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The Brief Self-Control Scale Predicts Jail Inmates' Recidivism, Substance Dependence, and Post-Release Adjustment

Abstract

Previous research finds that self-control is positively associated with adaptive and negatively associated with maladaptive behavior. However, most previous studies employ cross-sectional designs, low-risk samples, and limited assessments of self-control. This study of 553 jail inmates examined the relationship of a valid measure of self-control (Brief Self-Control Scale; BSCS) completed upon incarceration with behavior before, during, and one year after incarceration. After controlling for positive impression management (PIM), self-control was negatively related to substance misuse, suicidality, risky sex, and criminal history prior to incarceration and post-release illegal substance misuse, recidivism, and positive adjustment. Lower self-control predicted increases in substance dependence at post-release compared to pre-incarceration. Self-control was not related to misbehavior during incarceration, nor alcohol use or HIV-risk behavior one year post-release. Results were consistent as a function of age, race, and gender. This study supports self-control as an important risk and protective factor in a sample of criminal offenders.

Keywords

Self-control; substance dependence; criminal behavior; recidivism; HIV-risk

It is widely accepted that low self-control is key to understanding and predicting many behavioral problems, including serious antisocial behavior (Gottfredson & Hirschi, 1990; Baumeister & Heatherton, 1996). However, most psychological research on self-control has focused on fairly innocuous behaviors of college students and community members using cross-sectional designs. In this paper, we summarize what is known about the implications of self-control for behavioral adjustment from psychology and criminology literatures. We describe some key measurement and methodological shortcomings in existing research. To address these shortcomings, we present longitudinal data from a large study of jail inmates who were assessed upon incarceration and at one year post-release.

Behavioral Implications of Self Control: Research from Psychology and Criminology

Self-control refers to the ability to override impulses and direct responding in order to conform behavior to one's own standards and goals (Baumeister, Vohs & Tice, 2007). People vary in their willingness and capacity to exert self-control, and these individual differences in self-control have implications for many aspects of emotional, social, and behavioral adjustment.

In a recent meta-analysis, self-control had a small to medium relationship with behavior in various domains, including school and work, eating, interpersonal functioning, wellbeing, planning, decision-making, and addictive and deviant behavior (de Ridder, Levsvelt-Mulders, Finkenauer, Stok, & Baumeister, 2012). Results from laboratory studies in college and community samples also find that experimental manipulations of self-control (i.e., self-control depletion) are linked to a variety of potentially maladaptive behaviors, including increased consumption of alcohol and high-calorie food in the laboratory setting, as well as lack of persistence on difficult tasks (see Gailliot & Baumeister, 2007 for review).

Beyond day-to-day minor misdeeds, self-control has been theorized to be the root cause of criminal and dangerous behavior. According to Gottfredson and Hirschi's (1990) General Theory of Crime, individuals with impaired self-control are prone to indulge in immediate gratification despite future consequences, a tendency that puts them at risk for all types of antisocial behavior; notably crime, substance misuse, and risky sexual behavior. Gottfredson and Hirschi describe self-control as a stable universal risk factor, arguing that it has important implications for the behavior of all individuals across the lifespan, regardless of race, gender, or other individual characteristics.

Over the past two decades, the General Theory of Crime has spawned much research in the field of criminology. In a meta-analysis of 21 empirical studies of the General Theory of Crime, Pratt and Cullen (2000) found self-control to be one of the strongest correlates of crime. In the years since (we searched 2000-2012), we identified another 48 empirical studies that examined the link between self-control and criminal behavior in addition to those reviewed by Pratt and Cullen (2000) and de Ridder and colleagues (2012)[1]. Consistent with prior research, the majority of these studies find a significant small to medium relationship between self-control and criminal behavior (e.g., Blackwell & Piquero 2005; De Li, 2005; Holtfreter, Reisig, Piquero, & Piquero, 2010; Tittle, Ward, & Grasmik, 2003; Kerley, Copes, Tewksbury, & Dabney, 2011). Taken together, substantial research indicates that self-control is positively associated with adaptive behaviors and negatively associated with maladaptive behavioral outcomes. However the existing self-control research has measurement and methodological limitations.

Limitations in the Social Personality Psychology and Criminology Literature

Reliance on Cross-Sectional Designs

The link between self-control and behavior is of theoretical and applied interest because self-control presumably *affects* people's willingness or ability to effectively regulate their behavior. Conceptually, self-control is clearly the independent variable and behavioral outcomes represent dependent variables. Yet, the vast majority of studies of self-control in

[1]We searched the database 'PsycInfo' for the search terms *self-control*, *impulsivity*, *impulsiveness*, and *self-regulation*. We included all empirical articles that investigated any measure of self-control's relationship with antisocial or risky behavior, such as crime, violence, substance use, and other outcomes relevant to the criminal justice system (e.g., jail misbehavior, probation violation). We limited our search results to articles published after Pratt and Cullen's 2000 meta-analysis that were not reviewed by de Ridder and colleagues (2012). We included articles with human samples of all ages. For more information, please see supplementary material to this article.

both social psychology and criminology have employed cross-sectional designs. Longitudinal designs, in which individual differences in self-control are measured *prior to* hypothesized outcomes, are particularly well suited for assessing theoretically-derived hypotheses regarding the long-term implications of self-control for future behavior.

Despite the benefits, there is a dearth of longitudinal research in this area. Of the 102 studies identified for de Ridder and colleagues' (2012) meta-analysis, only 20 (20%) employed a longitudinal design. Longitudinal research is especially sparse in the field of criminology, where researchers have argued that longitudinal designs are unnecessary, given the rank order stability of self-control and antisocial behavior over time (Gottfredson & Hirschi, 1983). Of the 21 criminology studies identified in Pratt and Cullen's (2000) review, only two (9.5%) employed longitudinal designs. Of the 48 additional studies of self-control's relationship with deviant behavior, we are aware of 23 (48%) that were longitudinal in design.

