Self-Control and the Supply of Effort

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Abstract

This paper reviews the existing literature on self-control problems with effort. The theoretical roots of self-control problems lie in time-inconsistent preferences such as hyperbolic discounting or present bias. Alternative modeling possibilities such as dual-self models are discussed. In laboratory and field experiments, self-control problems are pervasive, but subjects tend to be only partially sophisticated about the extent of their problem. Solutions such as commitment devices tend to work well in inducing additional effort, but take-up rates are typically low. Opportunities for future work on this topic are discussed, including theoretical extensions and novel solutions to self-control problems with effort.

1 Introduction

Exercising self-control is a fundamental part of the human condition. The modern world bombards us with temptation from all directions, and living a successful and happy life requires frequently resisting these temptations. It is all too common for people to wish they would exercise more, quit smoking, and work harder.

This internal conflict is unexplained by classical economic theory. For much of the history of the field, it was supposed that agents value the present more than the future, but in a time-consistent way. In other words, the difference in the value of consumption between
two points in time should depend on the length of time, but not on how far away from the present the valuation occurs. Yet people repeatedly procrastinate and avoid changing habits they know would improve their lives. These decisions indicate time-inconsistent preferences, which are the root of self-control problems. Broadly defined, a self-control problem exists when an agent makes a decision in the moment of consumption that differs from what the past or future self would choose.

Self-control problems exist in a wide range of decisions. An important distinction between various self-control problems is whether they involve an immediate cost or an immediate reward. For example, exercising involves enduring some discomfort now for long-term health benefits. Quitting smoking, on the other hand, involves avoiding the temptation of immediate gratification that another cigarette provides. People with self-control problems find themselves shifting rewards to the present and costs into the future.

Solutions to self-control problems often involve imposing costly constraints on oneself. For example, one might install a program that blocks time-draining websites on a work computer. People who wish to save more money might sign up to have part of their paycheck directly deposited into a savings account. The key feature of these self-control solutions is that they reduce flexibility, but remove temptation when the time to make the decision arrives.

While many of these self-imposed constraints are informal and unbinding, there are some practical ways to make them binding. For example, savings commitment contracts allow people to deposit money in an account that will be forfeited and donated to charity if individuals fail to achieve their set goals. Field experiments on commitment devices have shown that they can be effective in increasing savings and assisting in smoking cessation (Ashraf, Karlan, and Yin 2006 and Giné, Karlan, and Zinman 2010). However, these solutions require that people are sophisticated about their self-control problems. That is, people need to predict that they might succumb to temptation when the time to make a decision arrives. In most field experiments involving commitment contracts, take-up rates are quite low even when self-control issues are pervasive, providing some evidence that many people are naive
about the extent of their self-control problems.

One self-control problem of particular interest to labor economists is the supply of effort at work. The traditional focus of personnel economics has been solving the moral hazard problem, in which firms would like to induce employees to work harder. More recently, an emerging strand of literature has explored the fact that workers themselves would often like to work harder, but instead succumb to the temptation to shirk.

This paper will review the literature on self-control and the supply of effort. Section 2 will examine various ways to model self-control problems. Section 3 will present empirical evidence on the issue from both lab and field experiments. Section 4 will discuss the results and explore ideas for future research.

2 Modeling Self-Control Problems

Economists have long recognized that consumption in the present is more valuable than consumption in the future. However, for most of the history of the profession it was assumed that agents discount the future in a time-consistent manner. Given that this is at odds with much observed behavior, theorists have developed a number of ways to model self-control problems. The most popular approach to modeling self-control problems is to use nonstandard discount functions.

When dealing with intertemporal decision-making, economists typically use models in which agents maximize utility over a number of periods but discount consumption in future periods with some mathematical function. Consider the general formulation of utility from a consumption stream across $T$ periods:

$$ U = \sum_{t=0}^{T} D(t)u(c_t) $$

The discount function $D(t)$ is of particular interest because it determines whether preferences are time-consistent or not. Formally, a discount function is time-consistent if
depends on $k$ but not on $t$. In other words, preferences are time-consistent if the marginal rate of substitution between consumption over a time interval does not depend on how far in the future the interval begins. Strotz (1955) proved that this is only true of the exponential discounting function, which takes the following familiar form:

