

Self-Control, Alcohol, and Crime: A Dual-Self Theory *

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Abstract. This paper develops a formal economic model of crime in which offending arises from the interaction between temptation and costly self-control. The framework embeds a dual-self structure into the standard expected-utility model and thereby provides a tractable representation of the process view of self-control that has become central in modern criminology. In the model, alcohol consumption increases the probability of crime by raising the cost of exerting self-control rather than by altering preferences or beliefs about punishment. Deterrence and education retain their conventional comparative statics but also affect criminal behavior indirectly through their influence on optimal alcohol consumption. The framework offers a microfoundation for the empirical association between intoxication and violent offending and provides a behavioral mechanism consistent with long-run historical declines in violence.

Keywords: crime; alcohol; self-control; dual-self model.

JEL: D91, K42, I24, J19, N30.

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1. INTRODUCTION

The economic theory of crime explains offending as the outcome of individual choice under uncertainty, where expected benefits are weighed against the expected costs of punishment (Becker, 1968). In this framework, deterrence operates by increasing the probability or severity of sanctions, and higher opportunity costs reduce the incentive to engage in illegal activity. While this approach has been highly influential, it abstracts from a central feature of many criminal acts, particularly violent and expressive offenses: they are often committed in situations in which individuals fail to act in accordance with their long-run interests. Alcohol intoxication, emotional arousal, and situational stress are frequently associated with such behavior, suggesting that failures of self-control play a key role in criminal decision-making.

Self-control has therefore become a central concept in criminology. Gottfredson and Hirschi's (1990) general theory of crime is widely regarded as one of the most influential paradigms in the field and has generated extensive empirical research. In its original formulation, the theory characterizes low self-control as a stable individual trait that predisposes individuals toward impulsive, risk-seeking, and short-sighted behavior. Recent scholarship, however, emphasizes a more nuanced, process-based interpretation. In this modern view, self-control is the effortful inhibition of an immediately rewarding impulse in the service of long-term goals, and criminal behavior results from the interaction between temptation and regulatory capacity rather than from a fixed disposition alone (Burt, 2020). This reconceptualization highlights the importance of situational factors that affect self-control, including intoxication and emotional states.

The present paper develops a formal economic model of crime that is consistent with this process-based conception of self-control. The model builds on the dual-self framework (Thaler and Shefrin, 1981; Fudenberg and Levine, 2006), which formalizes the idea that behavior results from the interaction between a forward-looking self and an impulsive self. In this structure, self-control is not a fixed personality trait but a costly regulatory activity that must be exerted whenever immediate gratification conflicts with long-term welfare. By embedding this dual-self representation into the standard expected-utility crime framework, the model provides a tractable microfoundation for impulsive offending while preserving the familiar comparative statics with respect to punishment and human capital. To our knowledge, this is the first economic model that provides a formal representation of the process-based interpretation of Gottfredson and Hirschi's general theory of crime.

The dual-self interpretation is supported by a large body of evidence in psychology and neuroscience showing that distinct neural systems are involved in impulsive and deliberative behavior. Affective responses are associated with evolutionarily older structures, including the limbic system, which react rapidly to salient stimuli and prioritize immediate rewards. Long-term planning and behavioral inhibition are linked to the prefrontal cortex, which enables the evaluation of delayed consequences and the suppression of prepotent responses (McClure et al., 2004; Bechara, 2005; Hare et al., 2009). Self-control can therefore be understood as the effort required for prefrontal processes to override limbic impulses. This biological distinction provides a natural foundation for modeling temptation and self-regulation as separate components of decision-making.

Alcohol consumption directly interferes with this regulatory mechanism. Experimental studies show that intoxication weakens performance monitoring, reduces self-awareness, and impairs the neural signals that indicate when an action is inappropriate or likely to lead to negative consequences (Hull, 1981; Bartholow et al., 2012). Importantly, alcohol need not alter beliefs about punishment or preferences over outcomes. Instead, it increases the difficulty of inhibiting impulsive behavior. In the model developed below, this effect is represented as an increase in the cost of exerting self-control. Crime becomes more likely not because expected sanctions are misperceived, but because the effort required to resist temptation rises.

The framework generates several implications. First, individuals with higher self-control are less likely to offend even when the immediate gain from crime is substantial, providing a formal counterpart to the central prediction of self-control theory. Second, alcohol consumption increases the probability of crime by raising the cost of self-control. This result holds both for naive individuals who do not anticipate the behavioral consequences of intoxication and for sophisticated individuals who optimally adjust alcohol consumption in light of its effect on criminal behavior. Third, traditional determinants of crime such as deterrence and education retain their standard effects but also operate indirectly by influencing alcohol consumption and therefore the frequency of self-control failure.

