



Sensitivity to punishment and self-control: the mediating role of emotion

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Abstract

Past research has found that high sensitivity to punishment is associated with a vulnerability to experience negative emotions (Carver & White, 1994) and lowered self-control (Segarra, Molto, & Torrubia, 2000). Separate lines of research have found that negative emotions may contribute to a loss of self-control (Tice, Bratslavsky, & Baumeister, 2001). Two studies were conducted to test whether vulnerability to and current experience of emotional distress mediates this relationship between sensitivity to punishment and self-control. In Study 1, neuroticism (vulnerability to emotional distress) served as a mediator in the relationship between sensitivity to punishment and self-control, such that sensitivity to punishment led to neuroticism, which, in turn, negatively affected self-control behavior. In Study 2, which replicated and extended Study 1, depression and anxiety (current emotional distress) mediated the relationship between sensitivity to punishment and self-control. These findings help account for the diminished self-control observed in individuals high in sensitivity to punishment and provide support for a mechanism underlying self-control failure.

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Self-control is crucial to a variety of everyday activities, including coping, negative affect control, inhibition of impulses to yield to temptations (Muraven & Baumeister, 2000), planning of goal-directed activities (Barkley, 1997), suppression of stereotypical responses (Macrae, Bodenhausen, & Ford, 1997), and engagement in social interaction (Gilbert, Krull, & Pelham, 1988). Self-control has also been linked with condom use (Sacco, Rickman, Thompson, & Levine,

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1993) and smoking (Tiffany, 1990; Wills, Sandy, & Yaeger, 2000). Finally, poor self-control serves as prerequisite for such social problems as drug addiction (Brown, 1998; Marlatt & Parks, 1982) and antisocial behavior (Hughes, White, Sharpen, & Dunn, 2000; Sutker & Allain, 1983). The pervasiveness of the phenomena associated with self-control failure, which affects psychological and social areas of human functioning, makes it an imperative social problem. Hence, the study of self-control is vital because it may promote a deeper and better understanding of the mechanisms underlying self-control behavior.

Two studies were conducted to explore the relationship between sensitivity to punishment, emotional distress, and self-control behavior. In particular, we hypothesized that emotional distress mediates the relationship between sensitivity to punishment and self-control behavior. Research has found that individuals high in sensitivity to punishment tend to have less self-control than individuals less sensitive to punishment (e.g., Carver & White, 1994). We suggest that this effect may be mediated by the increased vulnerability to and experience of negative emotions among individuals high in sensitivity to punishment. Indeed, previous research has found that individuals high in sensitivity to punishment are more likely to experience negative emotions (e.g., Carver and White, 1994) and that negative emotions undermine individuals' self-control performance (e.g., Tice, Bratslavsky, & Baumeister, 2001).

Self-control, a type of choice behavior, is typically defined as the ability to overcome immediate gratification and to strive toward distant goals, not apparent in the immediate environment. The lack of self-control (sometimes operationalized as impulsivity) is characterized by inability to suppress the desire for immediate gratification. Impulsive behavior emerges when the salient rewarding stimuli in the environment heavily influences an individual's behavior. An impulsive person's temporal horizon is impaired, such that he or she is focused primarily on the present and demonstrates very little, if any, concern about the future (e.g., Metcalfe & Mischel, 1999).

Individuals' willingness to delay immediate gratification depends on a variety of individual difference and situational factors. For example, research indicates that negative moods and stress lead to poor self-control. When people are upset they are inclined to make impulsive choices and lose self-control (e.g., Mischel, Ebbesen, & Zeiss, 1972; Shiffman, 1982; Tice et al., 2001). In particular, when presented with a choice between a smaller reward leading to immediate gratification and a larger delayed reward requiring suppression of the desire for immediate gratification, individuals experiencing a negative mood tend to select an impulsive reward (a smaller reward leading to immediate gratification) over a self-control reward (a larger reward with a delayed gratification). Thus, negative emotions are one factor that impact individuals' self-control behavior. The notion that emotional distress interferes with long-term goal attainment and increases the probability of yielding to less favorable short-term goals of immediate gratification has been widely supported by research. For example, in the series of experiments by Tice et al. (2001) individuals experiencing sad moods exhibited poorer impulse control as manifested via failure to resist temptations, desire for immediate gratification, and procrastination. The authors interpreted poor impulse control as a strategic shift in self-regulatory objectives from long-term goals to the short-term goal of negative mood alleviation. In the context of emotional distress, the immediate mood enhancement becomes a priority over impulse control and achievement of long-term goals. The boundary condition of the effects of mood on impulse control has also been identified in these experiments. The perceived inability to elevate negative mood leaves regulatory objectives intact, such that long-term goals and impulse control remain the self-regulatory priority

