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Time and Punishment: Delayed Consequences and Criminal Behavior

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This article develops two distinct explanations for the failure of potential consequences to influence behavior. Discounting is the tendency to deliberatively devalue the future. In contrast, poor impulse control refers to the failure to consider the future. The implications of this distinction were investigated with data from the National Longitudinal Survey of Adolescent Health. The study produced several findings. First, both forms of present-orientation independently predicted a range of problem outcomes among respondents. Second, high discounting was a better predictor of deliberative or future-related problem outcomes, whereas poor impulse control was a better predictor of urge driven behaviors or conduct involving little forethought. Third, only poor impulse control but not high discounting predicted violent offending among respondents. While both forms of present-orientation were associated with property offending, high discounting was a stronger and more consistent predictor. These three findings were far more evident for males than they were for females.

KEY WORDS: impulsivity; self-control; discounting; add health; adolescent health.

1. INTRODUCTION

Would be offenders experience positive and negative consequences from crime. The positive consequences include money and property, thrills, the satisfaction of urges for violence or illicit substances, and the alleviation of "strain." The potential adverse consequences include legal sanctions, guilt, and social stigma. Although the benefits from crime are typically immediate, the criminal justice system assures that many of the potential

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costs are delayed. Crimes occur, among other possible reasons, when the delayed costs do not motivate perpetrators to refrain.

This article investigates two distinct explanations for why deterrence fails. Under one perspective, individuals who are least deterred by the costs of crime highly "discount" future consequences. According to Wilson and Herrnstein (1985:50), "the rewards of crime usually precede the costs of crime... Because of this, time discounting becomes extremely important in explaining criminal behavior." Similarly, a large economics literature on crime concludes that individuals who devalue future consequences most are least deterred by delayed potential sanctions and, therefore, most prone to crime (Becker, 1968; Posner, 1973). Our prior research has shown the conceptual linkages between discounting and the deterrence concepts of sanction "celerity" and "severity" (Nagin and Pogarsky, 2001, 2003).

Under an alternative perspective, rather than discount future consequences, individuals with "poor impulse control" tend not to consider the consequences at all. Psychological research on executive cognitive dysfunction and need for cognition suggests individuals may be prone toward crime because of their failure to *recognize* inhibitory consequences (Seguin *et al*., 1999). Criminological research has found that visceral states, such as anger and sexual arousal, increase the likelihood of criminal and antisocial behavior. Rather than affect the perceived costs and benefits from offending, visceral influences seem to bypass rational processes entirely (Exum, 2002; Loewenstein, 1996; Loewenstein, *et al*., 1997).

The central thesis of this article is that discounting and poor impulse control are distinct explanations for the failure of potential consequences to influence behavior. We acknowledge that these are not the only explanations for a disjuncture between behavior and consequences. Further each of these explanations themselves can be disaggregated into more specific perspectives. The claim is simply that explicit distinction of these two viewpoints will promote greater conceptual clarity in theories of crime decision-making. Current research often adopts one perspective, and disregards the other or, alternatively, conflates the two perspectives.

This article first elaborates the distinction between discounting and poor impulse control. Thereafter, the study investigates the empirical implications of this distinction with data from the National Longitudinal Study of Adolescent Health, a nationally representative sample of adolescents who were in grades 7–12 at the onset of the study in 1995. Indices of discounting and poor impulse control are developed based on respondents' attitudes toward the future and tendency to act on impulse. The study then tests the relationship between these two measures and various attitudes and behaviors of respondents. The analyses suggest each construct independently predicts a range of problem outcomes for respondents. Moreover,

high discounting correlates most closely with problem outcomes that involve forethought and planning, whereas poor impulse control is the better predictor of problem outcomes involving little forethought.

2. TWO DISTINCT EXPLANATIONS FOR DISREGARDING FUTURE CONSEQUENCES

2.1. Discounting

As observed earlier, delayed consequences have little influence when individuals consciously devalue the future. This perspective is traceable to the discounted utility model of Samuelson (1937), and ensuing advancements in intertemporal choice in both economics (Fishburn and Rubinstein, 1982; Koopmans, 1960) and judgment and decision-making (Loewnestein and Prelec, 1991).

The discounting approach begins with the cost-benefit calculus of deterrence and rational choice theories,

$$U(\text{Benefits}) > p^* U(\text{Costs}). \tag{1}$$

This expression suggests that an actor will commit crimes for which the resultant utility, U(Benefits), outweighs the expected disutility, p^*U(Costs). The utility function permits the comparison of costs and benefits in comparable units.[4] The right side of the inequality is scaled downward by p, the probability of punishment for the contemplated crime.[5]

Our earlier work incorporated a discount factor into Eq. (1),

$$U(\text{Benefits}) > \delta^* p^* U(\text{Costs}), \tag{2}$$

where

$$\delta = \left[\frac{1}{1+r}\right]^t < 1, \qquad r > 0. \tag{3}$$

[4]For example, the benefits from stealing money are weighed against the costs of potentially going to jail.