$$D(t) = \delta^t, \text{ where } \delta \in [0, 1]$$

The use of alternative discount functions has become a popular way to model self-control problems. The hyperbolic discount function is an alternative form of discounting that provides time-inconsistency. The intuition behind the function is that per-period discount rates are lower when consumption is further in the future. The functional form is slightly more complex:

$$D(t) = (1 + \alpha t)^{-\gamma}$$

Although the above form is useful, many theorists prefer a simpler model of time-inconsistent preferences called quasi-hyperbolic discounting. Also known as present bias, this discount function gains much in terms of mathematical tractability while maintaining the spirit of time-inconsistency:

$$D(t) = \begin{cases} 1 & \text{for } t = 0 \\ \beta \delta^t & \text{for } t \geq 1 \end{cases}$$

In words, present-biased agents use exponential discounting but add an additional discount for any consumption that is not immediate. While it doesn’t have the realistic feature of increasing patience over longer horizons, present bias alone is enough to explain many features of self-control problems.
Theorists have applied hyperbolic and quasi-hyperbolic discounting to many self-control problems. A key distinction in these applications is whether agents are sophisticated or naive, because that determines whether they will have a demand for binding commitments.

Laibson (1997) explores the implications of present bias for savings decisions. He presents a model in which agents demand an illiquid asset that takes an additional period to sell. Sophisticated agents will prefer such a commitment device because it will prevent tempting but ultimately welfare-reducing consumption. He argues that financial innovation can actually be a bad thing if it reduces the availability of illiquid savings commitment devices.

O’Donoghue and Rabin (1999) consider a present-biased agent deciding when to perform a single action, and contrast results when agents are sophisticated versus naive about their own present bias. When the task involves an immediate cost, they show that both types of agents will procrastinate, but sophisticated agents will procrastinate less. In their model, sophisticated agents are always better off from a welfare standpoint when facing immediate costs than naive agents.

Although hyperbolic discounting and present bias seem to be the most common approaches to self-control problems in the literature, other approaches exist. For example, Gul and Pesendorfer (2001) propose a two-period model in which agents experience disutility from resisting tempting goods, even if they choose a different good. These agents are time-consistent, but the introduction of an unchosen irrelevant alternative can be welfare-reducing.

Fudenberg and Levine (2006) also abstract away from discounting in their dual-self model, instead focusing on a repeated game played between multiple versions of the agent’s self. In their model, a sophisticated long-term self may impose constraints on a series of myopic selves who play a stage game. The myopic selves have the same preferences in each stage game, but their preferences differ from those of the long-term self. Since the short-term selves are the ones who make the actual decision in each stage, the long-term self is willing to impose costly constraints to change the decisions of the myopic selves.
3 Empirical Evidence

This review now turns to the empirical evidence on self-control and the supply of effort. Over the past few decades, considerable attention has been devoted to time-inconsistent preferences. The popularity of this topic has grown with the development of behavioral economics and the broader acceptance of experimental methods in economics.

Researchers have generated a large body of evidence indicating time-inconsistent preferences from lab and field experiments. Both kinds of experiments have benefits and drawbacks. Lab experiments offer a large degree of control, but the results are not always generalizable to other settings. Field experiments are more externally valid because they observe subjects in natural environments, but offer less control than the lab.

3.1 Lab Experiments

The bulk of experimental research on time preferences has focused on subject decision-making with money. Apart from being only tangentially related to time-inconsistency in effort, there are other issues with these experiments. Some evidence indicates that a large cause of observing excessive hyperbolic discounting in lab experiments is a lack of trust in the experimenter; subjects are worried they won’t actually get paid in the future. In fact, when Andreoni and Sprenger (2012) went to great lengths to build subject trust in future payments, evidence of time-inconsistent preferences over money all but disappeared. Further, if subjects are not credit constrained, they can easily take advantage of above-market interest rates in an experiment by shifting consumption to the present and borrowing in the meantime. Finally, recall that the theory is really about intertemporal allocation of consumption, not money.

Few experiments have observed subjects allocating consumption over time. The problem with consumption in the lab is that experimenters have no control over differences in consumption utility between subjects. Some lab experiments have explored self-control problems by offering positive consumption utility through sips of beverages to thirsty subjects.
or providing marshmallows to children (Brown, Chua, and Camerer 2009; Bucciol, Houser, and Piovesan 2011a). Effort, however, involves negative consumption utility.