despite the presence of negative mood. Believing that one's mood is unchangeable and cannot be improved or eliminated by indulging in immediate pleasure secures expression of self-control behavior and inhibition of impulsivity.

In a different study, poorer self-control was found for individuals who were exposed to aversive imagery than for controls who were not subjected to a negative mood manipulation (J. R. Gray, 1999). This same study also revealed that stress is linked to poor impulse control. In particular, students who reported stress due to approaching exams demonstrated lower self-control than students who did not report experiencing stress.

Anxiety, too, appears to play a role in self-control behavior. For instance, poor self-control characterized by risk taking has been connected to anxiety (Leith & Baumeister, 1996). Both anxiety and depression have also been implicated in such self-control behaviors as dieting, quitting smoking or drinking. For example, overweight individuals (Logue, 1993; Slochower & Kaplan, 1980) and dieters (Greeno & Wing, 1994) report an increase in their food consumption when experiencing stress, and when feeling depressed or anxious. Similarly, attempts at quitting drinking tend to fail when one is under emotional distress (Brownell, Marlatt, Lichtenstein, & Wilson, 1986; Hodgins, el Guebaly, & Armstrong, 1995). Experimental studies also have revealed that failure experiences and other aversive experiences (such as making a speech or listening to sad music) undermine dieting, alcohol restraint, and other self-control activities (Heatherton, Herman, & Polivy, 1991).

Thus, emotional distress, such as anxiety and depression, makes impulsive behavior more likely. In fact, it has been suggested that upset individuals may be hypersensitive to rewards and as a result act on their impulse to obtain an immediate reward even if it is a smaller one (Leith & Baumeister, 1996). Anticipation of negative outcomes, when depressed or anxious, may make individuals sensitive not to just any rewards but rewards that are immediate. Impulsive behavior emerges, as these individuals become less willing to wait for larger delayed rewards and select smaller rewards that are available immediately. Negative mood interferes with future oriented behavior by making individuals focused on the present. The pursuit of long-term rewards is no longer considered or is perceived as less attractive by individuals experiencing negative moods.

Self-control performance is also related to individuals' sensitivity to punishment. In particular, two distinct and independent motivational systems have been postulated as basic processes regulating behavior: A behavioral inhibition system (BIS), characterized by sensitivity to and anticipation of punishment, and a behavioral activation system (BAS), characterized by responsiveness to and anticipation of rewards (Carver & White, 1994; J.A. Gray, 1987). The two motivational systems represent individuals' sensitivity to environmental cues of punishments and rewards and serve as regulators of behavior by either aversive motivation (BIS) or appetitive motivation (BAS).

Research evidence suggests that BIS sensitivity may play a role in self-control. Prior studies have found that individuals high in sensitivity to punishment sometimes exhibit poorer self-control. For example, Carver and White (1994) found that the BIS was associated with Disinhibition-Constraint, a measure of self-control. Eating disorders and eating disorders in combination with alcohol abuse, which are psychopathologies associated with poor impulse control, have been found to be related to sensitivity to punishment (Loxton & Dawe, 2001). Likewise, under certain circumstances, females high in sensitivity to punishment performed poorly on a go/no go task, a common measure of inhibition and self-control (Segarra et al., 2000). Finally, Newman and

Wallace (1993) suggested that high BIS may represent one of the pathways to a variety of psychopathology of impulsivity. In particular, they argued that poor attention shifting between environmental cues of punishment and rewards contributes to many different psychopathologies characterized by poor impulse control, including psychopathy, conduct disorder, and attention deficit hyperactivity disorder. In other words, high levels of sensitivity to punishment may lead to impulsivity.

