

# Behavioral Economics of Self-Control Failure

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The main idea in this article is that addiction is a consequence of falling victim to decision failures that lead to preference for the addictive behaviors. Addiction is viewed as valuation disease, where the nervous system overvalues cues associated with drugs or drug-taking. Thus, addiction can be viewed as a diminished capacity to choose. Addicted individuals assign lower values to delayed rewards than to immediate ones. The preference for immediate gratification leads to self-control problems. This article highlights a number of motivational forces that can generate self-control failure.

## INTRODUCTION

A common finding with regard to quitting addictive behavior is that even though initial success is quite prevalent, the long-term maintenance is generally quite rare. For instance, dieters tend to display disinhibited eating in response to a wide variety of events. These events disrupt self-control and often trigger episodic overeating that wipes out all the dietary achievements that have been made since the last overeating episode. Dieting has been a constant project with them. Ultimately, to avoid weight regain will require one to work his whole life. However, 98 percent can't expect to attain this goal [1]. The question is, why do people fail to stick to their goal of eating a healthy diet in order to maintain weight loss? What leads a person to temporarily prefer a poorer alternative?

One possible answer is that people have self-control problems in the form of a present-biased preference (a predisposition for excessive myopic behavior), in which one places extra value on more immediate rewards. For instance, in the moment, faced with a particularly appealing snack, they often can't resist saying no. The ability to resist immediate temptations in the service of a long-term goal is a key aspect of self-control [2]. Self-control is the ability of the self to alter dominant responses or inner states such as impulses, urges, emotions, and replace them with a different response to fulfill larger

goals (e.g., losing weight, quitting smoking, staying calm). This ability to control behavior enables people to maintain healthy behavior throughout their lives. Self-control failures result in a person acting in a way opposite to his or her better judgment or intention.

This article highlights a number of interconnected motivational forces that can generate self-control failure or present-bias preferences. Self-control can be temporarily undermined by a number of factors, including lack of willpower, cravings, negative moods, and so on. These factors together explain why there is conflict between long-term human intentions and short-term actions, which leads to myopic decisions. In essence, this article identifies where the decision-making process has broken down in the context of diet relapse. An understanding of the circumstances under which people fail at self-control can provide valuable insights into how to overcome self-control problems. The article concludes by discussing ways to motivate individuals to act according with their long-term goals.

The understanding of how decision making can fail under certain conditions can explain impulsivity, health problems, and obesity. Indeed, it has been estimated that 40 percent of deaths are attributed to poor self-control [3]. The annual expense of treating obesity-related illness (e.g., Type 2 diabetes, cardiovascular disease, and cancer) and the added cost of treating almost any medical

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condition when the patient is obese is estimated to be \$190 billion [4]. In the context of weight loss and dieting, Americans spend in the aggregate many billions of dollars each year trying to lose weight through dieting or exercise. National surveys indicate that approximately 30 percent of U.S. adults are currently trying to lose weight, and approximately 50 percent report having tried to lose weight in the past year. Obviously, these dieters are very motivated to lose weight and yet gradually they regain the weight. The prevalence of overweight and obesity along with a high interest in dieting indicate the difficulty people face in maintaining long-term weight loss [4]. In the language of public health, self-control failure could be considered as a risk factor.

Although the United States accounts for 4 percent of the world's population, Americans consume 65 percent of the world's illegal drugs. In 2007, the cost of illicit drug use totaled more than \$193 billion [5]. About 1 in 15 Americans aged 12 and older currently uses drugs. The U.S. government spends approximately \$40 billion a year on drugs policy. The U.S. drug policy efforts are dominated by enforcement activities. However, there is no evidence that tougher enforcement has made drugs harder to get. The following illustrates that addictive substances can impair decision-making. The failure in human judgment can help explain why enforcement has limited success.

## HYPERBOLIC DISCOUNTING OF DELAYED GRATIFICATION

This article presents a behavioral economic perspective for understanding self-control failure. Behavioral economics provides a framework to understand when and how people make errors. The basic message of behavioral economics is that humans are hard-wired to make judgment errors and they need a nudge to make decisions that are in their own best interest.