The model contributes to three strands of literature. First, it provides a formal representation of the modern process-based theory of self-control in criminology, which has rarely been stated in economic terms. Second, it connects the economics of crime to the dual-self literature on temptation and self-regulation. Third, it offers a theoretical framework for interpreting

the well-documented empirical association between alcohol consumption and violent crime (Peranen, 1991; Greenfield, 1998; Felson et al., 2008). Unlike time-allocation models of crime, which emphasize occupational choice between legal and illegal activities, the present framework focuses on situations in which offending reflects a failure of self-control in the presence of temptation. This distinction is particularly relevant for violent crimes such as homicide and assault, which often yield limited material gain and occur in emotionally charged environments, but the mechanism is sufficiently general to apply to a broader class of criminal behaviors.

The remainder of the paper develops the model and derives the main comparative statics.

2. THEORY

This section develops a simple model of crime in which offending is the outcome of a self-control problem. The framework preserves the central deterrence mechanism of the Beckerian approach – expected punishment reduces the attractiveness of crime – but departs from standard time-allocation models by focusing on situations in which an individual faces an immediate temptation to offend. The decision problem is therefore not how to optimally allocate time between legal and illegal activities over the life cycle, but whether to give in to an impulsive action that conflicts with long-run interests. The model is thus complementary to occupational-choice approaches to crime and is intended for situations in which offending is impulsive rather than planned. This perspective is particularly suitable for violent and expressive crimes, which are often committed in affective states and yield little material return. It also allows us to connect the economics of crime to the modern process-based conception of self-control, in which behavior is determined by the interaction between temptation and the effort required to resist it.

2.1. Benchmark: Rational crime. An individual obtains lifetime utility $U(H^O)$ if no crime is committed, where H^O denotes the offender’s human capital and $U' > 0$. The net utility from committing a crime is

$$U_N = U_c(H^O, H^V) - p \left[c + U(H^O) \frac{L}{T} \right], \quad (1)$$

where U_c is the immediate gain from crime, p the probability of conviction, L the prison sentence, T life expectancy, and c additional punishment costs. Crime occurs if $U_N > 0$. Higher punishment (p, c, L) and higher offender education H^O reduce U_N .

2.2. Self-control. Following the dual-self model (Thaler and Shefrin, 1981; Fudenberg and Levine, 2006), an impulsive self values the immediate gain U_c , while a forward-looking self evaluates lifetime consequences. We assume $U_c(H^O, H^V) > 0$ for crimes that are tempting to the offender. Not committing the crime requires self-control and yields

$$U(H^O) - \gamma U_c(H^O, H^V), \quad (2)$$

where $\gamma \geq 0$ is the cost of self-control.

The net utility from crime becomes

$$U_S = (1 + \gamma)U_c(H^O, H^V) - p \left[c + U(H^O) \frac{L}{T} \right]. \quad (3)$$

Implication. For $U_N < 0 < U_S$, an individual with imperfect self-control commits a crime that a fully rational planner would avoid. A higher γ increases the likelihood of offending. This formulation provides a formal representation of the process view of self-control: crime occurs when the cost of resisting temptation exceeds the long-run loss. If we consider a distribution of γ in the population we get the prediction that individuals with less self-control (higher γ) are more likely to commit the crime. Holding other factors constant, more highly educated individuals refrain from offending even when the cost of self-control is high, whereas less educated individuals are more likely to commit the crime at lower self-control costs.

2.3. Alcohol and self-control. Neuroscientific evidence shows that alcohol impairs performance monitoring and behavioral inhibition (Hull, 1981; Bartholow et al., 2012). In the model this corresponds to $\partial\gamma/\partial a > 0$, where a denotes alcohol consumption.

PROPOSITION 1 (Naive Alcohol Consumption and Crime). *If alcohol increases the cost of self-control, higher alcohol consumption increases the range of parameter values for which $U_S > 0$.*

The result follows directly from $\partial U_S / \partial \gamma = U_c > 0$.

2.4. Sophisticated agents. Suppose individuals anticipate the loss of self-control. Let $\pi(a)$ denote the probability that drinking leads to offending, with $\pi' > 0$ and $\pi(0) = 0$. Taking this into account the individual maximizes expected utility from drinking $u_a(a) - p_a a + \pi(a)U_N$. The first order condition for optimal alcohol consumption is

$$G = u'_a(a) - p_a + \pi'(a)U_N = 0. \quad (4)$$

We focus on individuals who would not commit crime when sober, that is $U_N < 0$. Sufficient, not necessary conditions for a solution to exist are $u_a'' < 0$ and $\pi'' > 0$. These conditions are also plausible. From implicitly differentiating (4) we obtain the comparative statics:

PROPOSITION 2 (Sophisticated Alcohol Consumption and Crime). *For an individual with $U_N < 0$, a higher alcohol price reduces consumption and therefore the probability of crime.*

For the proof, we compute $\partial G/\partial a = u_a(a)'' + \pi(a)''U_N < 0$ and $\partial G/\partial p_a = -1 < 0$ and conclude the result from the implicit function theorem, $da/dp_a = -(\partial G/\partial p_a)/(\partial G/\partial a) < 0$ and $\pi'(a) > 0$.