Notably, research has also demonstrated that BIS activity is associated with individual differences in negative affectivity and proneness to states of anxiety and depression (Carver & White, 1994; Gable, Reis, & Elliot, 2000; Jorm et al., 1999). Individuals high in sensitivity to punishment seem to be more likely to experience negative moods. Sensitivity to punishment also increases vulnerability to depression and anxiety. Similarly, neuroticism appears to be positively related to sensitivity to punishment (Torrubia et al., 2001). In conclusion, individuals high in BIS appear to have a greater predisposition to experience and actually experience negative emotions to a greater degree than individuals lower in BIS. We suggest that this sensitivity to negative emotions may account for the greater impulsivity of individuals high in BIS.

Thus far, research suggests a strong link between vulnerability to emotional distress (neuroticism)/emotional distress (depression and anxiety) and self-control, such that emotional distress impairs temporal horizon of an individual, which results in at least temporary abandonment of long-term goals for the sake of short-term goals of immediate gratification. Second, research reveals that sensitivity and anticipation of punishment (i.e. BIS) represents a basic process underlying the experience of negative moods. Finally, some research evidence exists identifying heightened sensitivity to punishment as a predictor of various impulse control disorders.

Two studies were conducted with the goal of integrating these separate lines of research on negative emotional states, self-control, and sensitivity to punishment. We suggest that individuals high in BIS may exhibit greater impulsivity because of their increased experience of negative moods. The mediating effect of emotional distress on the link between punishment and self-control was investigated (Fig. 1). Study 1 explored the mediating effect of neuroticism, which represents vulnerability to emotional distress, on the relationship between sensitivity to punishment and self-control. Study 2 extended results obtained in Study 1, and tested if depression and anxiety as indicators of emotional distress mediate the association between sensitivity to punishment and self-control behavior.

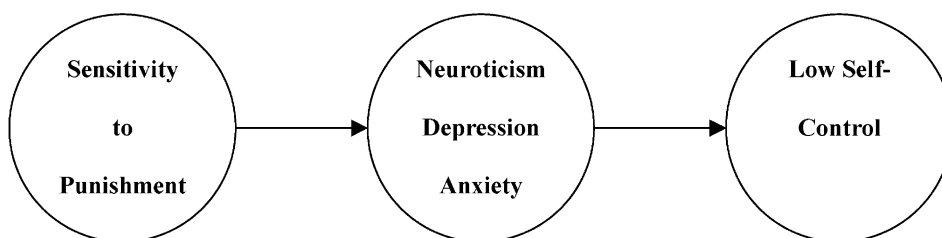


Fig. 1. Model of the hypothesized mediating effect of vulnerability to emotional distress on the relationship between sensitivity to punishment and self-control.

1. Study 1

In Study 1, it is hypothesized that neuroticism, as vulnerability to emotional distress, mediates the relationship between sensitivity to punishment and self-control behavior. Individuals high in neuroticism are more likely to experience negative emotions because they are inclined to perceive a greater variety of situations as threatening. In particular, it is predicted that (1) sensitivity to punishment is associated with neuroticism, (2) sensitivity to punishment is associated with poor self-control, (3) neuroticism is associated with poor self-control, and, finally, (4) the influence of neuroticism on self-control behavior is above and beyond the influence exerted on self-control by sensitivity to punishment. In short, it is predicted that sensitivity to punishment is associated with neuroticism, which, in turn, leads to poor self-control.

1.1. Participants

A total sample of 126 undergraduate students at the University at Albany participated in Study 1. Each participant completed the BIS/BAS scale (Carver & White, 1994) to assess sensitivity to punishment; Eysenck Personality Questionnaire (Eysenck, Eysenck, & Barrett, 1985) to measure neuroticism; and a trait self-control scale (TSC) designed for this study to assess tendencies to engage in self-control behavior. The order of questionnaires was counterbalanced.