Reliance on Low-Risk Samples Engaging in Behavior in the Normal Range

A second limitation concerns the use of low-risk samples in studies typically focusing on variations in behavior in the normal range. For example, the vast majority of studies reviewed by de Ridder and colleagues (2012) were studies of student (67%) or (non-clinical, non-correctional) community (22%) samples. Little research in psychology has focused on populations at high risk for dangerous, antisocial behavior, such as criminal offenders (de Ridder et al., 2012). Even in the field of criminology, research on the implications of self-control for dangerous behavior among high-risk populations is surprisingly thin. In Pratt and Cullen's (2000) review of the criminology literature, only four (19%) of 21 studies employed offender samples.

Of the 48 studies on the relationship between self-control and antisocial behavior that have been published since Pratt and Cullen's (2000) review, only 15 (31%) included offender samples. Seven of these were longitudinal studies that supported self-control's relationship with subsequent substance use (Longshore, Chang, Hsieh, & Messina, 2004), recidivism (Benda, Toombs, & Corwyn 2005), parole outcome (Langton, 2006), property crime and drug use (Conner, Stein, & Longshore, 2009), and criminal offense (Longshore, Chang, & Messina, 2005; Piquero, MacDonald, Dobrin, Daigle, & Cullen, 2005; Winfree, Taylor, He, & Esbensen, 2006).

Issues in the Measurement of Self-Control: The Problems of Criterion Contamination and Content Validity

Social-personality psychologists and criminologists differ in conceptualization and measurement of self-control. The field of criminology has been greatly influenced by Gottfredson and Hirshi's definition of self-control, which represents a composite of characteristics thought to predispose an individual to crime, rather than a unitary psychological variable (Hirschi, 2004; Piquero & Bouffard, 2007). This definition maps directly onto the observed characteristics of crime (i.e., acts that harm others, provide short-term rewards, incur negative long-term consequences, and require little skill or planning) and includes six dimensions: impulsivity, self-centeredness, preference for physical activity,

preference for simple tasks, risk-taking, poor temper (Arneklev, Grasmick, & Bursik, 1999).[2].

Based on these six dimensions (Arneklev et al., 1999), criminological measures of self-control often measure constructs outside the psychological definition of self-control. For example, the widely used criminological measure of low self-control by Grasmik and colleagues (1993) includes domains assessing self-centeredness, as well as preference for physical activities and simple tasks. Including such items essentially "contaminates" the measure of *self-control* with other related, but distinct, constructs. Notably, a review of the literature finds that roughly half of the criminological studies of self-control's relationship with antisocial behavior employ the Grasmick measure (Pratt & Cullen, 2000).

It has been argued by criminologists that the best indicators of self-control are specific behavioral markers (e.g. "I save regularly"), rather than general self-control processes (e.g. "I have self-discipline") (Gottfredson & Hirschi, 1990). While this measurement method may circumvent some problems with self-report (e.g., focusing on concrete behaviors that require little insight), it can introduce a tautological problem of predictor criterion overlap when used to predict behavioral outcomes (Marcus, 2003; Cretacci, 2008). For example, in a study investigating the relationship between self-control and substance misuse, one would not want to measure self-control with an item "In the mood, I have drunk more than I could handle" (Marcus, 2003). In such situations, the independent variable is "contaminated" with items that also describe the dependent variable; hence the reasoning becomes circular: maladaptive behavior is correlated with itself. Some measures of self-control consist only of ratings of specific behaviors (e.g., Retrospective Behavioral Self-Control scale: Marcus, 2003). Other questionnaires mix items assessing specific behaviors (e.g., "I change residences") with general items of self-control (e.g., the Barratt Impulsiveness Scale-11: Patton et al., 1995).

Of the seven longitudinal studies of self-control in high-risk populations identified above, two studies used an index of behavior problems vulnerable to tautology (Piquero et al., 2005; Benda et al., 2005), and several studies employed a multidimensional scale with poor content validity (Longshore et al., 2004; Longshore et al., 2005; Conner et al., 2009; Langton, 2006). Only one study employed a measure of self-control with reasonable content validity and without posing the problem of criterion contamination (Winfree et al., 2006).

The Brief Self-Control Measure

The Brief Self-Control Scale (BSCS) is a 13-item measure of self-control that avoids criterion contamination and maintains content validity. The BSCS focuses on processes that directly involve self-control (e.g., breaking a habit, working toward long-term goals), rather than distal behavioral outcomes of self-control. Along with its longer version, the Self-Control Scale (SCS), the BSCS has shown good reliability and validity among college students (Tangney, Baumeister & Boone, 2004; de Ridder et al., 2012) and relates to a

[2]However, recent theoretical and empirical work by Hirschi (2004) reconceptualizes self-control as the absence of social bonds that inhibit antisocial behavior (i.e., bonds to family, to ideals, to morality). From this perspective, self-control is a social rather than psychological construct (Hirschi, 2004; Piquero & Bouffard, 2007).

variety of behaviors, but as noted, existing studies have almost exclusively employed cross-sectional designs with college or community samples. Of the 50 studies employing the BSCS or the SCS identified in de Ridder and colleagues' (2012) meta-analysis, (86%) were cross-sectional and nearly all focused on student (64%) or community (32%) samples. The most commonly investigated behavioral outcomes with the BSCS/SCS were in the domains of school/work, eating/weight, interpersonal functioning, and wellbeing/adjustment.

A few BSCS/SCS studies have examined risky or antisocial behavior. In several college samples, the BSCS/SCS has been negatively correlated with retrospective reports of alcohol use (de Ridder, de Boer, Lugtig, Bakker, & van Hooft, 2011; Quinn & Fromme, 2011; Quinn & Fromme, 2010; Reisig & Pratt, 2011), illegal drug use (Tsukayama, Duckworth, & Kim, 2012), risky sexual behavior (Quinn & Fromme, 2010), and minor illegal behaviors (Holtfreter, Reisig, Piquero, & Piquero, 2010; Reisig & Pratt, 2011; Reisig, Wolfe, & Holtfreter, 2011). Only one study of the BSCS/SCS and risky behavior has been conducted in a high-risk sample. In a study of 122 male prisoners, the SCS was correlated with reports of past bullying behavior during incarceration (Archer & Southall, 2009). Given the lack of empirical research with the BSCS/SCS in high-risk samples, it remains unclear if this measure would provide a reliable and valid measure of self-control in criminal offender populations.