A key concept in behavioral economics focuses on how delayed rewards are discounted by individuals and how there is deviation from the rational-choice paradigm. Delay discounting refers to the reduction in the present value of a reward when its delivery is delayed. The discounting model shows how an individual balances the consumption of a small amount of a commodity now compared to a large amount later. In the trade jargon, this is known as an intertemporal decision. These decisions have a time dimension, meaning that they involve tradeoffs between costs and benefits occurring at different times. Such choices pervade our lives — from daily decisions to those that can have life-long consequences, such as dieting, saving for retirement, education, and marriage.

This section briefly reviews the central elements of delay discounting and provides a framework for identifying sources of impulsive behaviors. Dieting is a useful example to illustrate the relevance of delay discounting. After all, dieting involves giving up some enjoyment today in order to have a better tomorrow.

A rational decision maker will choose his or her behavior to maximize the sum of his or her current and future rewards. This requires him or her to consider how current actions may affect future choice, i.e., long-term goals to lose weight, eat healthily, and exercise, all of which require costly up-front commitments. In contrast, behavioral economics shows that individuals discount (devalue) too strongly future rewards and overemphasize near-term pleasures. When we can hold all alternatives at a distance, our evaluations of them remain true to their values in our lives. But our subjective evaluation of a reward (our appetite for it) grows when we are closer to the reward than when we are far away, and unless we somehow commit ourselves to our previous preferences, we succumb. For example, most people would be indifferent between \$10 in 10 days versus \$10 in 11 days, but they would prefer \$10 now to \$11 tomorrow. This tendency is often referred to as “hyperbolic discounting,” or present bias [6].

This inconsistency rests on an illusion that we all experience every day. For example, imagine you set your alarm clock at midnight to wake up at 6:00 AM the next morning. But when the alarm goes off, the choice that you made last night now “seems absurd.” The warmth and comfort of the bed makes you change your mind. What was chosen the night before is now rejected.

Time inconsistent behavior means that an individual's preference at time 1 differs from her preference at time 2. At time 1, the person chooses to overeat; at time 2, this person wishes that he or she had consumed a smaller portion. For example, ice cream may seem like a bad idea when considered a few days before it appears at a birthday party, but as the party approaches, the ice cream becomes ever more appealing while the dietary consequences will recede further into the future. This change in preference is often the source of a self-control problem. We often want instant gratification and want to be patient in the future, such as eating highly caloric foods, while planning to start a diet tomorrow [7].

In sum, the hyperbolic discounting model describes conflicts between short- and long-term motives. The hyperbolic model represents the dynamic of a self-control problem. A self-control problem is a sign that individuals fail to have a proper valuation of distant rewards, and they often end up acting against their own best interests. This implies that any health investment activity (choices with consequences over an extended period of time) is vulnerable to present bias, because it is hard to see the value from moment to moment. Consequently, people tend to avoid and/or delay investment health behaviors.

The concept of delay discounting provides a valuable organizing principle to explain the human taste for instant gratification (e.g., addictions, overeating, and procrastinations). The main problem with most self-control problems (e.g., addiction and overeating) is that the costs occur in the future, whereas the pleasures occur in the present [8]. Valuations of immediate (and short-term) negative

value (e.g., withdrawal) are likely to be weighed more heavily than valuations of long-term negative consequence (adverse health impact). The addicts and overeaters want to discontinue their behaviors at some point — but not today. It always feels better to defer aversive efforts. They fail to quit because they continuously procrastinate, and the difficulty of overcoming such procrastination is the main problem with addiction and obesity. The cost of having yet another piece of cake or smoking yet another cigarette may be so small that it is reasonable to see it as insignificant.

## THE DIVIDED SELF

The hyperbolic discounting model is an expression of a “divided self,” of preferring, for example, indulgence for the immediate self and prudence for the future one [5]. Different selves can be thought of as having different discount rates or time inconsistent preferences — one more present-oriented and the other more future-oriented — that are competing for control. A person is time inconsistent if the plan he or she makes today for a future period is different from the one actually chosen during that period. Indeed, the essence of a self-control problem is mainly about conflict between two selves (e.g., one who wants to be thin and the other who wants to eat). Thus, the hyperbolic discounting (the preference reversal or present bias) describes conflicts between short- and long-term motives.