Thus, naive and sophisticated individuals generate a similar positive nexus between alcohol consumption and crime. The difference is that sophisticated individuals adjust their alcohol consumption by internalizing the probability of committing crime when drinking while naive individuals fail to take this side effect into account. This feature is also visible in the comparative statics of the other model parameters, for which we obtain similar changes in crime for both types of individuals but a feedback response on alcohol consumption only for sophisticated individuals:

COROLLARY 1. *Higher punishment (p, c, L) and higher education H^O reduce both alcohol consumption and the probability of crime.*

For the proof, we compute $\partial G/\partial c = -\pi'p < 0$, $\partial G/\partial p = -\pi' [c + U(H^O)L/T] < 0$, $\partial G/\partial L = -\pi'U(H^O)/T < 0$, and $\partial G/\partial H^O = \pi'\partial U_c/\partial H^O < 0$, and apply the implicit function theorem as for Proposition 2.

If we consider a whole population, the probability of committing a crime becomes the prevalence of crime. With heterogeneous self-control costs in the population, an increase in average alcohol consumption raises crime prevalence by shifting more individuals above the self-control threshold. Deterrence and education reduce crime both directly and indirectly through lower alcohol consumption.

3. DISCUSSION AND CONCLUSION

This paper develops a formal economic model of crime in which offending results from the interaction between temptation and costly self-control. By embedding a dual-self structure into the standard expected-utility framework, the model provides a tractable microfoundation for the process-based interpretation of self-control that has become central in modern criminology (Burt,

2020). In this setting, criminal behavior does not primarily reflect a systematic miscalculation of expected punishment but the failure of regulatory effort in situations in which immediate rewards conflict with long-term welfare. Alcohol consumption increases the likelihood of such failures by raising the cost of exerting self-control.

The framework yields three main insights. First, it provides a formal representation of Gottfredson and Hirschi's (1990) general theory of crime that is consistent with its contemporary reinterpretation as a theory of situational self-control rather than a purely trait-based account. Second, it shows that traditional determinants of crime such as deterrence and education retain their standard comparative statics while also influencing criminal behavior indirectly through their effects on alcohol consumption and the probability of self-control failure. Third, it generates a unified explanation for the empirical association between intoxication and violent crime that does not rely on changes in preferences or beliefs but on the increased difficulty of behavioral regulation.

Beyond its microeconomic implications, the model provides a natural interpretation of long-run historical trends in violent crime. Historical research has repeatedly emphasized that the secular decline in interpersonal violence since the early modern period was accompanied by a gradual internalization of behavioral restraints and an increasing cultural premium on self-discipline (Elias, 1978; Eisner, 2014; Pinker, 2011). In Elias's theory of the civilizing process, the expansion of state capacity and the growing interdependence of social life raised the costs of impulsive behavior and increased the rewards to foresight and self-control. Eisner (2014) documents that macro-level indicators of future orientation and self-regulation closely track the long-run fall in homicide rates, while Pinker (2011) interprets the historical decline in violence as the outcome of a civilizing process in which self-control became a central social norm.

The mechanism developed here provides a simple formal counterpart to these accounts. If the exercise of self-control becomes less costly or more strongly rewarded – for example through education, institutional development, or cultural change – the threshold for resisting impulsive behavior rises and the prevalence of violent crime declines. Conversely, environments that impair self-control, such as widespread intoxication or situations characterized by strong immediate rewards and weak long-term incentives, increase the frequency of regulatory failure. In this sense, the model links individual decision-making to the macro-historical evolution of violence through a common behavioral channel.

This interpretation also clarifies the role of alcohol in historical and contemporary crime patterns. Rather than viewing alcohol solely as a consumption good with external effects, the model treats it as a factor that alters the cost of behavioral regulation. Policies that affect alcohol prices or availability therefore influence crime not only through standard opportunity-cost mechanisms but also by changing the likelihood of self-control failure. At the same time, improvements in education and the effectiveness of deterrence reduce both the direct incentive to offend and the optimal level of alcohol consumption for forward-looking individuals, reinforcing the long-run decline in violent behavior.

Several extensions suggest themselves. The present model abstracts from addiction, peer effects, and dynamic learning about self-control, all of which may further amplify the interaction between substance use and criminal behavior. It also treats self-control as an individual-specific parameter, whereas recent work emphasizes that regulatory capacity is shaped by developmental and institutional environments. Incorporating these elements would allow the framework to address the intergenerational transmission of violence and the role of early-life conditions in shaping criminal behavior.

More broadly, the analysis illustrates how insights from criminology, psychology, and neuroscience can be integrated into a standard economic framework without abandoning tractability. By formalizing the process view of self-control, the model provides a bridge between the economics of crime and the general theory of crime and offers a unified perspective on the relationship between alcohol consumption, human capital, deterrence, and violent behavior.

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