The Current Study: A Longitudinal Test of Self-Control's Relationship to High-Risk Behavior in a High-Risk Sample

The current study draws on longitudinal data from 553 jail inmates spanning the period of incarceration to one year post-release. This study has two major aims, to: 1) assess the reliability and validity of the BSCS in a sample of jail inmates and 2) examine the relationship between the BSCS and behavior before, during, and after incarceration including criminal activity, jail misbehavior, substance dependence, HIV risk behavior, and suicidality. We focus on self-control's prospective relationship with behavior during the first year post-release. Thus, this study contributes a longitudinal examination of the implications of a conceptually sound social psychological measure of self-control for subsequent key behavioral outcomes in a high-risk population. In addition, we examined self-control's ability to predict *changes* in behavior for the subset of variables measured both regarding pre-incarceration and post-release behavior (i.e., HIV risk, substance use and dependence).

The current study further contributes to the literature in three important additional respects. First, we controlled for the effects of social desirability for all study outcomes derived from self-reports. For various reasons, respondents may be unwilling to endorse negative characteristics about themselves, intentionally presenting themselves as having more socially desirable characteristics than they actually do. Because self-control is a socially desirable capacity, social desirability bias can threaten validity of self-report assessments of self-control (Dougherty, Mathias, Marsh, & Jagar, 2005; Lejuez et al., 2002). Previous research has found mostly moderate to strong positive correlations between measures of social desirability and self-report measures of self-control, (Bertrams & Dickhauser, 2012; Mathie & Wakeling, 2011; Tangney et al., 2004). Thus, analyses controlling for social desirability are of interest, but few studies have done so. Initial evidence with the

BSCS/SCS in a college sample demonstrated that self-control's concurrent relationship with outcomes is surprisingly robust when controlling for social desirability (Tangney et al., 2004). Social desirability is rarely, if ever, considered in longitudinal studies and in studies of high-risk populations.

Second, we examined whether the strength of relationships varied across diverse groups of inmates. Few studies (cross-sectional or longitudinal) have examined whether the link between self-control and behavior is equally important across gender, age, and ethnicity. The diversity of samples in which a significant relationship between self-control and crime has been demonstrated provides some evidence for generalizability (see Tittle et al., 2003 for review). However, a more informative test of the universality hypothesis would be to directly test for moderation -- i.e., whether the strength of the relationship (not statistical significance) varies across demographic groups. We are aware of no prior published empirical tests of moderation of the relationship between self-control and antisocial behavior by gender, age, or ethnicity.

Finally, influenced by Positive Psychology, we examine both positive and negative aspects of post-release adjustment. Whereas existing criminology studies of offenders' self-control have focused exclusively on negative outcomes (e.g., re-arrest), the current study considers both negative and positive aspects of adjustment to the community. What is missing in most of the criminology literature is the substantial variance in life adjustment among those who do not recidivate. Among non-recidivists, some are homeless; others have successfully reintegrated into the community: holding a job, maintaining relationships, supporting children, and volunteering their time for others. Positive adjustment to the community is not merely the flip side of the recidivism coin, and predictors of positive post-release adjustment are not necessarily the same as predictors of recidivism. The current study of offenders is unique in considering positive outcomes –a community functioning index – in addition to the negative outcome of criminal recidivism.

Methods

Participants were 553 (381 male) adult inmates held at a metropolitan area county jail. The sample was diverse in terms of race/ethnicity (44.1% African American, 35.8% Caucasian, 9.4% Hispanic/Latino, 10.7% Other) and age (18.20- 69.73 years of age, $M = 32.3$, $SD = 9.99$).

These data were gathered as part of a larger ongoing longitudinal study of moral emotions and criminal recidivism. Enrollment for the study occurred between 2002 and 2007. Due to the wide range in participants' sentence length (from less than a year to a life sentence) there is substantial variability in inmates' eligibility for follow-up interviews. Follow-up interviews began in 2003 and are currently ongoing. Details about study recruitment, design and data collection are available elsewhere (see Tangney, Mashek, & Stuewig, 2007).

Six hundred and twenty-eight inmates (74% of those who were approached) were consented and enrolled in the study. Of these participants, 553 provided valid baseline measures of self-control, and 508 completed valid essential portions of the initial assessment (i.e., were

not transferred or released to bond before the baseline assessments could be completed) and were followed longitudinally. At the time of analyses, 486 participants had been eligible for the one-year post-release assessment (e.g., were not still incarcerated). We re-interviewed 336 (69%) eligible participants, a rate comparable to other longitudinal follow up of inmates (Brown, Amand, & Zamble, 2009; Inciardi, Martin, & Butzin, 2004). Figure 1 presents a consort diagram of attrition.[3]

Baseline Measures: Time 1 – Initial Incarceration

Self-Report—*Self-control* was assessed using the Brief Self Control Scale (BSCS), a 13-item self-report measure of general self-control (Tangney, Baumeister, & Boone, 2004). Participants rated how well statements described them (i.e. "I am good at resisting temptation") on a 5-point scale. The BSCS demonstrated good reliability in the current sample (α =.85).

Demographics were assessed by participants' self-reported gender, age, and race as part of the initial interview.

Self-reported personality dysfunction and suicidality were assessed with the Personality Assessment Inventory (PAI; Morey, 1991). The PAI is a widely used, well-validated, self-report measure of psychopathology and personality traits. PAI scales were created using T-scores based on the census standardization sample and reliability was consistent with those observed in the standardization samples (Morey, 1991) and in correctional samples (Edens & Ruiz, 2005).

This paper includes subscales of the PAI measuring symptoms of Borderline Personality Disorder, Antisocial Personality Disorder, and suicide risk, as well as validity indices. The Total Borderline Features scale includes four subscales measuring affective instability (6 items, α = .77), identity problems (6 items, α = .72), negative relationships (6 items, α = .64), and self-harm/ impulsivity (6 items, α = .76). This last scale, which ostensibly measures self-harming behaviors, assesses the more general characteristic of impulsivity (e.g. "I'm too impulsive for my own good"). The Antisocial Features Scale includes three subscales: antisocial behaviors (8 items, α = .70), egocentricity (8 items, α = .67), and stimulus seeking (8 items, α = .74). The Suicidality Scale of the PAI (12 items, α = .85) includes items that assess impulses and plans to commit suicide, as well as thoughts about death (Morey, 2003).