[5]Equation (1) reflects several simplifying assumptions. First, the absence of a term, (1 − p), on the left side of the inequality represents a "non-forfeiture" assumption. In this version of the model, the actor obtains the same benefits from crime whether or not they are caught. Second, the model does not distinguish costs that result from apprehension by law enforcement authorities from costs such as "stigma from the act" (Williams and Hawkins, 1986), which do not depend on apprehension. For the purposes of this analysis these simplifying assumptions are not consequential.

The discount factor addresses the possibility that delay can diminish the perceived disutility of the costs from offending (Nagin and Pogarsky, 2001). Consider an obligation to pay a fine. The longer an individual can delay payment of the fine, the less onerous is the obligation. Under this reasoning, individuals often place less weight on delayed rather than immediate adverse outcomes.

Equation (3) shows that the degree of discounting depends on the length of delay and the individual's discount rate. This is because $[1/(1+r)]$ is raised to the power of t, the expected delay. If the value of this expression is less than 1, as it must be since $r>0$, then as t becomes larger, δ becomes smaller. Therefore, the present disutility of a potential cost from offending diminishes as its expected onset is delayed. This is, in the language of deterrence, a celerity effect.

The value of the discount factor also depends on r, the discount rate. The discount rate helps assign present magnitude to future consequences. As r increases, δ decreases. As an example, imagine hypothetical individuals A and B. Each is deciding whether to arrange for a designated driver before attending a party where they intend to consume alcohol. A is far more present-oriented than B; A's discount rate is 20% and B's is only 10%. Assume for simplicity that any punishment for drunk driving will be delayed one time period ($t=1$). In this example, A's discount factor is $\delta = 1/(1+0.20) = 0.83$, while B's is $\delta = 1/(1+0.10) = 0.91$. Therefore, A's higher discount rate yields a lower discount factor. The net result is that delayed punishments will have less present disutility for A than they will for B. As a result, A will be less prone to make the effort to find a designated driver and more likely to drive while intoxicated.

Although discounting best characterizes the approaches used in economics and judgment and decision-making research for analyzing choices with a time dimension, the perspective is found throughout crime scholarship. For example, Gottfredson and Hirschi (1990:89) define low self-control as, among many other things, a preference for immediate gratification with little interest in long-term pursuits. To reiterate, the crux of the discounting perspective is that future consequences have little influence for individuals who consciously devalue the future.

2.2. Poor Impulse Control

An alternative perspective is that individuals may fail to consider future consequences rather than consciously devalue them. The benefits from offending are typically the subject of an urge or goal — for example, to possess something or attack someone. The costs consist of reasons *not* to

pursue the desired objective. For example, the victim might suffer or the perpetrator might go to jail. The discounting perspective assumes individuals recognize and weigh the inhibitory information in deciding whether to pursue the contemplated activity. The premise of the poor impulse control perspective is that individuals differ in whether they meaningfully attend to inhibitory information at all. Several distinct lines of research illustrate the poor impulse control perspective.

In psychological parlance, the positive and negative consequences from offending comprise multiple levels of conflicting "behavioral cues," which often unfold quickly and require individuals to "think on their feet." Research on "executive cognitive functioning" shows that individuals differ in their capacity to process multiple levels of information, reason, problem solve, and modulate their behavior (Zelazo *et al.*, 1997). Once an urge toward crime or aggression arises, deficient executive functioning can impede the actor from meaningfully recognizing inhibitory information. The desired objective is pursued with "blinders" or "tunnel vision." Not surprisingly, low executive functioning is associated with aggressive and antisocial behavior (Giancola *et al.*, 1998; Seguin *et al.*, 1999).

Work by Seguin and colleagues (2002) illustrates the "attention narrowing" aspects of low executive functioning. These experiments investigated "response perseveration"—the tendency to persist in conduct despite increasing cues to desist. Perseveration is measured with a computerized Card Playing Task (CPT) developed by Siegel (1978) and Newman *et al.* (1987). On each turn, subjects press a button that displays a playing card. Picture cards result in a five-cent gain. Face cards result in a five-cent loss. After each turn, subjects decide whether to stop and receive their running total, or continue. The probability of winning decreases as the game progresses. Response perseveration is measured as the number of turns after the expected monetary outcome on each turn becomes negative. In essence, the task measures how long individuals persist once it becomes judicious to stop.

Seguin *et al.* (2002) reported several findings. First, 51% of subjects with no past physical aggression but only 25% of subjects who had committed prior aggression stopped when the expected payoff remained nonnegative. Second, reduced verbal working memory, a leading indicator of deficient executive functioning, was positively related to response perseveration. These results suggest low executive functioning reflected a lesser *capacity* to process inhibitory information; in turn, this diminished functioning led to more frequent crime and aggression.

