

# Vividness of the Future Self Predicts Delinquency

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## Abstract

The tendency to live in the here and now, and the failure to think through the delayed consequences of behavior, is one of the strongest individual-level correlates of delinquency. We tested the hypothesis that this correlation results from a limited ability to imagine one's self in the future, which leads to opting for immediate gratification. Strengthening the vividness of the future self should therefore reduce involvement in delinquency. We tested and found support for this hypothesis in two studies. In Study 1, compared with participants in a control condition, those who wrote a letter to their future self were less inclined to make delinquent choices. In Study 2, participants who interacted with a realistic digital version of their future, age-progressed self in a virtual environment were less likely than control participants to cheat on a subsequent task.

## Keywords

future self, delinquency, virtual reality, temporal discounting, self-defeating behavior, decision making

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A defining characteristic of delinquent acts is not their illegality per se, but the fact that they offer immediate rewards, such as cash, sexual gratification, or excitement, but have more remote costs (Hirschi, 2004). Unsurprisingly, one of the most established findings in crime research is that delinquents tend to focus on short-term gains while failing to adequately think through the longer-term consequences of their behavior (Gottfredson & Hirschi, 1990; Pratt & Cullen, 2000).

This individual disposition to live in the here and now is a key ingredient of several established theories and explanations of crime. Wilson and Herrnstein (1985), for example, noted that “the extent to which people take into account distant possibilities . . . will affect whether they choose crime or noncrime” (pp. 44–45). In a similar vein, Gottfredson and Hirschi (1990) argued that people with a here-and-now orientation tend to respond to tangible stimuli in their environment and are unable to defer gratification, which leads them to engage in crime. Nagin and Pogarsky (2003) linked the tendency to live in the present to individuals' discount rates; future-oriented

individuals are more deterred by the delayed costs of their behavior compared with their present-oriented counterparts, who overly discount temporally remote consequences. Moffitt (1993) argued that impulsivity can lead to delinquency through its interference with the ability to think through the future consequences of one's actions.

What these different perspectives have in common is that each of them posits that delinquent choices are the result of a limited ability to make informed trade-offs between immediate benefits and long-term costs of behavior. Although research has consistently found the tendency to live in the here and now to be related to delinquent involvement, less is known about the cognitive mechanisms responsible for this association. In this

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article, we examine the possibility that delinquent tendencies result in part from the way individuals think of their future selves. More specifically, we hypothesize that delinquent behavior, and the present-oriented mind-set that often accompanies it, results from a limited ability to imagine one's self in the future.

Recent research shows that people think about their current selves and their future selves as if they are different people (Pronin & Ross, 2006; Wakslak, Nussbaum, Liberman, & Trope, 2008). *Multiple-self models* assume that instead of being unitary, individuals consist of a succession of temporally distinct and overlapping selves (Bartels & Rips, 2010; Frederick, 2003; Hershfield, Cohen, & Thompson, 2012; Parfit, 1986; Strotz, 1956). The connectedness or overlap between selves naturally diminishes as a function of time, and hence people identify less with a very distant future self, such as their 20-years-old self, than with a temporally closer one, such as their 3-months-old self (Frederick, Loewenstein, & O'Donoghue, 2002; Hershfield, 2011). The psychological link between successive selves and decision making can, for example, explain people's preferences for smaller, immediate rewards over larger, delayed ones (Bartels & Rips, 2010; Bartels & Urminsky, 2011; Ersner-Hershfield, Garton, Ballard, Samanez-Larkin, & Knutson, 2009).

The vividness or concreteness of the image of the future self is likely to be a determining variable in the context of intertemporal choice (Hershfield, 2011). Parfit (1986), for example, noted that "when we imagine pains in the further future, we imagine them less vividly, or believe confusedly that they will somehow be less real, or less painful" (p. 161). In a similar vein, Loewenstein (1996) hypothesized that a more vivid mental impression of a future action or self might intensify the emotions that are linked to thinking about that scenario. This might then allow the individual to be better informed regarding the future consequences of a decision made in the here and now. For example, a victim who is portrayed in vivid terms is more likely to elicit a sense of connection and sympathy, and subsequent charity, than one who is not (Small & Loewenstein, 2003).