Past suicidal behavior was also assessed as part of an in-depth psychosocial interview supporting the assessment of psychopathy (see below).

Positive Impression Management (PIM) was assessed with the PAI. This 9-item scale (α = .79) assesses a socially desirable response bias where high scores represent either intentional

[3]To evaluate the possibility of biased attrition, attrition analyses were conducted on data collected as of 9/27/12. Eligible individuals who were re-interviewed vs. those who were not (not found, refused, and withdrew) were compared on 34 baseline variables. Variables were from a variety of domains including demographics, mental health (e.g., borderline personality disorder), psychological (e.g. shame, self-control), criminality (e.g. criminal history, psychopathy), and substance dependence. Attrition analyses indicated that out of 34 background variables tested, there were only two differences. Those individuals who were missed at one-year post-release tended to be slightly younger and Hispanic. Importantly, there were no differences in self-control.

overstatement of positive characteristics or lack of insight into personal shortcomings (Morey, 2003).

Substance use and dependence were assessed using the Texas Christian University: Correctional Residential Treatment Form, Initial Substance Use Assessment (TCU-CRTF) (Simpson & Knight, 1998). For the year prior to incarceration, participants reported how often they used alcohol, marijuana, cocaine, and opiates on a scale ranging from 0 = "*Never*" to 8 = "*More than once a day*." Additionally, participants rated how often during that year they experienced symptoms of substance dependence in different domains as specified by DSM-IV (American Psychiatric Association, 2000). Item responses ranged from 0 = "*Never*" to 4 = "*7 or more times*." Four substance dependence scales were created to assess dependency on alcohol (7 items, $\alpha = .93$), marijuana (6 items, $\alpha = .92$), opiates (7 items, $\alpha = .99$), and cocaine (7 items, $\alpha = .98$). Responses were averaged within domain and a total score was computed by taking the mean across the seven domains (six in the case of marijuana because withdrawal is not considered part of the criteria). Given the similarities between cocaine and opiates (illegal, highly addictive) and the low rate of opiate use in our sample, opiates and cocaine were combined into a category of "cocaine/opiates." Frequency and dependence of cocaine/opiate use was defined as the higher of the two ratings for either cocaine or opiates.

HIV risk was operationalized as a composite of a variety of behaviors associated with risk for contraction of HIV. We used items from the TCU HIV/AIDS Risk Assessment Form (ARA; Simpson, 1997) measuring frequency of unprotected sexual acts and IV drug sharing behaviors in the 30 days prior to incarceration to compute a modified Bernoulli mathematical model to express the probability *P* of HIV infection (Pinkerton & Abramson, 1993; Holtgrave, Levitson, Wagstaff, & Pinkerton, 1997). In this model, *P* represents the cumulative likelihood that a given person becomes infected after engaging in multiple, specific acts of unprotected intercourse and/or sharing needles and drug paraphernalia over a given time period. For more information about the Bernoulli model in this sample, see Adams, Kendall, Smith, Quigley, Stuewig, & Tangney (in press).

Clinician Assessment—*Psychopathic traits* were rated by a clinician at baseline using the Hare Psychopathy Checklist: Screening Version (PCL:SV; Hart, Cox, & Hare, 1995). The 12-item checklist is scored based on an in-depth psychosocial history interview and review of criminal and jail records. The PCL-SV yields a total psychopathy score, as well as two factor scores. Factor 1 assesses a personality style defined by glibness and superficiality, egocentric grandiosity, deceit and manipulation, lack of remorse and empathy, and shallow emotions in general. Factor 2 assesses a chronically unstable and antisocial lifestyle. In scoring Factor 2, clinicians rate several traits related to self-control which are also associated with psychopathy: impulsivity, poor anger control, lack of realistic long-term goals, and irresponsibility. Additionally, Factor 2 includes ratings of adult and adolescent anti-social behavior. For information about PCL: SV scoring in this study see (Hastings, Krishnan, Tangney, & Stuewig, 2011).

Official Records—*Criminal history* was assessed via a review of National Crime Information Center (NCIC) records (the national database of criminal records maintained by

the FBI). *Criminal history total* represents the total number of criminal charges in participants' records (range from 1 to 176). *Criminal history violent* represents the number of violent charges (e.g., physical and sexual assault, carjacking) (range from 0 to 24). We controlled for participants' age in both variables.

One-Year Post-Release Measures: Time 2

Substance use and dependence were re-assessed using the TCU-CRTF (Simpson & Knight, 1998) in reference to the first year post-release, using scales paralleling those at baseline (described above). Reliabilities for dependence scales were : alcohol (7 items, $\alpha = .93$), marijuana (6 items, $\alpha = .87$), opiates (7 items, $\alpha = .98$), and cocaine (7 items, $\alpha = .98$).

Recidivism was assessed in several ways. First, participants reported how many times they had been arrested for any of 17 types of crime (e.g. theft, assault, drug offenses, etc.) during the first year post-release. A variable reflecting total *number of arrests* during the first year post-release was computed and ranged from 0 to 11. Second, they reported how many times they had engaged in each type of crime without being arrested during the year after their release. Given that frequency of illegal behavior is confounded with type of crime (e.g. possession of illicit substances occurs more frequently than robbery), we created a variable of criminal versatility (the number of different types of crimes instead of frequency). Research comparing measures criminal versatility to criminal frequency has favored measures of versatility (Bendixen, Endresen, & Olweus, 2003). The *criminal versatility-undetected offenses* variable measured the number of different types of crimes participants committed, but were not arrested for (range 0-5). Because the total arrests and criminal versatility variables were positively skewed, we examined results using log-transformed versions of the variables. Since there were no differences, results reported are from analyses using the standard (non-transformed) variables.

HIV risk was reassessed using items from the TCU HIV/AIDS ARA (Simpson, 1997) measuring risky behavior during the 30 days prior to the one-year post-release interview. HIV risk was calculated using procedures parallel to those at baseline (described above).