There are two main methods of simulating effort in the lab: cost of effort functions, and real effort tasks. Implementing an increasing, convex cost function is a common way of examining effort in the lab. Subjects choose an effort level $e$ and bear a cost $c(e)$ which is deducted from their experimental earnings. This method has the important benefit of equalizing effort costs between subjects, and is useful for exploring topics like reciprocity between employers and employees. However, it is fundamentally a decision about money rather than consumption, and intertemporal effort decisions with this method avoid none of the associated drawbacks mentioned above.

Real effort tasks provide a more externally valid way to explore self-control problems in the lab. With this method, subjects are paid to perform some disagreeable task. It is important that the task is sufficiently disagreeable because experimenters want to simulate real work, which often has increasing and convex costs. Examples of real effort tasks include stuffing envelopes, solving mazes, and proofreading poorly-written papers. The drawback of the real effort method is that experimenters lose control over effort costs, and are unable to observe effort cost differences between individuals.

To narrow the scope even further, inducing self-control problems with effort in the lab requires subjects to either allocate real effort over time, or endure some sort of temptation to draw their attention away from the task at hand. Ideally, these experiments would also test solutions to self-control problems and measure the level of sophistication of subjects. Very few lab experiments have explored these questions. One practical issue is getting subjects to allocate work over multiple weeks, rather than over a single short lab session.

Augenblick, Niederle and Sprenger (forthcoming) provide a highly relevant and rigorous examination of self-control problems with effort in the lab. Subjects performed one of two real effort tasks. The first was to transcribe strings of blurry Greek letters. The second was to complete a modified version of Tetris which moved much slower and didn’t have
progressive levels, a presumably boring version of the game. Subjects were paid piece rates for each task completed.

The identification of time-inconsistency in effort involved asking subjects to allocate tasks between two work dates with varying piece rates. First, subjects were asked how many tasks they wanted to complete on each work day a week in advance. For example, in Week 1, subjects were asked how many tasks they wanted to perform on the work day of Week 2 versus the work day of Week 3. When the first work day arrived, effort allocations were elicited again. Continuing with the example, on the work day of Week 2 subjects were asked how many tasks they wanted to complete that day versus in Week 3. This second allocation allowed the identification of present bias, since subjects chose between work in the present and work in the future.

To properly incentivize subjects to submit honest task allocations, one of the two allocations was randomly chosen to be implemented. In the baseline treatment, the second allocation (the one with opportunity for present bias) was chosen with a probability of 0.9, and the earlier allocation with a probability of 0.1. During the second half of the experiment, subjects were offered a commitment device to address their self-control problems with effort. The device simply shifted the probabilities such that the earlier allocation was chosen with a probability of 0.9, and the later one with a probability of 0.1.

The results indicate significant present bias over real effort tasks. Controlling for variations in payment rates and task type, subjects allocated on average 2.47 fewer tasks to the sooner work day when that work would occur on the same day. In other words, when allocating work a week in advance, subjects were willing to do more work; once the work day arrived, subjects decided to put off some of their work for another week. To put the magnitude of present bias in perspective, 50 tasks was the maximum per day and mean numbers of tasks ranged from roughly 10 to 40 depending on the piece rates.

A striking result is the magnitude of demand for the commitment device: 59% of subjects chose to shift the probability towards their earlier allocation when doing so was free. This
implies that many subjects were sophisticated about their self-control problems. Further, the level of present bias was higher in subjects who demanded the commitment device; these subjects allocated on average 3.58 fewer tasks to the sooner work date when it was the same day.

The high take-up rate of commitment only held when the commitment was free. When the experimenters offered additional money for retaining high probability on the present-biased allocation, they found that virtually all demand for commitment vanished. When the price of commitment was just $0.25, 91% of subjects preferred the original probability over the commitment probability. At even higher prices, virtually no subjects were willing to use the commitment device. This result is consistent with evidence from field experiments discussed below – subjects are rarely willing to sign up for commitment devices when monetary costs are involved.