Because delinquency tends to be characterized by immediate benefits, which accrue to the present self, and by costs (e.g., a criminal record, loss of one's job, difficulties on the labor market, social exclusion) that come at the expense of a more distant and harder-to-imagine future self, the temptation to engage in delinquent behavior can be hard to resist. However, if the future self is more vividly imagined—that is, pictured more easily in one's mind—costs will receive greater weight in decisions to commit a delinquent act or to abstain from crime. The degree to which an individual is able to imagine him- or herself in the future can therefore be expected to correlate with the degree to which he or she will engage

in crime. Increasing the vividness of the future self should motivate individuals to act in a more future-oriented way and should therefore reduce delinquent involvement.

We tested this hypothesis in two studies. In Study 1, we manipulated vividness by having participants write a letter to their future selves and subsequently presented participants with a series of scenarios that allowed for making a delinquent choice. In Study 2, vividness of the future self was manipulated using immersive virtual reality technology. Specifically, participants were confronted with a realistic version of either their present or their older self while looking into a virtual mirror (see Hershfield et al., 2011). We then measured actual rates of delinquent behavior using a quiz that gave participants an opportunity and incentive to cheat.

## Study 1

In this study, we examined whether vividness of the future self can be experimentally induced using a writing task. Previous research has shown that writing is an effective way to improve the psychological connectedness between multiple selves (Oyserman & Saltz, 1993; Pronin & Ross, 2006). Following the writing task, participants were presented with a series of scenarios to measure their tendency to make delinquent choices.

## Method

A total of 114 young adults participated in exchange for \$0.30. Participants were between the ages of 20 and 25 (mean age = 22.80) and were recruited from the Mechanical Turk subject pool.<sup>1</sup> Three participants were excluded for failing to complete the letter-writing task that served as our manipulation.

For the letter-writing task, participants read a cover story indicating that the research was about how people see themselves in the future. In the distant-self condition, participants were asked to take 5 min to write a 200- to 300-word letter to their future self in 20 years' time. In the near-self condition, participants were asked to write a letter to themselves 3 months into the future. The instructions read: "Think about who you will be 20 years from now [3 months from now], and write about the person you are now, which topics are important and dear to you, and how you see your life."

The letter-writing task was followed by a questionnaire containing five brief delinquent-choice scenarios created for the purposes of this study. The scenarios were introduced as dilemmas. For example, the scenario about buying stolen goods read,

*Imagine the following:* You need a new computer but you are short on cash. A fellow student tells you

about an acquaintance of his who sells laptops that 'fell off a truck.' The laptops meet your requirements and are very attractively priced. How likely is it that you would buy one of these potentially stolen laptops?

The other scenarios concerned theft, insurance fraud, and illegal downloading. Answers were given on 7-point Likert scales (from *very unlikely* to *very likely*). Participants' responses to the five dilemmas were averaged to form a delinquent-choice scale ( $\alpha = .69$ ;  $M = 4.00$ ,  $SD = 1.36$ ). Higher scores on this scale reflect a tendency to make more delinquent choices.

## Results and discussion

On average, participants used a total of 151 words ( $SD = 73$ ) in their letters. There was no difference between the experimental groups in the number of words used,  $t(109) = 1.09$ , n.s. However, as predicted, participants in the distant-self condition scored significantly lower on the delinquent-choice scale ( $M = 3.71$ ,  $SD = 1.45$ ) than did participants in the near-self condition ( $M = 4.23$ ,  $SD = 1.24$ ),  $t(109) = 2.01$ ,  $p = .05$ ,  $d = 0.39$ . Furthermore, for each of the five scenarios, participants in the distant-self condition reported a lower likelihood of choosing the delinquent option, although the difference was not always significant (see Table 1).

These results show that having individuals contemplate their selves in the future can influence their tendency to make delinquent choices. Note that the use of a 3-month period in the near-self condition rules out the possibility that differences in the dependent variable between the two conditions were simply due to differential consideration of the (more direct) consequences of the behaviors in the scenarios. It should be possible for these consequences of a criminal choice, such as detection or arrest, to materialize during a 3-month period.