Community Functioning was assessed using eight items representing an index of adaptive community functioning chosen from a broader measure of detailed demographic information given at the one-year post-release interview. Participant responses on each of the eight items were evaluated in terms of the level of adaptive functioning. Responses deemed to be adaptive were given a score of "*1*", and those that were either neutral or maladaptive were given a score of 0. Items include 1) residential stability (1 = not homeless and had less than three residences in the first year), 2) home ownership (1 = owned home), 3) current marital status (1 = legally married), 4) largest source of financial support in the past year (1 = participant's own job), 5) valid driver's license (1 = has valid drivers license), 6) financial support of children (1 = financially supporting all of the children for whom he/she is financially responsible), 7) educational and vocational upgrades (1 = worked on or completed vocational training or a degree), and 8) volunteerism in the community (1 = volunteered). For example, participants who reported a legal job as their largest sources of support received a score of 1, whereas those who reported that they received financial support primarily from family (considered neutral) or welfare (considered maladaptive)

received a score of 0. Detailed scoring information for each item is provided in supplemental material to this article.

Official records—*Jail Misconduct* was coded using jail records obtained between time of enrollment in the study and release date. Three indices of institutional misconduct were calculated: 1) *Number of Incidents* recorded in the inmate's file regardless of whether they led to a formal institutional charge or finding; 2) *Number of Formal Charges* against the inmate for violation of institutional rules; and 3) *Number of Formal Physical Charges* for physical violence (e.g., fighting, assault on a correctional officer, etc.) against the inmate.

Official records of recidivism were determined based on FBI records. We coded number of charges occurring during the period between the participant's release date and one year following.

Results

Aim #1: Validation of the BSCS: Reliability, Convergent and Discriminant Validity

At baseline, the participants reported moderate rates of self-control (M = 3.00, SD =.69). Mean score on the BSCS in the current sample was not significantly different from that observed by Tangney and colleagues (2004) in two samples of college students ($t(902)$ = . 36, p = .71; $t(808)$ = 1.27, p = .21). To investigate convergent and discriminant validity, participants' BSCS scores were compared with clinician ratings of psychopathic traits and behavior on the PCL: SV (Table 1). We expected self-control assessed by the BSCS to be significantly negatively related to scores on Factor 2, which assesses impulsive, antisocial lifestyle, but not with Factor 1, which assesses a psychopathic interpersonal style defined by superficiality, grandiosity, deceit, and lack of empathy. Consistent with our hypothesis, the BSCS was significantly negatively related to Factor 2, but unrelated to Factor 1. Specifically, the BSCS was negatively related to clinicians' ratings of impulsivity, poor anger control, lack of self-reliance and realistic goals, and irresponsibility. The BSCS was also negatively correlated with items rating antisocial behavior during adolescence and adulthood.

To further establish construct validity, we examined the relationship of the BSCS to assessments of psychological disorders that include impulsivity as a symptom -- i.e., Borderline Personality Disorder (BPD) and Antisocial Personality Disorder (ASPD) (Whiteside & Lynam, 2001). The BSCS demonstrated moderate to strong negative correlations with symptoms of both disorders. The BSCS was negatively correlated with all BPD subscales. Of these, the BSCS was most negatively correlated with the "self-harm" BPD subscale, which measures problematic impulsivity. In addition, there were moderately strong negative relationships between the BSCS and PAI measures of aggression and suicidality.

The BSCS was substantially positively correlated with the PAI scale measuring Positive Impression Management (PIM). Nonetheless, the relationships of the BSCS to concurrent self-reports on the PAI were remarkably robust when controlling for PIM, as shown in Table 1.

Aim # 2: Investigation of BSCS's Relationship with Behavior

BSCS and Retrospective Reports and Official Records of Pre-Incarceration Risky Behavior—Because most research on the behavioral correlates of self-control draws on data gathered at a single point in time, we present analyses of the relationship between BSCS and retrospective reports of risky behavior prior to incarceration (see Table 2). Self-control had a significant negative relationship with substance misuse (self-reports of both frequency of use and symptoms of dependence), which held above and beyond the influence of PIM. According to the conventions specified by Cohen (1992) for small (r = .01), medium (r = .03) and large (r = .05) effect size, the effect sizes of these negative relationships ranged from medium, in the case of misuse of cocaine/opiates, to small in the case of alcohol misuse. While self-control had a small negative bivariate relationship with HIV-risk behavior, this relationship dropped to non-significant when controlling for the effects of PIM. As for suicidal behavior, individuals with higher self-control were less likely to report having attempted suicide. This relationship remained significant when controlling for PIM (B = −.60, S.E. = .29, Wald = 4.23, ExpB = .55, $p < .05$). Furthermore, the BSCS had a small, negative relationship with official records of overall criminal history. However, self-control was not significantly related to official records of specifically violent criminal charges, likely owing to a restriction of range.

Does the BSCS Predict Future Risky (and Adaptive) Behavior?—Official records of behavior problems during incarceration revealed a low rate of deputy-reported behavioral incidents (M = 1.34, SD = 2.70) and official charges (M = 1.07, SD = 2.43). The BSCS, administered at the outset of incarceration, did not predict either official charges (r = −.02, $p > .05$) or behavioral incidents during incarceration (r = −.02, $p > .05$). As shown in Table 3, neither did the BSCS predict post-release HIV risk behavior. However, the BSCS demonstrated a significant and robust negative relationship with misuse of illegal substances (marijuana, cocaine, and opiates), even when controlling for PIM. Regarding criminal re-offense, the BSCS predicted participants' self-reported arrests and versatility of undetected crimes; participants with higher self-control reported fewer arrests and lower versatility of crime. The link between self-control and subsequent undetected crime held when controlling for PIM, whereas the relationship to self-reported versatility of arrests did not. However, the BSCS negatively predicted official records of number of charges (which are not subject to biased responding).

Because much research in criminology operationalizes recidivism as a dichotomous variable (did or did not re-offend), we also present results for dichotomous indicators of self-reported arrests, self-reported undetected crimes, and official records of arrests at the top of Table 3. At the bivariate level, the BSCS negatively predicted each of the three recidivism dichotomies. The effect held for self-reported undetected offenses, but not arrests, when controlling for PIM.

Regarding adaptive behavior, the BSCS significantly positively predicted adaptive community functioning in the year after release. This relationship remained significant after controlling for PIM.