While the Augenblick, Niederle, and Sprenger paper is the most thorough examination of time-inconsistency in effort in the lab to date, a few other lab experiments are relevant to self-control problems with effort. The following experiments explore the impact of temptation on productivity in real effort tasks.

Bucciol, Houser, and Piovesan (2011b) designed an experiment to test whether resisting a tempting distraction drains willpower and thus reduces productivity in a subsequent task. This is motivated by the fact that many employees in modern desk jobs are tempted to waste time on the Internet. While some employers take the approach of blocking time-wasting websites to address this moral hazard problem, it is likely that many employees would prefer to be more productive as well.

The experiment involved three phases. First, subjects performed three real effort tasks that involved counting the number of times a ball was passed between individuals in a video. They were paid more if their responses were more accurate. Second, subjects were automatically shown a funny video in the control treatment, and had the option to press a button to watch the video in the temptation treatment. The fact that the video was
entertaining was salient because all subjects were able to hear the sounds of the video. Those in the temptation treatment were urged not to press the button by text on their screen, and 35 out of 36 subjects resisted the temptation. In the third phase, all subjects performed ten additional counting tasks.

Individuals who resisted the temptation of watching the video made significantly more mistakes in their counting tasks in the third phase. Resisting temptation in the workplace presumably drains willpower, leaving workers less able to exert high levels of effort. The authors suggest a policy implication that employers should not prohibit distractions such as Internet use while leaving them readily available. Instead, they should either remove temptation by blocking the time-wasting activity altogether, or allow employees to take occasional breaks.

Houser et al. (2010) ran a similar experiment on temptation and effort. The authors note that while temptation in the lab is often implemented as a single event, temptation in real workplaces is usually a repeated occurrence. Their motivation is to examine the effect of repeated temptation on productivity and the demand for commitment devices.

The design involved subjects performing a real effort task for two hours while a button would intermittently appear giving them the option to browse the Internet. The real effort task was to count the number of ones in a string of ones and zeros. If subjects performed all of the tasks with 70% or greater accuracy, they earned a significant amount of additional money. If they succumbed to temptation at any point, they would earn only their show-up fee and lose the opportunity to perform the task for the rest of the experiment. Subjects were also offered a commitment device: depending on the treatment, they could either remove the temptation pop-ups for free or for a cost of $1 (maximum earnings were $22).

There are a few key results from this paper. First, there was considerable demand for the commitment device. Overall, 36.4% of subjects used the device at some point in the experiment. However, the demand was much lower when there was a monetary cost involved. While 47.9% of subjects used the device when it was free, only 23.8% were willing
to pay for it.

Second, the demand for the commitment device increased as the experiment progressed. Across treatments, 20.5% of subjects used the device on the first opportunity, while an additional 15.9% used it later in the experiment. This implies either that subjects became more sophisticated about their self-control problems over the course of the experiment, or that their willpower was drained to such an extent that the commitment device finally became attractive.

These lab experiments provide important insights into self-control and effort. The lab offers researchers a large amount of control over work conditions and temptation. However, these experiments lack the strong external validity provided by field experiments run in actual workplaces.

3.2 Field Experiments

A number of field experiments have explored the role of self-control in the provision of effort, with varying levels of relevance. The most relevant field experiments have been done in cooperation with existing firms in real workplaces. These experiments work best in industries with output that is readily quantifiable. Other field experiments have examined the study effort of undergraduates (a group notorious for self-control problems with procrastination). Finally, field experiments on exercise address a self-control problem similar to work effort, since exercising causes an immediate cost for a delayed reward.

Ideally, researchers running a field experiment on this topic would want precise data on output, insights inside workers’ thoughts about their own effort levels, and the ability to evaluate the effectiveness of a commitment device in solving the self-control problem at a real workplace. Kaur, Kremer, and Mullainathan (forthcoming) provide all of this.

The experiment was run in cooperation with an Indian data-entry firm, where workers were paid piece rates for each correctly entered field of data. Some evidence that self-control issues existed in this firm came from the questionnaire workers filled out: 76% of workers
agreed or strongly agreed with the statement, “Some days I don’t work as hard as I would like to.”

Before any treatments were introduced, workers exhibited signs of hyperbolic discounting – their output increased by 8% over the course of the week as their weekly payday approached. This cannot be due to day effects because their paydays were randomly assigned to different days of the week. The theory developed in the paper suggests that workers with large payday effects would demand a dominated contract to induce more effort from themselves when the time to work arrived.