Although we tend to view ourselves as a single and integrated self, people can be conceptualized as multiple selves with different points of view. Individuals are simply collections of different selves at odds with one another. Many psychologists find it more useful to think of the mind as consisting of multiple states that may to varying degree be in conflict with one another. In his book *The Happiness Hypothesis*, Haidt writes, “To understand most important ideas in psychology, you need to understand how the mind is divided into parts that sometimes conflict. We assume that there is one person in each body, but in some ways we are each more like a committee whose members have been thrown together working at cross purposes” [9]. In this view, there is no central executive control in the form of decider. Rather, decision making is a function of a coalition of different self-states.

Thomas Schelling was the first to note that people behave sometimes as if they had two selves, one who wants healthy lungs and long life and another who enjoys smoking or one who yearns to improve himself by studying hard and another would rather watch TV or socialize [9]. The two are in continual contest for control. In this case, behavior is controlled by a series of myopic “doers” who maximize immediate satisfaction and a farsighted “planner” who maximizes the discounted sum of the doer’s satisfaction (utilities). The person who makes plans and the person who fails to implement them are different parts of the divided self. Thus, no matter how strong the goal intentions, there is no guarantee that the goal will be

achieved because of the planner-doer gap (or the intention-action gap). Consequently, the option chosen by the doer (acting-self) will reduce total happiness over time.

The divided-self model indicates that the ultimate determinant of a person’s choice is not his or her simple preference. Rather, people may have a variety of contradictory preferences that become dominant at different points because of their timing (e.g., Jekyll and Hyde). If a person is vulnerable (e.g., has a sweet tooth) and close to a box of chocolates or a bottle of whisky, he or she will value these options differently than when far away from them. The intensity of the preference of each self may determine the option chosen. That is, the contexts or circumstances of ordinary life influence individuals’ choices. One can be pulled in several directions, and judging oneself after the decision is a bit like judging another person.

In sum, the divided-self model describes the behavior of a single “self” (our mental life) by the metaphor of two selves or characters in our mind. However, the interests of these two selves do not always coincide. Life seems to consist of a struggle between the short-sighted self and the long-sighted self, and to balance these two is an art [10,11]. This important insight about the human mind explains why we are conflicted and inconsistent. The inconsistencies in the mind give rise to self-control problem.

## HOW TO KEEP RESOLUTIONS?

The ability to exercise self-control and resist temptations is a key to maintaining a new behavior. We exert self-control when we resist the urge to consume alcohol or that extra slice of chocolate cake. However, on many occasions, the pull of the drug/behavior can create preference shift in favor of use. In the face of temptation, the vulnerable person attaches higher value to temptation and abandons prior resolutions. Further, this reversal of preference will lead to regret afterward and reinforces the belief that that he or she is powerless over the desire to use.

To counter this shortsighted behavior, decision makers employ self-control strategies to protect long-term goals from short-term consumption decisions. Personal rules as a self-control strategy help people see current decisions as predictors of future behavior, and the awareness of this linkage help them overcome temptation [7]. Personal rules are promises to cooperate with the individual’s own subsequent motivational states.

The basic idea for this strategy comes from turning individual choices into a matter of principle. The strategy requires perceiving a clear link between behavior today and behavior in the future, which transforms the impulsive act from an isolated decision into a pattern of behavior. The decision to stop smoking is in effect a decision to begin a pattern of behavior. Not smoking tonight makes it easier not to smoke tomorrow and not smoking tomorrow makes it easier not to smoke the next day, and so on. By tying together sequences of choices, the individual aligns his short-term incentives with his long-run interests.

**Table 1. Payoff matrix in the prisoner's dilemma.**

	Cooperate	Cheat
Cooperate	6m, 6m	10y, 0
Cheat	0, 10y	5y, 5y

The conflict between current and future selves can be seen as a prisoner's dilemma. Although this theory was originally developed with reference to individuals, it could equally be applied to the transient selves (a person being a collection of transient selves over time) [6]. Each self is an independent rational decision maker. Each self is also transient: He or she will not be (entirely) the same person tomorrow as today. For example, the individual who in the morning prefers to avoid overeating may be aware that this preference is in danger of being defeated by his or her future self in the evening. This self-control problem may be associated with a lack of identification with the self over time.