1.2. Measures

1.2.1. Sensitivity to punishment

Sensitivity to punishment was measured using the BIS/BAS scale (Carver & White, 1994). The scale is composed of 20 items: seven items, which assess the BIS and 13 items, which assess the BAS. Responses are made on a four-point Likert scale, with one designating strong agreement and four designating strong disagreement. Scores on the BIS were recoded such that higher scores were indicative of higher BIS (higher sensitivity to punishment) and lower scores were indicative of lower BIS (lower sensitivity to punishment). The coefficient alpha of the BIS scale in this study is 0.79. Previous research by Carver and White (1994) has demonstrated that coefficient alpha for the BIS scale is 0.74 and test–retest reliability for the BIS scale is 0.66. Convergent and discriminant validity of the scale has also been established. Each participant completed a full BIS/BAS scale. In accordance with prior research (Carver & White, 1994), the BIS and the BAS represented independent dimensions and were unrelated ($r=0.10$, $P=0.27$). Because no hypotheses were posed for the role of the BAS, only the BIS scores will be employed in the analysis.

1.2.2. Neuroticism

The Eysenck Personality Questionnaire (Eysenck et al., 1985) is a widely used instrument to ascertain neuroticism. The full scale consists of 100 items and it is divided into four distinct subscales (P, E, N, and L subscales). Even though participants were presented with the full Eysenck Personality Questionnaire, only scores comprising the N scale will be used in the analyses. The N scale is composed of 24 items with higher scores indicating greater neuroticism. Previous research reports that reliability of the N scale is 0.88 for males and 0.85 for females. The coefficient alpha for the N scale in this study is 0.89.

1.2.3. Trait Self-Control (TSC)

The TSC was designed for this study to measure individuals' general predilection to engage in self-control. The measure originally consisted of 36 items. Participants were asked to rate how often they found themselves experiencing a variety of situations on a scale ranging from 1 (not at all) to 7 (extremely often).

The dimensionality of the 36 items was examined using principal components factor analysis. Three criteria were used to determine the number of factors: the a priori hypothesis that the measure was unidimensional, the scree test, and the interpretability of the factor solution. Based on these three criteria, the analysis yielded one factor composed of 28 items. The factor accounted for 25.83% of the item variance. Factor loadings of the TSC (28 items) are presented in Table 1. Item analysis was conducted to obtain an internal consistency estimate of reliability for the self-control scale. The coefficient alpha for the scale was 0.91. Items conceptually the reverse of the scale definition were reverse coded, such that higher scores suggested poor self-control. The TSC mean score was calculated for each participant (for the entire sample, $M = 3.63$, $S.D. = 0.90$).

Table 1
Factor loadings of the TSC

Item	Study 1	Study 2
1. I have trouble making appointments.	0.50	0.49
2. I find it difficult to make changes in my diet.	0.54	0.34
3. I have trouble getting up in the morning.	0.50	0.54
4. I can't study for very long.	0.62	0.73
5. I try to break bad habits but they keep coming back.	0.49	0.54
6. For me, being in a good mood requires effort.	0.63	0.55
7. Keeping up with my schoolwork drains me.	0.63	0.58
8. If I want to change something in my life, it is hard for me to get myself together to actually start.	0.73	0.77
9. I usually wait until the last minute to study for my exams.	0.60	0.60
10. I wait until the last minute to register for my classes.	0.53	0.57
11. I have difficulties suppressing my emotions when I feel sad.	0.39	0.41
12. It is hard for me to control my actions when I am irritated.	0.42	0.44
13. ^a Once I start something, I am good at keeping up with it.	-0.53	-0.38
14. Once I make changes in my diet, I have a hard time maintaining them.	0.55	0.45
15. I tend to wait until the last minute to look for the summer job.	0.49	0.49
16. I find it difficult to start exercising.	0.41	0.59
17. Even if I study hard at the beginning of the semester, it is hard for me to maintain the pace.	0.71	0.71
18. It is hard for me to initiate things.	0.61	0.66
19. I am easily distracted when I study.	0.59	0.67
20. I want to go back to bed after I have been awake.	0.60	0.46
21. I give up easily.	0.69	0.67
22. ^a Once I start something, I am good at keeping up with it.	-0.50	-0.52
23. ^a I try to stick to my goals.	-0.44	-0.42
24. ^a If I get a bad grade in the course, I usually give up.	0.58	0.50
25. I find it difficult to start working after a vacation.	0.45	0.42
26. When I am frustrated, I give up.	0.64	0.63
27. I have trouble keeping appointments.	0.48	0.55
28. I have a hard time starting to study.	0.72	0.67

^a Items conceptually reverse of the scale meaning.