The authors implemented four treatments to test their theoretical predictions about self-control and effort. The first treatment was the control contract: workers were paid their normal show-up fee plus a standard piece rate. The second treatment imposed a dominated contract (without choice) that halved the piece rate until a certain threshold of output was reached. The third and fourth treatments allowed workers the option of choosing their own dominated contract either the night before work or the morning of work.

The results show that self-control problems at work can be partially addressed by potentially costly commitment contracts. Overall, 36% of workers agreed to implement a dominated contract when it was optional. As predicted by the theory, workers with larger payday effects were more likely to agree to the dominated contracts. Additionally, workers with larger payday effects ended up improving productivity under dominated contracts more than workers with small payday effects.

One interesting result is that workers appeared to learn about their self-control problems as the field experiment progressed. Workers with large payday effects chose the dominated contracts more often, while workers with small payday effects chose them less. This confirms results from other experiments that subjects seem to increase in sophistication with experience.

Another field experiment by Cadena et al. (2011) used non-monetary prizes to fight procrastination among loan officers in a Columbian bank. Branch managers observed that
many loan officers would become much more productive as their monthly bonus approached. The bank agreed to implement a treatment which awarded small prizes such as movie tickets to loan officers who completed work goals at the beginning of the month. The first part of the experiment involved the prizes alone, while in the second part branch managers also reminded workers of the program, their goals, and their progress each week.

The impact of the treatment was strong, but only when branch managers nudged their employees along with the original program. Workers increased loan sourcing in the first two weeks of the month, made more money in monthly bonuses, and even reported less work-related stress and higher job satisfaction. The fact that the non-monetary prizes alone were not very effective suggests that simply reminding workers about their procrastination habits might have improved self-control. It seems plausible that this intervention increased the sophistication of workers about their self-control problems and allowed them to reduce their procrastination even without monetary incentives.

Ariely and Wertenbroch (2002) examined the relationship between deadlines and procrastination for undergraduates writing papers for a class. In their experiment, one treatment group had deadlines evenly spaced throughout the quarter, while students in the other group were able to set their own deadlines. Setting an earlier deadline is a commitment device because it addresses self-control problems with effort at the cost of less flexibility.

The main result was that students tended to set early deadlines (compared to the last possible day) when given the option, but had lower grades than those who had externally imposed evenly spaced deadlines. This implies that students realized they had some self-control problems, but did not set optimal constraints for themselves.

The authors designed a second experiment in which students proofread three papers with purposely embedded errors over the course of three weeks, and were paid for each mistake they found. This time, in addition to the evenly spaced deadlines and self-imposed deadlines, a third treatment put all three deadlines on the final day. Again, in the self-imposed deadlines group, subjects imposed earlier deadlines than the last possible day, indicating a voluntary
reduction of flexibility to fight procrastination. In terms of efficiency, the evenly spaced deadlines had the highest earnings and the least late submissions. Subjects in the self-imposed deadlines treatment did second best, while the treatment group with all three deadlines on the final day earned the least and had the most late submissions. These results suggest that although people are at least partially aware of their self-control problems, they prefer to leave some flexibility rather than impose harsher constraints that elicit the most effort.

Burger, Charness, and Lynham (2009) ran a similar field experiment on procrastination among undergraduates, with an additional feature to test the effects of draining willpower before work. In their experiment, subjects in the control group needed to complete 75 hours of monitored studying at the library over the course of five weeks to receive $95. In a separate treatment, students were also required to meet intermittent deadlines of 12 hours per week to receive the final reward.

In contrast with the results of the Ariely and Wertenbroch paper, Burger, Charness, and Lynham found that students in the intermittent deadline treatment were actually less likely to complete the task. The weekly deadline group had a completion rate of 39.5%, while the group with only the final deadline had a completion rate of 61.1%. Subjects with weekly deadlines appeared to procrastinate during the week and try to make it up at the end of the week, but for many of them it was not enough.

A notable difference is that in this experiment, missing a single deadline resulted in completely failing the task. In the Ariely and Wertenbroch experiment, missing a deadline only resulted in a small penalty per day. It appears that imposing constraints to solve self-control problems is a delicate matter; the loss of flexibility can sometimes outweigh the self-control benefits.