Does the BSCS Predict Changes in Behavior from Pre-incarceration to Post-release?—For those variables measured both at pre-incarceration and post-release (i.e., HIV risk behavior, substance use and dependence), we examined whether the BSCS explains variance in post-release levels above and beyond pre-incarceration levels. Controlling for each variable at pre-incarceration (Time 1), self-control was unrelated to post-release (Time 2) use of alcohol and marijuana, as well as HIV risk (see Table 4). Self-control was significantly negatively related to Time 2 cocaine/opiate use, as well as alcohol, marijuana and cocaine/opiate dependence controlling for Time 1.

Is Self-Control Differentially Adaptive as a Function of Sex, Race, and Age?—To determine if self-control's relationship with behavior during the first year post-release varied as a function of sex, race (African-American vs. white), or age, we ran a series of moderation analyses (11 total) employing multiple regression. In order to adjust for multiple comparisons (33 analyses total), we used a Bonferroni adjustment of $p < .002$. No interaction term was significant at this level[4]. In short, the BSCS predicts substance misuse, recidivism, and positive post-release adjustment similarly for former inmates, male or female, Caucasian or African-American, young or old.

Discussion

This study tested the BSCS's reliability, validity, and its relationship with jail inmates' subsequent post-release maladaptive and adaptive behaviors. Whereas the majority of research on self-control's relationship with behavior have been cross-sectional studies of college and community samples, this study's methodological rigor was enhanced by 1) using a conceptually sound measure of self-control, 2) considering both longitudinal and cross-sectional analyses 3) controlling for the effects of social desirability bias, 4) examining generalizability across demographic groups and, when possible 5) examining the relationship with post-release behavior controlling for pre-incarceration behavior.

The Reliability and Validity of the BSCS in a High-risk Sample

While the BSCS has been validated in high-functioning samples, little was known about its ability to provide a reliable and valid measure of self-control in high-risk samples. In the current study of jail inmates, the BSCS demonstrated good reliability and both discriminant and convergent validity. It is notable that multiple sources of information supported the validity of the BSCS; it demonstrated expected relationships with both self-report questionnaires (e.g., symptoms of borderline personality disorder) and clinician administered interviews (e.g., PCL-R assessment of psychopathic behavior).

Self-control is Important in Predicting Maladaptive Behavior in High-Risk Populations

This study documents the utility of self-control in longitudinally predicting extreme forms of behavior in high-risk samples. Clearly, substance misuse and criminal behavior are influenced by a plethora of individual, social, and situational factors. Yet, despite these

[4]Only one interaction term was statistically significant at the $p<.05$ level, indicating that self-control's relationship with alcohol use during the year post release was stronger for African-American participants compared with Caucasian participants.

myriad unmeasured factors, self-control assessed by 13-items about seven months prior to release predicted significant variance in criminal recidivism and substance misuse during the year post-release. Both criminal behavior and substance misuse involve a short-term reward (e.g., intoxication, quick money) balanced against the possibility of a long-term negative consequence (e.g., health risks, incarceration). Because individuals with low self-control are less able to delay gratification or deliberate before acting, they may be more drawn to experimentation with crime and substances. Once involved, low ability to persist may inhibit successful attempts to disengage from these dangerous activities.

Furthermore, this measure of self-control predicted *decreases* from pre- to post-incarceration in in use of cocaine/opiates as well as dependence on alcohol, marijuana, and cocaine opiates. Given the infrequent availability of substances in the well-managed county jail in which we conducted this study, inmates were returning to the community having experienced a period of abstinence during their incarceration. Inmates with low self-control were less able to maintain this reduction in substance use post-release. These findings support self-control's role as a predictor (rather than an outcome) of substance misuse.

Self-Control is Also Important to Positive Outcomes, Such As Community Adjustment

In high-risk samples, positive aspects of adjustment that entail *active engagement* in *positive* behaviors are rarely considered. Avoiding negative behavior is not synonymous with engaging in positive behavior. For example, in this sample (Moore, et al., in revision), the Community Functioning Index was not simply the flip side of maladaptive behavior; it correlated only moderately with measures of recidivism (r's ranged from −.17 to −.23) and substance dependence (r's ranged from −.10 to −.21). Results from the current study underscore that self-control makes a significant contribution both to positive community reintegration as well as desistence from negative behavior. The capacity for self-control may be especially crucial during the first few weeks or months of re-entry into the community. Inmates returning to the community often find many obstacles (e.g., stigma, strained relationships, financial difficulty) and few opportunities. Because those with high self-control are better able to forego temptations of the moment and persist toward long-term goals, they are likely better able to navigate obstacles and pursue opportunities

The Effects of Self-Control Are Largely Independent of Social Desirability

Social desirability response bias, as measured by the Positive Impression Management (PIM) scale of the PAI, had a large positive relationship with the BSCS. Because of this potential confound, we investigated self-control's relationship with all self-reported outcomes controlling for PIM. While the magnitude of most relationships were reduced when the effects of PIM were taken into account, self-control remained significantly related to the majority of outcomes, including illegal substance misuse, undetected criminal behavior, and positive community functioning. These results have two major implications. First, results highlight the importance of self-control's relationship with behavior above and beyond PIM. Because controlling for PIM in analyses provides a rigorous test of self-control's predictive power, the result of a robust effect of self-control is especially impressive. Second, given that controlling for PIM generally reduced self-control's bivariate relationships, in some cases to non-significant (e.g., with alcohol dependence, self-reported

arrests), it is recommended that future research measure and control for social desirability bias.

The Effects of Self-Control Generalize Across Age, Gender, and Race

We found that self-control's longitudinal relationship with a range of subsequent behaviors generalized across different demographic groups. Statistical tests of moderation provided no compelling evidence that the strength or direction of relationships depended on participant race, age, or sex. While failing to find significant differences is not the same as confirming conformity, these results add to previous findings that self-control's relationship with behavior is significant in diverse samples (DeLi, 2005; Tittle, Ward & Grasmick, 2003; Shekarkhar & Gibson, 2011). These findings are consistent with Gottfredson and Hirschi's (1991) hypothesis that self-control is a universal risk factor for antisocial behavior. Clinicians may benefit from assessing and addressing self-control broadly across their client caseloads, given the lack of evidence that self-control is only important to a demographic subsample.