2. Results

The correlation analyses are summarized in Table 2. The results demonstrate that the BIS is significantly and positively correlated with the N scale, indicating that greater sensitivity to punishment (higher BIS scores) is associated with neuroticism; the BIS is also significantly and positively associated with the TSC, suggesting that higher sensitivity to punishment (higher BIS scores) is associated with poor self-control. In addition, the N scale and the TSC are significantly and positively associated, supporting the hypothesis that neuroticism is linked with poor self-control.

To test the hypothesis that neuroticism mediates the relationship between sensitivity to punishment and self-control, a regression analysis was conducted using the procedure summarized by Baron and Kenny (1986). When neuroticism and BIS were entered simultaneously, scores on the N scale predicted scores on the TSC, $t(111) = 6.33$, $P < 0.01$. However, the influence of the BIS on the TSC became non-significant, $t(111) = 0.66$, ns. Most importantly, the Sobel test (Baron & Kenny, 1986) for mediation was significant, Sobel = 3.30, $P < 0.01$. Thus, the study provided supportive evidence for the mediating effect of vulnerability to emotional distress (i.e., neuroticism) on the relationship between sensitivity to punishment and self-control.

Study 1 has two major limitations. First, neuroticism represents vulnerability to emotional distress but not emotional distress per se. Scales of depression and alternative scales of anxiety should be employed to extend present findings to different types of emotional distress as individuals currently experience them. Second, the self-control scale employed in the present study, while possessing an adequate reliability, has never been used in research and validity of the scale has not been previously established.

3. Study 2

The purpose of Study 2 is to attend to limitations of Study 1, to extend the findings obtained in Study 1 and to address divergent validity by utilizing different measures of self-control. In Study 2, the mediating effect of anxiety and depression on the relationship between sensitivity to punishment and self-control was tested. It was hypothesized that sensitivity to punishment results in greater depression and anxiety. Furthermore, because negative emotional states are associated with attentional deficits (e.g., difficulties in strategically focusing on goal-oriented activities) and a

Table 2
Pearson's product-moment correlations among variables: Study 1^a

	BIS	N	TSC
BIS	–	–0.34**	–0.25**
N		–	0.55**
TSC			–

^a BIS = Behavioral Inhibition Scale; N = Neuroticism; TSC = Trait Self-Control.

** $P < 0.01$.

reduced temporal horizon, it is expected that depression and anxiety would lead to poor self-control.

3.1. Participants

A total sample of 146 undergraduate students at the University at Albany participated in the experiment. Each participant completed the measures in counterbalanced order.

3.2. Measures

3.2.1. Anxiety

The State-Trait Anxiety Inventory, S-Anxiety (STAI; [Spielberger et al., 1970](#)) was used to assess anxiety. STAI S-Anxiety represents a measure of current levels of anxiety and is widely utilized in laboratory research. The measure is composed of 20 items and assesses general feelings of apprehension, tension, worry, and nervousness. Higher scores on the measure are indicative of anxiety. The coefficient alpha obtained for the STAI in the present sample is 0.89. Past research has demonstrated that test–retest reliability of the scale ranges from 0.65 to 0.86. Validity of the scale has been previously established by demonstrating that the STAI correlates with the Taylor Manifest Anxiety scale ($r=0.80$), the IPAT Anxiety Scale ($r=0.75$), and the Multiple Affect Adjective Check List ($r=0.52$).

3.2.2. Depression

The Beck Depression Inventory (BDI; [Beck & Beamesderfer, 1974](#)) was used to assess depression. The BDI is a 21-item self-report scale ascertaining depressive attitudes and symptomatology. Higher scores on the scale represent depression. In the present study the coefficient alpha of the BDI is 0.90. The BDI, when administered to clinical and non-clinical samples, is characterized by high internal consistency, with alpha coefficients ranging from 0.73 to 0.92 ([Beck, Steer, & Garbin, 1988](#)). Test–retest reliability ranges from 0.48 to 0.86 ([Groth-Marnat, 1990](#)). The BDI has been shown to be a valid instrument characterized by predictive validity, concurrent validity, convergent and discriminant validity ([Groth-Marnat, 1990](#)), and content validity ([Beck et al., 1988](#)).