In the same paper, Burger, Charness, and Lynham also report the results of a second experiment which explored the implications of draining willpower before a real effort task. Students had to answer 20 multiple choice questions within two days, and were paid for each
correct answer on top of a completion fee. Random assignment to Tuesday-Wednesday or Friday-Saturday groups controlled for day effects. The control group completed a concordant Stroop task, which is a trivial task that involves retyping the name of a color printed on the screen. The treatment group had their willpower drained with a discordant Stroop task, in which the name of a color is printed but the text is written in a different color. Subjects must type the color of the font and suppress reading the printed text, a task which involves exercising considerable executive function.

The results of this willpower test were counterintuitive. Subjects who were assigned the discordant task were less likely to complete the questions on the first day compared to the control group (31% versus 49%), but had higher overall completion rates by the end of the second day (70% compared to 57% in the control group). It makes sense that willpower-depleted subjects would put off the task until the next day, but it is puzzling that this group had higher overall completion rates.

The authors offer two possible explanations for this strange result. First, by completing the discordant task, subjects might signal to themselves that they have strong willpower or a good work ethic. The next day, they would exert more effort remembering their strong performance the previous day. Second, subjects might view completing the difficult Stroop task as a sort of commitment. After completing the annoying test, they might resolve that they need to finish the experiment and earn the full reward. While both of these explanations are plausible, understanding the effects of draining willpower on self-control with effort will require additional research.

Shifting away from effort at work and school, there are lessons to be learned from the literature on habit formation in exercise. Clearly exercise is not equivalent to effort in the workplace, but there are some important similarities. Most people consider exercise to have an immediate cost because it causes discomfort. The rewards often occur in the distant future in the form of improved physical and mental health, among numerous other benefits. The fact that self-control problems exist in the realm of exercise is evident from the number
of people who make New Year’s resolutions to exercise more and lose weight (and often fail to meet these goals). So while results on exercise are not necessarily directly applicable to the workplace, the similarities imply that insights from exercise may carry over to other kinds of effort.

Charness and Gneezy (2009) provide monetary incentives for gym attendance to undergraduates and find strong treatment effects, at least in the short term. Although there is substantial decay in gym attendance a few months after the incentives end, it appears that short-term habit formation was strongest in subjects who did not attend the gym before the experiment.

Acland and Levy (2013) implement nearly identical incentives as Charness and Gneezy, again on a population of undergraduates, this time with calibration of time-inconsistent preference models in mind. The authors found that subjects did not predict their habit formation; projection bias caused them to underestimate effect incentives would have on their long-term gym habits. Additionally, subjects overestimated their future attendance by a large magnitude, indicating naïveté about the degree of their present bias.

Royer, Stehr, and Sydnor (forthcoming) designed a large-scale field experiment on exercise with two main goals in mind. First, they wanted to address some methodological concerns from previous field experiments on exercise, such as small sample size, large attrition rates, and selected samples consisting mainly of college students. Second, they wanted to design incentives that might produce long-lasting habit formation, given that past results on incentives to exercise typically produced short-term improvements with little to no effects in the long term.

The experiment involved 1,000 employees at a Fortune 500 company who were divided into three treatment groups. Since all subjects in the sample had access to the on-site company gym, transportation and membership costs were equalized across subjects. The control group had no incentives to attend the gym. The remaining two groups were both paid $10 per gym visit, up to three times per week over the course of a month. This was the
end of incentives for the first treatment group. The second treatment group was offered the option of entering a self-funded commitment contract, in which money pledged by subjects would be forfeited to charity if they went more than 14 days in a row without attending the gym over the course of two months.

In both treatment groups, gym attendance roughly doubled compared to the control group during the initial incentive period of one month. For the group not offered the commitment contract, only 25% of the increase remained one month after the incentives ended, and after two months the increase was almost entirely gone. Effects were much more persistent for the group offered the commitment contract, even though the overall take-up rate was quite low at 12%. For those offered the commitment contract, 50% of the increase remained two months after the initial incentives ended. Effects were still detectable in this group up to a year after the initial incentives ended.