Therefore, participants' merely thinking about the consequences of their acts or contemplation of the future in general cannot easily account for the results, as both the near-self and the distant-self groups were encouraged to "think ahead" in this study. However, although this study supported our predictions, it relied on a self-report measure and lacked a behavioral indicator. In Study 2, we employed a behavioral measure and used a novel technique to induce vivid perceptions of the future self.

## Study 2

In this study, we capitalized on a novel technology, immersive virtual reality (IVR), to create an interaction between each participant's present self and future self. That is, instead of merely asking participants to imagine older versions of themselves, we had them interact with highly realistic age-progressed versions of their future selves in a virtual environment (Hershfield et al., 2011). IVR technology generates the experience of being immersed in a computer-generated environment, in which all real-world visual input is removed; thus, it creates the impression that one has actually stepped inside the virtual world (Witmer & Singer, 1998). We predicted that participants who saw an age-morphed version of their future selves, rather than their present selves, would engage in less delinquent behavior.

## Method

**Participants.** A total of 67 undergraduate students (47.8% women, 52.2% men; mean age = 21.6, range: 18–26) participated. Participants received €7 in exchange for their participation, and there was the possibility of earning an additional €7 if they did well on a short quiz (see the next section). Prospective participants, who were recruited in a university cafeteria, were told that they would meet their avatar in a virtual environment and that

**Table 1.** Results From Study 1: Scores for the Five Delinquent-Choice Scenarios in the Two Conditions and Probability Levels From Between-Condition Comparisons

Scenario	Control condition		Experimental condition		Between-condition $p$
	$M$	$SD$	$M$	$SD$	
Theft (1)	4.32	2.10	3.92	2.07	.32
Theft (2)	4.72	1.83	3.92	2.18	.04
Insurance fraud	3.45	2.10	3.29	2.06	.70
Buying stolen goods	3.22	1.98	2.98	2.05	.54
Illegal downloading	5.43	1.77	4.45	2.04	.01
Total scale	4.23	1.24	3.71	1.45	.05

Note: Higher scores indicate a greater self-reported likelihood of engaging in the delinquent behavior.

the goal of the study was to examine the relation between personality and the experience of virtual reality.

**Materials.** We followed the procedure designed by Hershfield et al. (2011) to create persuasive visual analogues of 40-year-old versions (i.e., avatars) of participants on the basis of digital pictures of their faces. When a participant entered the IVR system, sensors monitored his or her location and fed that location back to the participant through a head-mounted display. The environment, which was created for the purposes of this study, consisted of a basic room with a virtual mirror hanging in the middle of one of its walls (see Fig. 1). When participants approached the mirror, they saw either an age-progressed version of themselves (experimental condition) or a normal (i.e., non-age-progressed) version of themselves (control condition). The programming was such that the virtual mirror functioned identically to a regular mirror, and moves in the physical world were mirrored by the virtual self-image.

To measure the impact and strength of the virtual experience (i.e., to measure the extent to which participants felt psychologically connected to their avatars), we asked participants to respond to three items: “To what extent did you find your avatar realistic?” “To what extent did you recognize yourself in your avatar?” and “To what extent did you feel connected to your avatar?” Responses were made on 7-point Likert scales (from *not at all* to *very much*).

We used a procedure developed by Nagin and Pogarsky (2003) to measure delinquent behavior. Participants were given a quiz containing eight multiple-choice trivia questions; each question had five possible answers, one of which was correct. Participants were told that answering seven or eight questions correctly would entitle them to a €7 bonus (i.e., in addition to the €7 payment for participating in the experiment). The trivia questions were intended to be so difficult that it would be unlikely for participants to know even one correct answer, let alone seven or eight, and also that it would be virtually impossible to guess seven or eight answers correctly. One question, for example, asked, “Which country borders Tanzania?” The possible answers were Ethiopia, Sudan, Zambia, Zimbabwe, and Angola.