3.2.3. Self-control

Two self-control measures were utilized in Study 2. The first was the TSC measure used in Study 1. Similar to Study 1, principal components factor analysis of the items yielded one interpretable factor. This factor was composed of 28 items and accounted for 27.31% of the item variance. Factor loadings for the TSC (28 items) are presented in [Table 1](#). The coefficient alpha for the TSC in Study 2 was 0.92. Items conceptually the reverse of the scale definition were reverse coded. Higher scores on the TSC suggested poorer self-control. The TSC mean score was calculated for each participant (for the entire sample, $M=3.35$, $S.D.=0.92$).

The second measure of self-control was the Self-Control Scale (SCS) developed by [Rosenbaum \(1980\)](#). Low scores on the scale are indicative of poor self-control. The scale is composed of 36 items and responses are made on a six-point Likert scale ranging from +3 (very characteristic of me) to –3 (very uncharacteristic of me). The scale's test–retest reliability is 0.86 and the alpha

coefficient for the scale ranges from 0.78 to 0.84. The coefficient alpha for the SCS in the present study is 0.83. In Study 2, the two self-control measures are significantly correlated ($r = -0.52$, $P < 0.01$), suggesting that the two scales measure a similar construct. The relationship between the two scales is negative because high scores on the TSC and low scores on the SCS are indicative of poor self-control.

3.2.4. Sensitivity to punishment

The BIS/BAS scale (Carver & White, 1994) was used to measure sensitivity to punishment in Study 2. The coefficient alpha for the BIS scale in this study is 0.77. The BIS and the BAS represented independent dimensions ($r = 0.09$, $P = 0.31$). Because no hypotheses were posed for the relationship of the BAS to anxiety, depression, and self-control, only the BIS scores will be used in the analysis.

4. Results

As expected, the BIS was significantly and positively correlated with anxiety, depression, and the TSC and negatively with the SCS. These results indicate that sensitivity to punishment (high BIS scores) are associated with emotional (anxiety and depression) and self-control problems. Furthermore, both the BDI and the STAI are significantly and negatively associated with the SCS and significantly and positively related to the TSC, suggesting that emotional distress, anxiety and depression, are associated with self-control problems. The correlation matrix is presented in Table 3.

4.1. Anxiety

To test the mediating effect of anxiety on the relationship between the BIS and the SCS, a series of regression analyses were conducted. When entered simultaneously with the BIS, the STAI was associated with the SCS, $t(126) = -3.5$, $P < 0.01$, and the effect of the BIS on the SCS became non-significant, $t(126) = -0.82$, ns. The test of mediation was significant, Sobel = -2.45 , $P = 0.01$. Similar results were obtained for the TSC, the second measure of self-control. In particular, when

Table 3
Pearson's product-moment correlations among variables: Study 2^a

	BIS	STAI	BDI	SCS	TSC
BIS	–	0.28**	0.21*	–0.18*	0.17*
STAI		–	0.73**	–0.33**	0.56**
BDI			–	–0.45**	0.62*
SCS				–	–0.52**
TSC					–

^a BIS = Behavioral Inhibition Scale; STAI = State-Trait Anxiety Inventory; BDI = Beck's Depression Inventory; SCS = Self-Control Scale; TSC = Trait Self-control.

* $P < 0.05$; ** $P < 0.01$.

the STAI and the BIS were entered simultaneously, the STAI was associated with the TSC, $t(135) = 7.48$, $P < 0.01$, and the influence of the BIS on the TSC became non-significant, $t(135) = 0.20$, ns. The test of mediation was significant, Sobel = 3.15, $P < 0.01$.

4.2. Depression

The same analyses were conducted to test the mediating effect of depression on the relationship between sensitivity to punishment and self-control. When entered simultaneously with the BIS, the BDI scores were predictive of the SCS scores, $t(104) = -4.8$, $P < 0.01$, and the influence of the BIS on the SCS became non-significant, $t(104) = -1.11$, ns; Sobel test = -1.98 , $P < 0.05$. Finally, when entered together, the BDI was linked to the TSC, $t(109) = 7.90$, $P < 0.01$, and the influence of the BIS on the TSC became non-significant, $t(109) = 1.39$, ns; Sobel test = 2.15, $P < 0.03$. Study 2 provided supportive evidence for the mediating effect of emotional distress (i.e., depression and anxiety) on the relationship between sensitivity to punishment and self-control.