Psychological research on "need for cognition" establishes that beyond the *capacity* for high level cognitive functioning, there are also "stable individual differences in people's tendency to engage in and enjoy effortful cognitive activity" (Cacioppo *et al.*, 1996:197). Individuals with

low need for cognition have been characterized as "cognitive misers" who derive little satisfaction from "effortful problem solving" (Taylor, 1981).[6]

A recent experiment illustrates the behavioral manifestations of low need for cognition (Nagin and Pogarsky, 2003). Cognitive patience was measured with the following question from Frederick (2003): "The total cost of a bat and a ball is $1.10. The bat costs 1 dollar more than the ball. How much does the ball cost?" Only 39% of respondents in a sample of university students gave the correct answer of $.05.[7] In the experiment, 34% of individuals who answered this question incorrectly cheated on a laboratory task in order to obtain extra money, compared to only 20% of respondents who answered the question correctly. Therefore, "cognitively impatient" individuals were more apt to violate the rules, despite several possible negative consequences.[8]

Research on emotions and visceral factors also suggests individuals commit crimes because they do not meaningfully recognize the consequences. Loewenstein (1996:274–275) explains how visceral factors, such as hunger, anger, and sexual arousal, have an "attention-narrowing" impact on decision-making. Visceral factors focus attention and motivation on "activities. . .associated with the visceral factor," and reorient one's outlook toward the present rather than the future and toward one's self rather than others. Because the adverse consequences from crime are distant and less directly related to the objective of the criminal conduct,[9] Loewenstein's theory suggests visceral arousal leads to crime by making individuals less attentive to the inhibitory consequences.

[6]In other words, though technically able, certain individuals may be disinclined to wade through available information to meaningfully appreciate the negative ramifications of their conduct. This relates to Tittle's (1980) notion of *reflectiveness*, in which individuals who more deeply and patiently contemplate the implications of their conduct should be less prone to crime.

[7]Importantly, 55% of respondents answered $.10. The question presents respondents with two pieces of information: the total cost of the items, and the difference in their prices. The modal response of $.10 confirms that the most salient prices satisfying the first criterion are $1.00 and $.10. Cognitively impatient individuals are likely to stop at this point, either forgetting or losing interest in the second criterion, that the bat costs $1.00 more than the ball. In contrast, cognitively patient individuals expend the additional mental effort necessary to adjust to the correct prices of $1.05 and $.05.

[8]There were the formal consequences of potentially forfeiting their payment and the less formal consequences of being caught cheating in a room full of other participants.

[9]Punishments for crimes tend to be generic (fine or jail), while the benefits relate directly to the nature of the criminal activity. Thieves want money, but risk imprisonment. Attackers satisfy urges for physical and or sexual aggression but, again, risk imprisonment. Loewenstein's theory implies that tailoring punishments more closely to specific infractions could enhance their deterrent potential for viscerally aroused individuals.

Several criminological studies have investigated the impact of visceral factors on antisocial behavior. Exum (2002) tested the effect of anger on respondents' projections of the likelihood they would commit physical aggression. Loewenstein *et al.* (1997) measured the effects of sexual arousal on respondents' projections of the likelihood they would be sexually forceful in a hypothetical scenario. In both studies, viscerally aroused subjects reported they would be more likely to commit the hypothesized offense than did their unaroused counterparts.

Both studies also investigated whether emotional arousals affect rational choice considerations. All respondents estimated the costs and benefits to them from committing the hypothesized crime. Loewenstein *et al.* (1997) asked respondents to estimate how much fun it would be to have sex in the hypothetical scenario. Respondents also estimated the certainty and severity of various potential negative consequences from offending. Exum (2002) administered similar cost-benefit items. Both studies found little evidence that visceral arousal affects behavior by altering the perceived costs and/or benefits from offending. Instead, visceral arousals caused deliberative processes to "break down."

2.3. Summary of Theoretical Contentions

This study seeks to improve the clarity of theories of crime decision-making that emphasize the role of a failure to account for future consequences on criminal behavior. The discounting and poor impulse control perspectives provide a framework for sorting such theories along two distinct lines. We make no claim that either perspective is incapable of further disaggregation—only that the framework effectively groups existing perspectives and helps structure the ensuing empirical analyses. These analyses will test the breadth of the attitudes and behaviors associated with each decision-making tendency. Moreover, the study tests whether the two constructs predict distinct sets of outcomes. In particular, we test whether high discounting is disproportionately associated with deliberative or future-related problem outcomes and, in contrast, whether poor impulse control better predicts problem outcomes that are spontaneous and involve little forethought.

3. METHODS

3.1. Data

This study uses data from the National Longitudinal Study of Adolescent Health ("Add Health") to test the implications of the preceding

discussion. Add health is a school-based, multi-wave, panel study of the health related behaviors of adolescents between grades 7 and 12 at the onset of the study. Data are used from the wave 1 interviews conducted between April and December of 1995, and from the wave 2 interviews between April and August of 1996. During in-home interviews, information was obtained on a range of topics, including health status, decision-making, family composition and dynamics, educational aspirations and expectations, employment experience, sexual partnerships, substance use, and criminal activities.

The initial sampling frame for the Add Health study included all high schools in the U.S. with an 11th grade and at least 30 students. From this population, 80 high schools were randomly selected. For each high school, a feeder school—a "middle" school that enrolled its graduates in the high school—was also included.[10] After stratifying eligible students by grade and sex, 12,105 students were chosen from 119,232 enrolled in these schools. The present analyses include data from 6,504 of these 12,105 adolescents that were randomly designated to be available for public use.[11,12]

3.2. Measures

The analyses use three types of measures: (1) respondents' self-reported criminal behavior between waves 1 and 2, (2) various noncriminal behaviors and attitudes of respondents' measured at waves 1 and 2, and (3) attitudinal questions at wave 1 that measure poor impulse control and high discounting. Table I summarizes all measures.

