, giving the agent fewer options on when to do it can be beneficial.

4.3. Technology: Choking and Helpful Nudges

In standard principal-agent models, we take production to be an exogenous, typically stochastic, function of effort. Taking this technology of production and preferences as given, we then ask what form incentives should take. The most natural way to interpret the results on choking, however, is to assume that the technology of production is affected by the incentive scheme. Although none of the experiments discussed in Section 2.3 directly measures effort, the high stakes quite likely increased effort but led to lower performance. This would mean that incentives directly affect the production technology. One can, of course, easily write down a formal model where the production technology depends on the stakes, but it is not immediately clear whether such a model would deliver any novel insights about incentives, short of the obvious implication that low-powered incentives would become relatively more appealing.⁴⁵

To usefully incorporate these considerations into economics, it might be particularly important to emphasize the distinction between tasks in which performance is a simple consequence of effort and tasks in which remaining calm and collected is central for success.⁴⁶ The relevance of this distinction is clearly illustrated by the difference in the outcomes for the addition and typing tasks in Ariely et al. (2009b). In settings where eighty percent of success is showing up, one probably does not need to worry that paying too much will backfire. What is less clear is whether there are indeed some settings where avoiding stress and keeping a clear head are so important that a smaller contingent payment would lead to a better outcomes.

Thinking about how effort translates into output is also important to understand the power of nonstandard interventions. In *Nudge*, Thaler & Sunstein (2008) discuss a number of simple interventions that help people achieve what they already want to do.

⁴⁵Epstein & Kopylov (2007) consider a model where the agent becomes less confident when she has to make a consequential decision. In their model, however, confidence is not directly linked to performance nor is it explicitly a function of the stakes involved.

⁴⁶Also, as discussed above, when performance depends on ex ante investments, high stakes are unlikely to backfire.

My favorite example of such an intervention (not discussed in *Nudge*) is that in Holland drivers are taught that when you are about to get out of a car, you reach for the door handle with your right hand. Doing so forces drivers to swivel so they can see whether there is a bicycle coming from behind. This rule helps people do what they presumably already want to do—avoid an accident. An alternative way to deal with the accident risk would be to increase the fine for causing an accident (Becker 1968). I suspect that the right-hand prescription would be a more effective solution.

5. CONCLUSION

Monetary incentives are clearly powerful tools for motivating people. Prendergast (1999) reviews the empirical evidence on the use of incentives in firms and demonstrates that, in a variety of settings, incentives improve performance. For example, Lazear (2000) examines the impact of a change from fixed salaries to piece-rate compensation for workers in an auto-glass company. He finds that this introduction of incentives raised output per worker by 44%. However, Prendergast (1999) also points out that poorly structured incentives can have unintended consequences because of multitasking concerns that arise due to the difficulty of specifying all aspects of workers' jobs (Holmstrom & Milgrom 1991). In this review, I focus on other reasons why poorly structured incentives can backfire (while nonstandard interventions can work): Agents might have limited information about what they want to do, they might suffer from loss aversion and dynamic inconsistency, and their effort might become less productive when the incentives are too steep.

It is helpful to distinguish those tasks that people certainly do *not* want to do unless they are paid for them from those that people may or may not engage in, depending on the details of their choice-making environment. Much of contract theory deals primarily with the former.⁴⁷ For such tasks, such as showing up to work at an unpleasant, unrewarding job, incentives are clearly a crucial tool, although factors such as multitasking and repeated interactions between the employer and the employees still need to be taken into account. The results discussed in this review are most relevant for the latter type of task. Consider once again trying to induce people to save more for retirement.⁴⁸ Savings rates are not something that most people have clear preferences over. Most individuals are unsure how, when, and how much to save. Consequently, it is not obvious what would be a more effective way to raise 401(k) investments: lower the fees charged by the funds by 20% or implement a SMarT plan? Such an experiment has not yet been conducted, but for what it is worth, my money is on SMarT.

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⁴⁷There are important exceptions. For example, Prendergast (2007, 2008) emphasizes that workers often care about their jobs and that, consequently, incentives can be less important than hiring the right type of employees.

⁴⁸I am not suggesting that increasing retirement savings is necessarily a good idea. Despite initial indications to the contrary (e.g., Angeletos et al. 2001), it is no longer so clear that households' retirement savings are insufficient (Aguiar & Hurst 2005, 2007).

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