5. Discussion

Study 1 and Study 2 integrated past research and provided support for a model of a mechanism underlying self-control failure. In particular, we found that individuals high in sensitivity to punishment may be lower in self-control because of their increased vulnerability to (Study 1) and current experience (Study 2) of negative emotions. Across two studies, using a variety of measures, we found that negative emotions mediated the relationship between sensitivity to punishment and self-control. Specifically, in Study 1, neuroticism was found to mediate the relationship between sensitivity to punishment and self-control, such that sensitivity to punishment is associated with neuroticism, which consequently leads to self-control difficulties. Study 2 replicated the results obtained in Study 1 using different measures of emotional distress and self-control and demonstrated that both anxiety and depression mediate the relationship between sensitivity to punishment and self-control difficulties. This is consistent with previous research that has found that emotional distress leads to problems in self-control (Tice et al., 2001) and that sensitivity to punishment represents a basic process underlying emotional distress (Carver & White, 1994; Jorm et al., 1999). Thus, self-control problems among individuals high in sensitivity to punishment may be a result of negative emotions, and not sensitivity to punishment per se.

The present results may have therapeutic implications for the treatment of impulsive behavior, such as engagement in risky behaviors, procrastination, drug abuse, and failure to resist temptations. It appears that sensitivity to punishment exerts direct and indirect influence on self-control. Individuals who are sensitive to punishment cues in the environment are especially vulnerable to emotional distress, such as depression and anxiety. These emotional states are associated with attentional deficits and impairment of temporal horizon, which may bring about impulsive behavior. The implication is that treatments of individuals with self-control problems (e.g., persons with ADHD, gambling problems, substance abuse problems) should focus not on the treatment of impulsive behaviors per se but on challenging an individual's perception of the world and organization of his or her life in terms of sensitivity to punishment (i.e. punishment avoidance).

The present studies have several limitations. The first limitation is the correlational nature of the studies. Experimental studies are needed to provide support for the proposed operative mechanisms underlying self-control behavior. Second, participants in the two studies were undergraduate students. This sample may not be representative of the general population and especially of populations with severe impulse control problems. Future studies might investigate the proposed mediating effect of emotional states on the relationship between sensitivity to punishment and self-control among samples of individuals that suffer from impulsivity problems (e.g., individuals with ADHD, gambling problems, and substance abuse problems). Finally, the two studies employed only one measure of sensitivity to punishment. The BIS represents most widely used and highly valid measure of sensitivity to punishment. However, future research should aim at developing alternative measures of sensitivity to punishment and testing if the relationship uncovered in the present research could be generalized to the widest population.

Future researchers might want to investigate whether the mediating effect of depression and anxiety is especially pronounced among individuals with several self-control problems as compared to individuals with a single self-control problem. Research evidence suggests that suffering from more than one impulse disorder associated with poor self-control appears to produce greater overall self-control impairment (i.e., greater discounting rates of delayed rewards) than suffering from one self-control disorder only. For example, a recent study by Petry (2001a) revealed that pathological gamblers with substance abuse disorder discounted delayed rewards at higher rates than non-substance-abusing gamblers. Similarly, in a different study it was demonstrated that currently drinking alcoholics discounted delayed rewards at greater rate than abstinent alcoholics, and that normal controls manifested the lowest sensitivity to delay (Petry, 2001b). Thus, the greater number of self-control disorders is associated with less overall self-control as demonstrated by poorer ability to wait for delayed rewards. Consequently, it is possible that individuals with several self-control problems as compared to individuals with one self-control problem are more sensitive to environmental punishers and might suffer from more severe depression and/or anxiety.

In conclusion, we confirmed findings demonstrated by previous research that self-control is predicted by both sensitivity to punishment and predisposition to/current experience of negative emotions. We have extended that work to show that sensitivity to punishment exerts influence on emotional distress, which subsequently leads to a loss of self-control. This is important to understanding both the process of self-control and the effects of sensitivity to punishment.

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