3.2.1. Criminal Behaviors Between Waves 1 and 2

Respondents reported the number of times they committed six different crimes during the year preceding the wave 2 interview: shoplifting, car theft, burglary, threatening someone with a weapon, causing a public disturbance, and participating in a group fight. There were four response options per

[10]Several high schools included grades 7–12 and were therefore their own "feeder" school.

[11]All later analyses use corrective sample weights and robust variance estimation to adjust for the stratified sampling procedures and the potential clustering of observations within geographic units.

[12]Later analyses are based on a subset of these 6,504 respondents. The largest source of missing data is the exclusion of sexually inexperienced subjects. This is an invariable consequence of basing the poor impulse control scale on questions requiring some familiarity with sexual issues.

Table I. Description of Variables Used in the Study

Criminal Behaviors at Wave 2[a]	
Shoplifting	In the past 12 months, how often did you take something from a store without paying for it?
Car Theft	In the past 12 months, how often did you drive a car without the owner's permission?
Burglary	In the past 12 months, how often did you go into a house or building to steal something?
Threaten	In the past 12 months, how often did you use or threaten to use a weapon to get something from someone?
Public Disturbance	In the past 12 months, how often did you act loud, rowdy, or unruly in a public place?
Group Fight	In the past 12 months, how often participate in a fight where a group of your friends was agasint another group?
Attitudes and Non-Criminal Behaviors at Wave 1	
Pregnancy	Getting (if male, "someone") pregnant at this time in your life is one of the worst things that could happen to you. 1 = strongly agree, 2 = agree, 3 = neither agree or disagree, 4 = disagree, 5 = strongly disagree
College	On a scale from 1 (lowest) to 5 (highest), how much do you want to go to college?
Sweets	Think about all the food you ate yesterday, including meals and snacks at home, at school, at restaurants, and anywhere else. How often did you eat cookies, doughnuts, pie, or cake yesterday? 0 = did not eat, 1 = ate once, 2 = ate twice or more
Exercise	During the past week, how many times did you do exercise such as jogging, walking, karate, jumping rope, gymnastics, or dancing? 0 = not at all, 1 = 1 or 2 times, 2 = 3 or 4 times, 4 = 5 or more times
Drink and Drive	During the past month, how often did you drink alcohol and drive? 0 = never, 1 = 1 time, 2 = 2 or 3 times, 3 = 4 or 5 times, 4 = 6 or more times
Expelled From School	Have you ever been expelled from school? 0 = no, 1 = yes
Suffer if HIV Positive	If you got the AIDS virus, you would suffer a great deal. 1 = strongly agree, 2 = agree, 3 = neither agree or disagree, 4 = disagree, 5 = strongly disagree
Work for Pay	In the last 4 weeks, did you work for pay for anyone outside your home? 0 = no, 1 = yes
Regret Action[b]	Over the past 12 months, how often have you done something you later regretted because you had drinking? 0 = never, 1 = once, 2 = twice, 3 = 3 to 4 times, 4 = 5 or more times

Table I. Continued

Present Orientation Indices (Wave 1)	
Poor Impulse Control	
Birth Control	If you wanted to use birth control, how sure are you that you could stop yourself and use birth control once you were highly aroused or turned on? 1 = very sure, 2 = moderately sure, 3 = neither sure or unsure, 4 = moderately unsure, 5 = very unsure
Gut Feeling	When making decisions, you usually go with your gut feeling without thinking too much about the consequences of each alternative. 1 = strongly agree, 2 = agree, 3 = neither agree or disagree, 4 = disagree, 5 = strongly disagree
High Discounting	
Live to Age 35	What do you think are the chances that you will live to age 35? 1 = almost no chance, 2 = some chance, but probably not, 3 = a 50-50 chance, 4 = a good chance, 5 = almost certain
Hopeful About Future	How often during the past week did you feel hopeful about the future? 1 = never or rarely, 2 = sometimes, 3 = a lot of the time, 4 = most or all of the time

Notes: [a]Criminal behaviors were measured as follows: 0 = never, 1 = 1 or 2 times, 2 = 3 or 4 times, 3 = 5 or more times.
[b]This variable was measured at wave 2.

question: never, 1 or 2 times, 3 or 4 times, or 5 or more times. The distribution of offending frequency across respondents was skewed (sometimes highly) to the right. The percentage of respondents who answered "never" was at least 90% for threatening with a weapon, burglary, and stealing a car. The distribution of responses for creating a public disturbance was least skewed. However, the proportion that answered "never" was still substantial, 60%.

3.2.2. Other Attitudes and Non-Criminal Behaviors

Analyses also test the relationship of present-orientation to non-criminal behaviors and attitudes, predominantly measured at wave 1.[13] For example, the analyses test whether poor impulse control and high discounting predict how strongly respondents wished to attend college or whether they worked for pay outside the home. These behaviors were selected to examine how broad a range of behaviors and attitudes are related to high discounting and poor impulse control.