The correct answers were given on the reverse side of the last page of the booklet. Participants were instructed that once they had finished answering all the questions, and not before, they could check how many questions they had answered correctly. An envelope containing €7 was attached to the booklet, and if they had seven or eight answers correct, they were allowed to take the envelope with them. They were instructed that they could either keep or throw away the booklet. Note that providing the answers at the back of the booklet afforded participants an opportunity to cheat. Indeed, the obscurity of the trivia questions and the infinitesimal probability of guessing seven or eight answers correctly form the premise of the paradigm: Participants claiming a trivia bonus



**Fig. 1.** Illustration of the virtual reality setup in Study 2. In the photo on the left, a participant is wearing the head-mounted display in the immersive virtual reality room; the computer screen at the bottom shows the age-progressed version of himself that the participant is seeing through the display. The images on the right show the virtual room.

are safely assumed to have cheated (Nagin & Pogarsky, 2003).

**Experimental procedure.** Participants first read and signed a consent form, and then a picture of their face was taken. They were told that they would soon be brought into a virtual environment in which they would meet their avatar, but that first their avatar needed to be created on the basis of the picture of their face. Participants were randomly assigned to either the experimental condition or the control condition.

While the experimenter created a participant's avatar, the participant remained in a separate room to complete the 200-item version of the revised HEXACO Personality Inventory (Ashton & Lee, 2008), which was administered as part of the cover story of the experiment (i.e., examining the relation between personality and virtual reality experience). After the participant completed the personality questionnaire, a head-mounted display was placed on his or her head, and the participant was given instructions to navigate the virtual environment. The instructions indicated that the participant should first cross the virtual room to get used to the virtual environment and subsequently approach the mirror hanging on one its walls. The participant was to carefully study his or her face in the mirror for about 30 s, step away from the mirror to the left, step back in front of it and take another good look in the mirror, step away from the mirror to the right, and then step back to take another good look at his or her face. Finally, the participant was to walk toward the door in the virtual room.

After the participant completed this assignment, the experimenter took the headgear off, and the participant was escorted to a separate room and asked to fill out the survey containing the questions about the virtual reality experience and to take the quiz. After finishing both, the participant went back to the experimenter's room and was paid for the experiment. Debriefing occurred by e-mail a week later to avoid the possibility of participants giving away the goal of the experiment to fellow students.

## Results and discussion

We first examined the scores for the items assessing the virtual reality experience. None of the three items showed a difference between the experimental and control conditions. Participants in the control condition found their avatar as realistic ( $M = 4.59$ ,  $SD = 1.58$ ) as participants in the experimental condition ( $M = 4.39$ ,  $SD = 1.66$ ),  $t(65) = 0.49$ , n.s. Furthermore, participants in the control condition recognized themselves in their avatar ( $M = 5.44$ ,  $SD = 1.19$ ) as much as did participants in the experimental condition ( $M = 5.45$ ,  $SD = 1.54$ ),  $t(65) = -0.04$ , n.s.

Finally, there was no difference in participants' felt connectedness with their avatar between the control condition ( $M = 4.21$ ,  $SD = 1.61$ ) and the experimental condition ( $M = 4.03$ ,  $SD = 1.85$ ),  $t(65) = 0.42$ , n.s.

As mentioned previously, the prospect of gaining extra money for answering seven or eight quiz items correctly provided participants with an incentive to cheat. We expected participants in the experimental condition, who had been confronted with their older self, to cheat less than participants in the control condition. As predicted, participants in the experimental condition were significantly less likely to cheat (6.1%) than were participants in the control condition (23.5%),  $\chi^2(1, N = 67) = 4.03$ ,  $p = .04$ .

## General Discussion

In two studies, we found support for the hypothesis that delinquency in part results from a limited ability to imagine one's self in the future. In both studies, we manipulated vividness of the future self and found that when vividness of the future self is increased, individuals are less inclined to engage in delinquent behavior. In other words, the cognitive mechanism underlying the tendency to live in the here and now, which in turn leads to delinquent behavior, may hinge on the vividness of the future self. The findings have an important practical implication: Increasing the vividness of the future self can reduce criminal propensity.