Overall, many of these results on self-control and exercise mirror previously discussed results on effort at work. Self-control problems exist and commitment contracts can help, but voluntary take-up rates are low when monetary costs are involved.

4 Discussion and Future Research

After examining this large body of empirical evidence, a number of results seem to hold generally. First, self-control problems with effort seem quite common. People appear to have time-inconsistent preferences when it comes to enduring immediate costs for delayed rewards. However, they are only partially sophisticated about their self-control problems; they are often aware that the problem exists, but usually underestimate the extent of it.

Imposing constraints on the future self is the most commonly proposed solution. This solution tends to work well if the constraints are not too harsh, but there is a trade-off between reducing flexibility and assisting with self-control. The demand for commitment contracts relies on sophistication about self-control problems, and lack of full sophistication
partially explains the low commitment demand typically observed in experiments. People generally seem unwilling to risk their own money to remove the temptation to shirk, but are more amenable to it when it’s free.

Exercising self-control over effort appears linked to willpower, but the effects of draining willpower seem complex. When people resist realistic temptations in the lab, their productivity decreases. This could be because resisting temptation drains willpower, but it could also be that subjects were simply distracted by the temptations and unable to multi-task. When subjects have willpower drained through a discordant Stroop task, effort decreases immediately but appears to bounce back even higher than control groups the next day.

These results have some important implications for employers. When workers have large projects, it may be more effective to break them into smaller tasks with more frequent deadlines to reduce procrastination (Ariely and Wertenbroch 2002). In terms of distractions in the workplace, the willpower-draining effects of resisting temptation may harm productivity even more than just succumbing and wasting some time on the distraction. It seems best to remove temptations altogether when possible, rather than prohibit them but leave them readily available.

One characteristic in common among most of the empirical studies discussed above is that piece rates were paid for easily quantifiable output. This calls into question how generalizable these self-control results are to other workplace environments. In most jobs, output is not readily measurable. Indeed, this is exactly why many firms measure inputs rather than outputs, for example requiring workers to be in the office 40 hours per week, even when they work alone on a computer and could feasibly work from home instead. This situation seems more in line with standard principal-agent theory, in which workers prefer to shirk and firms attempt to address this moral hazard problem. It could be that self-control at work only plays a significant role when piece rates for output are already in place.

Without piece rates, one could still imagine self-control problems with workers who have long-term career concerns. Working harder at a minimum reduces a worker’s chance of
getting fired, and likely results in better opportunities for promotions or moving to more lucrative jobs with other firms. In fact, self-control may play an even more important role with career concerns because the benefits of promotions or new jobs involve rewards that are much more delayed than piece-rate paychecks or monthly bonuses. There is already a well-developed literature on career concerns, but combining this theory with new insights about self-control could be a promising direction for future research. One modeling possibility would be to combine self-control problems with a risk-of-firing model, a mechanism tractable enough to be implemented in the lab.

Much of the literature has focused on using monetary incentives to improve self-control, but there is promising evidence that costless interventions may also be effective. In the study with the Columbian bank branches, the most effective intervention seemed to be simply reminding workers of their goals and keeping tabs on their weekly progress (Cadena et al. 2011). Additionally, in many of the experiments discussed above, subjects appear to increase in sophistication over the course of their work, and eventually realize they need some way to remove the temptation to shirk.

Costless interventions designed to increase worker sophistication about self-control problems could be another promising possibility for future work. One possible treatment would be to elicit subject predictions about future procrastination, then measure actual output along with self-reported levels of stress and work satisfaction. Then, in the midst of working for the next deadline, workers could be occasionally reminded of their past procrastination, their naiveté about their self-control problems, and the level of stress it caused them. This costless intervention might induce a level of effort closer to what their past self would have preferred.

The existing theory does not entirely explain the empirical results. The main oversight is that people are consistently partially sophisticated, while theory typically allows for fully naive or fully sophisticated agents. It might be fruitful to build a model with an extra parameter that describes the level of sophistication of an agent. Although the models would
lose some tractability, it seems worthwhile given that partial sophistication is an empirical regularity.

Continued research on self-control and effort can provide valuable insights for both workers who wish they would work harder and the firms that employ them. Given how pervasive temptation is in modern society, finding innovative solutions to self-control problems has the potential to drastically improve the productivity and well-being of those who struggle with self-control the most.

References