3.3.3. Measures of Present-Orientation

The poor impulse control index consisted of two questions reflecting the tendency to act without considering the consequences. The first was "if you wanted to use birth control, how sure are you that you could stop yourself and use birth control once you were highly aroused or turned on?" There were five response options ranging from "very sure" to "very unsure." The second was "when making decisions, you usually go with your 'gut feeling' without thinking too much about the consequences of each alternative." This question also had five response options ranging from "strongly agree" to "strongly disagree." Responses to the second question were reverse-coded and added to the first question to create an index of poor impulse control, in which higher values indicated poorer impulse control.

[13]The wave 1 measures for these outcomes were used to maximize the temporal proximity between outcome and explanatory variables. Wave 1 attitudinal outcomes were measured at the same time as the attitudinal questions comprising the present-orientation indices. Most wave 1 behavioral outcomes were measured over a brief previous time span. For example, respondents were asked about exercise in the past week, eating sweets yesterday, and work over the past 4 weeks. The wave 1 versions afforded closer temporal proximity to the measures of present-orientation than did the wave 2 versions. Moreover, even though these non-criminal behaviors may have technically preceded the measurement of present-orientation, evidence for the temporal stability of impulsivity, for example, suggests this is not problematic (Costa *et al.*, 2000; Lynam and Miller, 2004). The only exception was the question that queried how often, *in the last 12 months*, respondents did something they later regretted because they had been drinking. For this question, wave 2 measures were used.

The high discounting index consisted of two questions reflecting the importance respondents' placed on the future when making decisions. For the first question, respondents selected one of five response options (from "almost no chance" to "almost certain") to estimate the chances they would live to age 35. Our rationale for including this question was that respondents who expressed less certainty of their living to 35 would have less reason to value future consequences simply because they would not be alive to experience them. The second question asked respondents to select from among four choices (from "never or rarely" to "most or all of the time" that indicated how often during the past week they "felt hopeful about the future." It is our expectation that the less hopeful someone feels about the future, the less weight they should place on future consequences when making decisions. Responses to both questions were reverse-coded and summed to create an index, on which higher values indicated greater "future discounting."

3.3. Analytical Strategy

The empirical investigation is reported in three parts. Part 1 is a brief descriptive analysis of the poor impulse control and high discounting measures. Part 2 is a series of regressions testing the relationship of the two present-orientation measures to various attitudes and non-criminal behaviors of respondents. This stage of the analysis was designed to explore the breadth of behaviors and attitudes associated with the two conceptions of present-orientation. These analyses also investigated whether the two present-orientation measures differentially predicted certain types of outcomes, and whether the pattern of such differences was consistent with the earlier theoretical discussion. Part 3 reports tests of whether poor impulse control and high discounting independently predict involvement in the six criminal behaviors previously listed.

4. RESULTS

4.1. General Descriptive Analyses of Present Orientation Measures

Figure 1 compares the distribution of scores on the high discounting and poor impulse control indices.[14] Each distribution is clustered around lower values and skewed to the right. The mean and median discounting

[14]Recall that discounting scores range from 2 to 9, whereas impulse control scores range from 2 to 10.

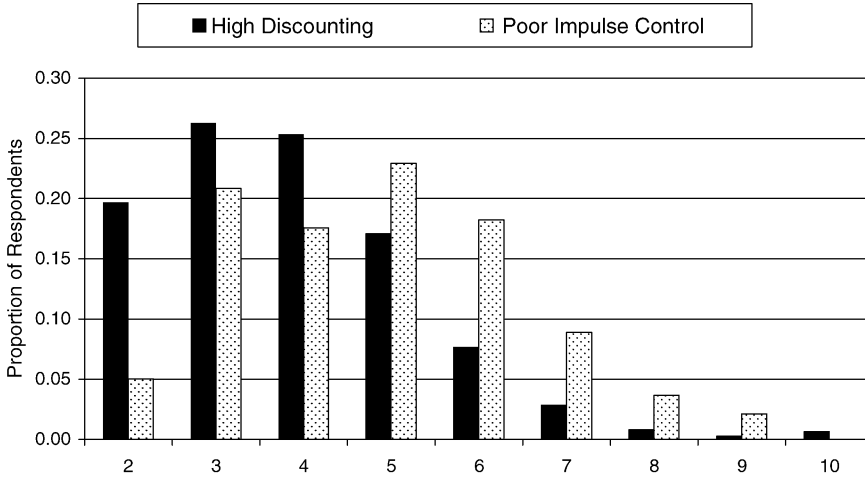

Fig. 1. Distributions of Discounting and Impulse Control measures.

scores are 4 and 3.8, respectively. The mean and median impulse control scores are 5 and 4.8, respectively. Generally, the shapes of these distributions are consistent with having identified traits correlated with criminal and antisocial behavior; the rightward skew of the distributions in Figure 1 resembles that of the population-wide distribution of involvement in crime.

Discounting and impulse control were moderately correlated ($r = 0.21$), which is not inconsistent with the earlier theoretical discussion. Some correlation is expected because both constructs are hypothesized to predict a range of problem behaviors. However, since the pathways through which these distinct decision styles lead to problem outcomes differ, the correlation is not expected to be too strong.