Self-control Was Related to Much, But Not Everything

Although there were robust relationships (predictive and postdictive) between the BSCS and the majority of behavioral outcomes, self-control was not significantly related to all outcomes. Although previous research has found a relationship between self-control and HIV risk and alcohol use, in the current study the BSCS was not related to self-reported post-release HIV-risk behavior or alcohol use. This may be due to the variety of contextual factors that influence theses behaviors in this sample of inmates returning to the community (e.g., neighborhood context) or to the specific measures employed in this study. We did not find a relationship between self-control and behavior problems during incarceration, which is inconsistent with prior research (e.g., DeLisi et al., 2008). Failure to find a significant relationship between self-control and jail misbehavior may be due to restrictions in range in jail misbehavior in the current sample; only 40% of inmates had a record of any jail misconduct.

Self-control was not associated with specifically violent criminal history in this sample. However, self-control was significantly associated with general criminal history at baseline as well as arrests and criminal versatility (engaging, likely impulsively, in a range of different types of crime) during the year post release. Individuals with low self-control may tend to engage in diverse criminal behavior as opportunities present themselves, rather than any one particular type of crime. Those seeking to predict specifically violent offense may employ other assessment tools, such as the Violence Risk Appraisal Guide, which has successfully related to violent offense in this sample (Hastings, Krishnan, Tangney, & Stuewig, 2011).

Limitations and Future Directions

While the results of this study hold important implications for the understanding of self-control in an incarcerated sample, it has several noteworthy limitations. Our sample consisted of "general population" adult jail inmates. We cannot assume that our findings will generalize to other high-risk samples, for example prison inmates, those assigned to

administrative or disciplinary segregation, those assigned to forensic units for the seriously mentally ill, IV drug users, or juvenile offenders. Future research should replicate these effects in other types of high-risk samples. Secondly, we relied on self-report assessment for the majority of correlates and outcomes (e.g., substance use, HIV-risk behaviors). To enhance validity of our outcomes, we controlled for the effects of social desirability and incorporated clinician ratings (e.g., psychopathic traits) and official records (e.g., jail misconduct, arrest records) when possible. However, future research may benefit from the use of additional objective measures of outcome variables (e.g., urinalysis for substance use).

Conclusion and Applied Implications

Although research suggests that self-control is related to dangerous and antisocial behavior, there are major limitations to prior empirical research on this topic. This literature has lacked longitudinal designs in high-risk samples, with sound measurement and rigorous methodology (i.e., controlling for social desirability). All in all, results from the current study are largely consistent with prior cross-sectional findings in low-risk samples: self-control is prospectively related to both adaptive and maladaptive behavior. By showing that a valid measure of self-control predicts behavior in a high-risk sample above and beyond potential confounds (i.e., social desirability), the current study fills an important empirical gap in the literature on self-control's relationship with behavior.

The current research supports the utility of the BSCS not only as a research tool, but also as a clinical measure. Andrews and colleagues' (1990) influential Risk, Need, and Responsivity Model (RNR) of effective offender rehabilitation is relevant in this regard. The risk principle emphasizes the importance of prioritizing high-risk offenders for the most intensive services, with corresponding fewer services provided to low risk offenders. The need principle directs clinicians to focus treatment on malleable (as opposed to static) "criminogenic needs" or risk factors for recidivism. Following the risk principle, the BSCS could be employed to identify inmates with low self-control for intensive services, given that they are at higher risk for recidivism and substance use, relative to their high self-control peers. Following the need principle, given that self-control is a malleable characteristic, inmates scoring low on the BSCS could be prioritized for self-control interventions.

At present, theory and research suggest that various treatments improve self-control, including problem solving interventions (Ronan, Gerhart, Dollard, & Maurelli, 2010), regular self-control exercise (Baumeister, Gailliot, DeWall, & Oaten, 2006 for review), and mindfulness meditation (Masicampo & Baumeister, 2007). Preliminary evidence finds that self-control training during incarceration may deter recidivism when compared to a control group (Ronan et al., 2010). Results from the current study highlight the importance of further developing empirically supported interventions to increase self-control among criminal offenders. Fostering higher self-control may not only deter risky behavior (substance misuse, crime), but also encourage adaptive community re-integration. Thus, effective self-control interventions have the potential to benefit the lives of individuals, as well as the health of the community.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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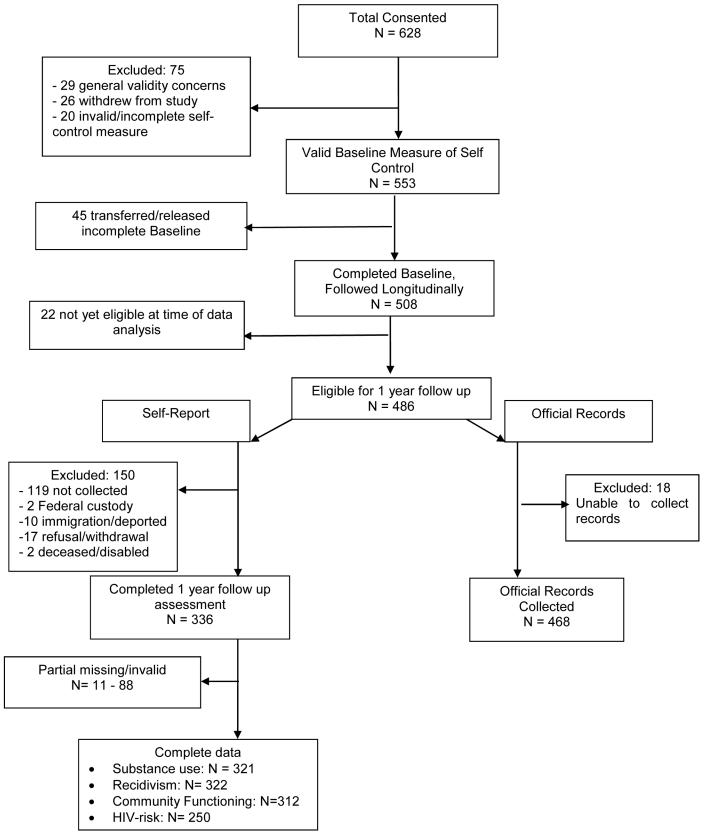