In the Prisoner's Dilemma, two accomplices are arrested and interrogated in separate rooms. The authorities give each prisoner the same choice: Confess your shared guilt (in effect, betray your partner) or remain silent (and be loyal to your partner). For example, if one betrays and the other stays silent, the defector goes free, and the silent, loyal one spends 10 years in jail. If both remain loyal, both get 6 months. If both betray the other, both get 5 years. Each person has the temptation to cheat the other to gain lower punishment. When both players pursue their own self-interest, both do worse than they would have if somehow they could have jointly and credibly agreed to remain silent. In short, the outcomes of strategic interactions depend on the choices of others as well as on one's own choices. In the interpersonal prisoner's dilemma, defect is a dominant strategy.

The problem of self-control has the same structure as the prisoner's dilemma (Table 1). Each self might prefer the outcome of being a non-smoker (all cooperate) to the outcome of a smoker (all defect) and reduce the risk of cancer. However, the cost of not using is borne entirely by the individual self (sacrificing the pleasure of smoking a cigarette), whereas the benefits of being a non-smoker is not captured by the transient self, rather they are shared across transient selves at the end of the person's life [12,13].

The choice that the self would prefer is to indulge today and quit starting tomorrow. However, the self will face the same decision tomorrow and, hence, will not quit. So we have a prisoner's dilemma with smoking equivalent to *defect* and giving up to *cooperate*.

While the physical independence of today and tomorrow is real enough, the fact remains that actions today affect actions tomorrow. The decision to stop smoking is in effect a decision to begin a pattern of behavior. To smoke the cigarette tonight is to fail to perceive the connection between tonight's act and the pattern of acts over

many nights and days. This approach emphasizes the significant cost of accumulated indulgence. The smoker who says "one cigarette won't kill me" perceives the indulgence in isolation with the negligible consequence. Thus, it is not a good idea to make decisions on a case-by-case basis [6]. On a case-by-case basis, most of us would have that second dessert or drink that third martini at a party.

We can use the insights from the prisoner's dilemma to suggest ways to resist changing motivation. That is, an individual has incentives to develop a self-enforcing cooperative arrangement with his or her future selves. For example, the reason why people who are recovering from alcoholism avoid taking a single drink is to maintain the credibility of their sobriety. When you make an agreement and you don't keep it, you undermine your own self-trust. Knowledge that he or she was able to overcome the desire to drink last night might make him or her more confident that he or she will be able to overcome the desire in the future — and more likely to resist tonight. Thus, an alcoholic who wants to quit might be willing to avoid drinking tonight if he thinks that he will not drink in the future, but not if he thinks that he will soon start again.

The motivation to sacrifice consumption on behalf of future selves also could depend on how "connected" the current self feels toward those future selves with respect to personal identity, such as beliefs, values, and goals. Research shows that having a psychological connection with our future selves such as sharing memories, intentions, beliefs, and desires increase patience [14]. Thus, interventions that involve imagining one's future self (e.g., viewing one's aged self) may encourage people's sense of connectedness with their future selves.

In sum, personal rules help a person motivate himself to resist the temptation if he or she believes that failing to resist this time will make future resistance less likely. For an addict, the recovery requires a measure of integration between his different selves and between his past and his present.

## CONCLUSION

Self-control failure or present-biased preferences describe human behavior under hyperbolic discounting. The hyperbolic discounting model implies that people will make relatively far-sighted decisions when planning in advance — when all costs and benefits will occur in the future — but will make relatively shortsighted decisions when some costs or benefits are immediate. For instance, most dieters have good intentions to eat less by counting calories, but on weekends they lose their resolve. In the moment of decision, they choose to eat fatty French fries, which are more attractive in the short run than a healthy but less tasty low-fat salad. This behavior is an expression of a "two selves," of preferring indulgence for the impulsive self and prudence for the reflective (future) one. The present-bias behavior leads to failures to maximize gains or minimize losses in the long run.

In this view, a self-control problem is the result of bargaining for control among different selves, and their bargaining game has the structure of a prisoner's dilemma. In sum, personal rules (establishing the so-called "red-line" that separates approved and disapproved behavior) helps a person motivate himself or herself to resist the temptation if he or she believes that failing to resist this time will make futures resistance less likely. For an addict, the recovery requires a measure of integration between his different selves — and between his past and his present. Thus, it is not a good idea to make decisions on a case-by-case basis (local choice). Moreover, personal rules lower deliberative efforts (exerting willpower) that might otherwise be engaged by each specific instance of temptation. Thus, individuals achieve some degree of self-control relying on their internal incentives internally, rather than manipulation of external cues.

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