The comparison of discounting and impulse control scores between males and females is also instructive. Males scored higher on both scales. The mean discounting score was 5.04 for males and 4.65 for females ($p < 0.01$). The mean impulse control score was 3.87 for males and 3.72 for females ($p < 0.01$). These gender differences are also consistent with having identified traits associated with criminal and antisocial involvement, since males offend at far higher rates than do females.[15]

The ensuing multivariate analyses are disaggregated by gender. Beyond the differential levels of present-orientation and problem behaviors between

[15]Although males have higher mean levels of discounting and poor impulse control than females, there was about equivalent variation on both indices across genders. The standard deviation for the high discounting measure was 1.43 for males and 1.34 for females. Moreover, the standard deviations of poor impulse control scores were virtually identical for males and females (1.66 and 1.68, respectively).

males and females reported above, prior research suggests there are gender differences in the decision processes leading to crime. For example, developmental research has found that family stressors like marital violence (Jouriles *et al*., 1987), marital discord (Capaldi and Patterson, 1991; Earls and Jung, 1987), family transitions (Bolger *et al*., 1995), divorce (Hetherington *et al*., 1982), and being born to a young mother (Pogarsky *et al*., 2003) all heighten the risk for antisocial behavior somewhat more for boys than for girls. Moreover, deterrence research has shown that males believe the certainty of punishment for criminal conduct is lower than do their female counterparts (Grasmick *et al*., 1993).

4.2. The Correlation of the Present-Orientation Indices with Other Attitudes and Non-Criminal Behaviors of Respondents

This section has two objectives. The first is to test the breadth of outcomes that are related to present-orientation. The second is to test whether one form of present-orientation was more closely associated with certain types of outcomes than the other, and whether any such differences coincide with the earlier theoretical discussion.

Table II reports regressions relating each present-orientation index to various attitudes and non-criminal behaviors of respondents. Ordered Probit regressions are estimated for ordered categorical outcomes and Logit regressions are estimated for dichotomous outcomes. Values for the present-orientation indices were standardized to permit the direct comparison of regression coefficients within models. Beyond poor impulse control and high discounting, each model also controlled for the age and ethnicity of respondents. A model improvement χ^2 statistic is reported for each model that tests whether including the present-orientation measures in the model explains significantly greater variation in the corresponding outcome. Finally, the reporting of regression coefficients reflects two distinct statistical tests. First, regression coefficients that were statistically distinguishable from zero at $p < 0.05$ and $p < 0.01$ are identified. Second, coefficients that differ statistically from the counterpart present-orientation coefficient in the same model at $\alpha = 0.05$ are in bold. For example, among females the ordered probit regression coefficient for high discounting relative to college (−0.28) was both statistically distinguishable from zero *and* statistically larger in absolute magnitude than the coefficient for poor impulse control in the same regression.

The present-orientation indices were associated with a range of problem outcomes for males. Both poor impulse control and high discounting are associated with the willingness to get someone pregnant, less desire to attend college, and a lack of exercise.

Table II. The Relationship Between Each Present-Orientation Index and Several Attitudes and Non-Criminal Behaviors of Respondents

	Poor impulse control	High discounting	Model improvement χ^2	*n*
Males:				
Ordered probit regressions				
Pregnancy	.08 (.03)**	.14 (.03)**	47.34**	2064
College	−.10 (.03)**	**−.26 (.03)****	127.66**	2063
Sweets	**.11 (.03)****	−.06 (.04)	20.72**	2065
Exercise	−.07 (.03)**	−.07 (.03)**	19.46**	2065
Drinking and driving	.09 (.05)*	.03 (.05)	5.50	2063
Suffer if HIV positive	−.03 (.03)	**.10 (.03)****	14.00**	2065
Regret action	**.19 (.05)****	.04 (.05)	19.36**	736
Logit Regressions				
Expelled from school	.13 (.11)	.21 (.10)*	10.98**	2061
Work for pay	.03 (.07)	−.13 (.07)*	8.96**	1395
Females:				
Ordered probit regressions				
Pregnancy	.10 (.03)**	.14 (.03)**	48.18**	2078
College	−.15 (.03)**	**−.28 (.03)****	131.48**	2080
Sweets	−.01 (.03)	−.04 (.03)	2.12	2080
Exercise	−.03 (.03)	**−.12 (.03)**	27.64**	2080
Drinking and driving	.10 (.07)	.01 (.07)	4.00	2080
Suffer if HIV positive	.08 (.03)*	.09 (.03)**	21.26**	2078
Regret action	.16 (.06)**	.07 (.05)	13.02**	706
Logit regressions				
Expelled from school	.37 (.15)**	.19 (.20)	11.3**	2076
Work for pay	−.04 (.06)	−.08 (.07)	4.76	1415

Notes: (1) Entries corresponding to poor impulse control and high discounting report regression coefficients with standard errors in parentheses; (2) All models include a constant and controls for the age and ethnicity of respondents; (3) The model improvement χ^2statistic is -2(Log Likelihood$_{\text{restricted model}}$ - Log Likelihood$_{\text{full model}}$), where the restricted model excludes the two present-orientation indices. For each model χ^2 test, there are 2 degrees of freedom, since the full model estimates 2 more parameters than does the restricted model; (4) * indicates $p < 0.05$, and ** indicates $p < 0.01$; (5) Coefficients in bold exceed the coefficient for their counterpart present-orientation index based on a coefficient comparison test at $p < 0.05$.