It should be noted that this research involved relatively minor crimes. Nonetheless, we assume that a similar mechanism applies across populations. As Hirschi and Gottfredson (2001) observed:

Criminal and deviant acts have something in common because participation in any one of them predicts participation in all of the others. . . . People who rob and steal are more likely than people who do not rob and steal to smoke and drink, use illegal drugs, break into houses, and cheat on tests. (p. 82)

Furthermore, criminal careers generally do not start with big heists, but rather begin with petty crime and rule-violating behavior that tend to escalate in severity over time.

It could be argued that our suggested approach to reducing criminal behavior resembles previous attempts to link present behavior to future consequences. A classic example is Scared Straight programs, which bring young offenders into adult prison facilities and brutally depict prison life under the assumption that this negative prospect will deter them from further involvement in crime. However, research shows that these programs have no effect at best and are counterproductive at worst (Petrosino, Turpin-Petrosino, & Buehler, 2003). A central

difference of these previous attempts from our approach is that in previous attempts, the scenarios involving the future self were hypothetical. Aging is a physiological change that is inevitable. The future self, as it was operationalized in the present studies, is therefore not hypothetical, but real. Furthermore, Scared Straight programs are designed to operate on an emotional level by inducing fear, which is a fleeting psychological experience that is not stored in memory. Hence, the effects of such programs can be expected to be only temporary. The extent to which increasing the vividness of the future self can produce long-term effects is an important question to be addressed in future research.

Additionally, future research could examine the stability of vividness of the future self and how vividness develops over the life course. For example, crime tends to peak during late adolescence, showing a consistent decline from early adulthood onward. It would be interesting to examine the extent to which vividness of the future self shows a parallel development and could account for age-related changes in delinquency.

It is possible that vividness of the future self could be linked to other concepts that are related to delinquent behavior (such as self-control and present bias). Yet, in previous work, Bartels and Urminsky (2011) used narrative manipulations to boost participants' sense of connectedness to their future selves and subsequently lower temporal discounting rates. They found that a host of factors—such as present bias, uncertainty about the future, and various affective evaluations about the future—could not account for the link between increased connectedness with the future self and temporal discounting. Along similar lines, Hershfield et al. (2012) demonstrated that trait-level self-control could not explain why greater overlap between the present and future self is correlated with a lower tendency to engage in ethically questionable behavior. As noted earlier, vividness, like similarity and connectedness, is an important component of people's conceptualization of their future selves (Hershfield, 2011). Nonetheless, the present studies did not examine connectedness or similarity with the future self, but instead looked solely at vividness. Thus, future work should examine whether manipulations that enhance vividness may also affect phenomena such as present bias and self-control more generally.

Finally, it could be the case that thinking about the future in general, rather than thinking about the future self per se, is what truly influences criminal decision making. Although we do not exclude this possibility, we do not consider it likely. Hershfield et al. (2012), for example, found that people's ability to project their self into the future was negatively related to their tendency to engage in unethical behavior, but that the ability to

consider the future in more general terms was not related to the tendency to engage in unethical behavior.

Crimes tend to severely affect their victims, the communities in which they are committed, and sometimes even society at large. Furthermore, crime is costly. Significant amounts of public resources are devoted to crime prevention and rehabilitation. Yet recidivism rates are high. Up to two thirds of U.S. prisoners, for example, are re-arrested within 3 years after their release from prison (Langan & Levin, 2002). One of the strengths of this research is its applied potential, as it has shown that increasing the vividness of the future self may offer a way of reducing criminal propensity. It is relevant in this respect to note that deterrence, one of the pillars of criminal-justice systems, essentially hinges on the ability of would-be offenders to imagine that the costs of their behavior accrue to (a future version of) themselves. Moreover, because analogous problem behaviors, such as gambling, speeding, smoking, and excessive drinking, are—like delinquency—characterized by immediate benefits and remote long-term costs (Loewenstein, 1996), interventions that focus on increasing the vividness of the future self may also prove effective for countering these other types of self-defeating behaviors.

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### Declaration of Conflicting Interests

The authors declared that they had no conflicts of interest with respect to their authorship or the publication of this article.

### Note

1. Because of experimenter error, participants were not asked to report their gender. However, Buhrmester, Kwang, and Gosling (2011) reported that Mechanical Turk samples tend to be 55% female.

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