Figure 1.
Consort Diagram

Table 1

Relationships of baseline self-control with concurrent assessments of conceptually related constructs

			Bivariate	Control for PIM
	M	*SD*	*r*	β
Clinician Administered Assessment				
Psychopathy Total	12.1	4.87	−.26**	
Factor 1	5.81	2.90	−.04	
Factor 2	6.37	2.81	−.40**	
Lacks Goals	0.85	0.69	−.28**	
Irresponsible	1.27	0.70	−.33**	
Poor Behavior Controls	0.79	0.81	−.11*	
Adolescent Antisocial Behavior	1.17	0.79	−.27**	
Adult Antisocial Behavior	1.54 *(n=491)*	0.56	−.23**	
Self-Report Assessment				
Antisocial Personality	64.3	12.0	−.59**	−.36**
Antisocial Behaviors	68.3	10.4	−.56**	−.37**
Stimulus Seeking	58.8	13.1	−.51**	−.34**
Egocentricity	55.9 *(n=513)*	12.7	−.36**	−.15**
Borderline Personality	63.2	12.8	−.66**	−.27**
Self-harm (Impulsivity)	63.5	14.8	−.67**	−.39**
Negative Relationships	63.6	11.8	−.42**	−.07
Identity problems	61.1	12.4	−.51**	−.17**
Affective Instability	54.9 *(n=514)*	12.1	−.55**	−.27**
Aggression	55.9	13.2	−.43**	−.18**
Verbal Aggression	52.3	10.6	−.36**	−.20**
Physical Aggression	58.2	14.5	−.39**	−.17**

			Bivariate	Control for PIM
	M	***SD***	***r***	**β**
Aggressive Attitudes	54.8 *(n=513)*	13.0	−.38**	−.12*
Suicidality	51.0 *(n=511)*	11.0	−.32**	−.15**
Positive Impression Management	45.5 *(n=512)*	12.21	.63**	

$^{\varphi}p < .10$,

$^{*}p < .05$,

$^{**}p < .01$

Table 2

Relationships of baseline self-control to retrospective reports of risky behavior

	M	*SD*	*Bivariate r*	Control for PIM β
Official-Records				
Criminal History-Total	17.18	17.88	−.16**	
Criminal History- Violent	1.9	2.72	.03	
Sample Size	*(n=555)*		*(n=529)*	
Self-Report				
HIV-risk composite	.01	.03	−.09*	.02
Sample Size	*(n=514)*		*(n=514)*	*(n=475)*
Substance use & Dependence:				
Alcohol Use	3.21	2.36	−.19**	−.11*
Marijuana Use	2.13	2.74	−.25**	−.27 **
Cocaine/Opiates Use	2.34	3.02	−.42**	−.31**
Alcohol Dep.	.72	1.02	−.28 **	−.14**
Marijuana Dep.	.52	.97	−.28 **	−.19**
Cocaine/Opiates Dep.	1.17	1.59	−.45 **	−.31**
Sample Size	*(n=547-549)*		*(n=541-549)*	*(n=500-507)*
	% Yes		Bivariate Odd's Ratio	Control for PIM Odd's Ratio
Prior suicide attempt	11.8		.46**	.55*
Sample Size	*(n=442)*		*(n=440)*	*(n=436)*

$^{\varphi}p < .10$,

$^{*}p < .05$,

$^{**}p < .01$

Table 3

Prospective relationships of baseline self-control with risky behavior during incarceration and one year post-release

	% Yes		**Bivariate Odd's Ratio**	**Control for PIM Odd's Ratio**
Official Records				
Arrested	40.4 *(n=468)*		.65** *(n=311)*	
Self-report				
Arrested	42.2		.56**	.67$^{\phi}$
Undetected offense	43.4 *(n=320-322)*		.50** *(n=319-321)*	.56** *(n=315-317)*
	M	*SD*	Bivariate *r*	Control for PIM β
Official Records				
# of criminal charges	1.36 *(n=459)*	2.45	−.11 *	
Self report				
# of arrests	.72	1.45	−.18**	−.18*
Crim. Vers. undetected offenses	1.08 *(n=322)*	1.45	−.30** *(n=321)*	−.27** *(n=316)*
HIV-risk composite	.01 *(n=250)*	.01	.01 *(n= 298)*	.00 *(n=245)*
Substance use & Dependence:				
Alcohol Use	2.79	2.45	−.09	.01
Marijuana Use	1.20	2.32	−.15 **	−.16**
Cocaine/Opiates Use	1.31	2.44	−.34**	−.22**
Alcohol Dep.	.54	.91	−.12 *	.02
Marijuana Dep.	.21	.55	−.17 **	−.15 *
Cocaine/Opiates Dep.	.69 *(n=319-321)*	1.29	−.36 **	−.22 **
Community Functioning Index	.86 *(n=320)*	.39	.31** *(n=318-321)*	.27** *(n=313-316)*

ϕ $p < .10$,
* $p < .05$,
** $p < .01$

Table 4

Self-control and changes in behavior: Hierarchical regressions of variables at Time 2 regressed on Time 1 and BSCS

	β	ΔR^2
HIV-risk composite: (*n*=234)		
Time1 HIV Risk	.16*	
BSCS	.03	.00
Substance use & Dependence: (*n*=314-319)		
Alcohol Use		
Time1 Alcohol Use	.49**	
BSCS	−.01	.00
Marijuana Use		
Time1 Marijuana Use	.49**	
BSCS	−.04	.00
Cocaine/Opiates Use		
Time1 Cocaine/Opiate Use	.41**	
BSCS	−.16**	.02**
Alcohol Dep.		
Time1 Alcohol Dep.	.49**	
BSCS	−.16**	.03**
Marijuana Dep.		
Time1 Marijuana Dep.	.40**	
BSCS	−.17**	.029**
Cocaine/Opiates Dep.		
Time1 Cocaine/Opiate Dep.	.42**	
BSCS	−.31**	.09**

$^{\phi}p < .10$,

$^{*}p < .05$,

$^{**}p < .01$