Moreover, high discounting is a better predictor than poor impulse control of outcomes that have a deliberative component and/or involve the respondent's future. A coefficient comparison test shows that high discounting was more strongly associated with two important future outcomes: desire to attend college, and how much they would suffer if they became HIV positive. Further, high discounting but not poor impulse control was associated with the failure of male respondents to work for pay outside the home.

In contrast, poor impulse control was a better predictor of "urge-driven" behaviors and/or conduct involving little or no contemplation. Poor

impulse control but not high discounting predicted the propensity of male respondents to eat sweets and to drink and drive. Poor impulse control was also the better predictor of male respondents' involvement in conduct they later regretted because they were intoxicated.

For females, the present-orientation indices also predicted several (though fewer) problem outcomes. Poor impulse control and high discounting were positively related to female respondents' willingness to become pregnant and their lack of desire to attend college. Moreover, high discounting was a better predictor of whether female students wished to attend college. In contrast, poor impulse control but not high discounting predicted female respondents' involvement in conduct they later regretted because they were intoxicated.

These analyses suggest that poor impulse control and high discounting tended to predict distinct subsets of problem behaviors and attitudes of respondents. High discounting more closely predicts problem outcomes with a deliberative or future component, whereas poor impulse control better predicts urge driven behaviors or conduct involving little forethought. The final analyses test the relationship of these two measures to several criminal behaviors.

4.3. The Correspondence of Poor Impulse Control and High Discounting with the Criminal Behavior of Respondents

Table III reports ordered probit regressions that related the two present-orientation indices to the number of times respondents committed one of six different offenses between waves 1 and 2.[16] As before, the sample is disaggregated by gender. Aside from the dependent variables, the model specifications are identical to those in Table II; the explanatory variables include the standardized present-orientation scores, and controls for age and ethnicity.

There is a distinct pattern in the regression results for male respondents. Poor impulse control but not high discounting predicted involvement in the three violent offenses, threatening with a weapon, creating a public disturbance, and participating in a group fight. Although both forms of present-orientation to some degree predicted the commission of property crime,[17] the predictive capacity of high discounting is stronger. This is evident for two reasons. First, for car theft, the coefficient for discounting was 78%

[16]The response options for each question were: never, 1–2 times, 3–4 times, 5 or times.

[17]The coefficient for poor impulse control for car theft among males was marginally significant at $p < 0.10$.

Table III. Ordered Probit Regressions of Involvement in Criminal Behavior Between Waves 1 and 2 Against the Present Orientation Indices

	Poor impulse control	High discounting	Model improvement χ^2	*n*
Males:				
Shoplifting	.17 (.04)**	.16 (.04)**	43.52**	1386
Car Theft	.09 (.05)	.16 (.05)**	21.72**	1388
Burglary	.04 (.06)	.19 (.06)**	14.5**	1388
Threaten	.12 (.06)*	.06 (.07)	6.30*	1387
Public Disturbance	.07 (.04)*	.00 (.04)	4.58	1389
Group Fight	.14 (.04)**	.06 (.04)	20.72**	1388
Females:				
Shoplifting	.06 (.04)	.11 (.04)*	10.20**	1410
Car Theft	.12 (.06)*	.13 (.06)*	14.62**	1413
Burglary	−.07 (.10)	−.01 (.11)	.72	1413
Threaten	.07 (.10)	.09 (.10)	2.14	1412
Public Disturbance	.03 (.04)	.09 (.04)*	8.20*	1412
Group Fight	.01 (.05)	.08 (.06)	8.50*	1413

Notes: (1) Entries corresponding to poor impulse control and high discounting report regression coefficients with standard errors in parentheses; (2) All models include a constant and controls for the age and ethnicity of respondents; (3) The model improvement χ^2 statistic is $-2(\text{Log Likelihood}_{\text{restricted model}} - \text{Log Likelihood}_{\text{full model}})$, where the restricted model excludes the two present-orientation indices. For each model χ^2 test, there are 2 degrees of freedom, since the full model estimates 2 more parameters than does the restricted model; (4) * indicates $p < 0.05$, and ** indicates $p < 0.01$; (5) Coefficients in bold exceed the coefficient for their counterpart present-orientation index based on a coefficient comparison test at $p < 0.05$.

higher than that for poor impulse control.[18] Moreover, whereas high discounting strongly predicted involvement in all three property offenses, poor impulse control only predicted involvement in shoplifting at $p < 0.05$.

For females, the present-orientation indices predicted involvement in *some* criminal behavior. All four significant regression coefficients had a sign that accords with the earlier theoretical discussion. In sum, three discounting coefficients and one poor impulse control coefficient were statistically distinguishable from 0. However, in contrast to the regressions for males, there was no discernible pattern in the types of offenses each form of present-orientation was most associated with. These findings may be attributable to the fact that there was far less variation in offending (particular for violent offenses) among females. Ultimately, however, it is impossible to determine whether the null findings for females resulted primarily from low statistical power, or whether true gender differences exist in the capacity for present-orientation to influence behavior.

[18]We note, however, that the coefficient comparison test is not significant at conventional confidence levels ($p < 0.14$).

5. CONCLUSION

This study has developed two distinct explanations for the failure of delayed consequences to influence behavior. Discounting is the tendency to deliberatively devalue the future. In contrast, poor impulse control refers to the failure to consider the future. Empirical investigation of this framework using data from the National Longitudinal Survey of Adolescent Health produced several findings.

First, both forms of present-orientation independently predicted a range of problem outcomes among respondents. Second, high discounting was a better predictor of deliberative or future-oriented problem outcomes, whereas poor impulse control was a better predictor of urge driven behaviors or conduct involving little forethought. Third, only poor impulse control but not high discounting predicted violent offending among respondents. While both forms of present-orientation were associated with property offending, high discounting was a stronger and more consistent predictor. These three findings were far more evident for males than for females.

In distinguishing the discounting and poor impulse control perspectives, this study has sought to lend clarity to theoretical treatments of how the consideration of consequences affects behavior. Prior treatments of this issue have been both incomplete and imprecise. They have been incomplete at least partly because scientific explanations are invariably bound by the philosophies and assumptions of the disciplines they arise from. For example, economics and psychology each have long traditions of research on human decision-making. Economic theories assume individuals freely pursue their self-interests. Therefore, the economic view of the influence of consequences on behavior focuses on processes of conscious deliberation. Psychological theories of decision making relative to antisocial behavior typically leave room for non-deliberative action. Indeed according to Hirschi (1986:111), pyschologically-based theories assume ''people are naturally social and must therefore be propelled into antisocial behavior by forces over which they have no control.'' While in our view this generalization is overly broad, it is the case that psychological explanations for criminal behavior commonly emphasize deficits or pathologies that supplant intrinsic prosocial tendencies. The present findings support the promise of an interdisciplinary model that integrates the economic, psychological, and other perspectives on crime decision-making.

Prior theorizing on consequences and behavior has also been imprecise. For example, low self-control is defined as *both* high discounting *and* poor impulse control, in addition to many other things (Gottfredson and Hirschi, 1990:89). The inordinate breadth of the key explanatory construct

in self-control theory virtually assures empirical confirmation of its central contention that low self-control should predict a wide range of problem outcomes. For this reason, some scholars consider the theory a tautology (Akers, 1991; Meier, 1995). Psychological research on impulsivity also suffers from conceptual imprecision. One recent study measured impulsivity by asking subjects to report their level of agreement with a series of statements, one being "You might say I act impulsively" (Scott, *et al.*, 1999:530).

Related to imprecision is the notion that key explanatory constructs might be multidimensional. There is evidence that this is true of both low self-control (Arneklev *et al.*, 1993; Longshore *et al.*, 1996) and impulsivity (Whiteside and Lynam, 2001). Indeed we too find little evidence that most problem behaviors stem from a single decision-making tendency. Instead, the present findings are consistent with recent work by Rebellon and Waldman (2003) finding that multidimensional models explain far more variation in problematic behaviors than does an omnibus approach. After investigating the factor structure of various forms of deviancy, Rebellon and Waldman (2003) concluded that acts of "force and fraud" reflect overlapping but conceptually distinct behavioral tendencies. The present findings provide further insight into this distinction. The present findings suggest acts of force may result more from the failure to consider future consequences. In contrast, acts of fraud are to some degree associated with both decision-making tendencies, although in the present study the association with discounting was stronger.

Recognizing that distinct decision-making processes may underlie different forms of deviancy and aggression has important implications for public policy. Such distinctions counsel against a "one size fits all" approach in favor of interventions tailored to specific deviant and antisocial behaviors. The present findings suggest policies to curb acquisitive crimes (e.g., property offending) should emphasize individuals' standing in society and prospects for the future. In contrast, interventions that reduce substance abuse, teach anger management, and improve cognitive decision styles may be best suited to address "attention narrowing" tendencies that may underlie violence. Certainly further and more detailed investigation is warranted before any such recommendations are enacted.

Several qualifications about this research are important. First, the data are from a sample of adolescents with light to moderate criminal involvement. Further research should test whether these patterns are robust in samples with larger proportions of serious offenders. Second, this study used a new strategy for measuring high discounting and poor impulse control. Although the findings suggest these constructs were operationalized as intended, further work must confirm that the substantive

findings were not artifacts of measurement. Finally, we do not claim that the distinct constructs identified in this study cannot be further disaggregated. There may be distinct explanations for the failure to consider future consequences that warrant separate recognition. One possible explanation, emerging from the psychological emphasis on dysfunction, holds that individuals differ in their capability to recognize inhibitory information. However, a distinct view emerges from Loewenstein's (1996:273) depiction of addicts and phobics who are fully aware their conduct is self-destructive or irrational, but are simply unable to behave consistently with this recognition.

This suggests further theoretical advances are necessary in understanding the relationship of consequences to behavior. We hope these further efforts forego vague and overly broad theoretical constructs in favor of an interdisciplinary approach characterized by improved conceptual clarity.

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