Self-control and jail inmates' substance misuse post-release: Mediation by friends' substance use and moderation by age

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Abstract

Objective—This study examined the relationship between two risk factors for substance misuse (self-control, substance using friends) and changes in jail inmates' substance misuse from pre-incarceration to post-release.

Method—Participants were 485 adult jail inmates held on a felony conviction, recruited from a metropolitan county-jail situated in the mid-Atlantic region of the U.S. During incarceration, participants completed self-report assessments of pre-incarceration substance misuse and self-control. At one-year post-release, participants reported their substance misuse and proportion of substance-using friends (*n*=322 at follow-up).

Results—The relationship between self-control and changes in inmates' substance misuse was fully mediated by association with substance-using friends. Age moderated the relationship between friends' substance use and changes in inmates' own misuse of marijuana and cocaine. Friends' use was more strongly related to marijuana misuse for younger adults than for older adults. However, for cocaine misuse, this relationship was stronger for older adults than for younger adults. Self-control's relationships with other variables were not moderated by age.

Conclusions—This study underscores importance of self-control's indirect relationship (through substance-using friends) with changes in substance misuse: inmates with lower self-control were more likely to associate with substance-using friends and, in turn, had more symptoms of substance misuse 1-year post release. Results emphasize the importance of considering adult substance-users' friend-relationships. However, age and type of substance appear important when considering the relative importance of friends' influence.

Keywords

Jail Inmates; Moderated Mediation; Peer relationships; Substance Abuse; Substance Dependence; Self-Control

1. Introduction

Substance-use problems and crime are interconnected; misusing substances can relate directly or indirectly to criminal offending. Surveys of jail inmates find that 52% of female and 44% of males meet criteria for substance abuse and dependence (Karberg & James,

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2005). In turn, continued substance misuse post-release has been linked to criminal recidivism (Huebner & Cobbina, 2007). Thus, an understanding of risk factors for substance misuse among offenders returning to the community is particularly important from both public health and criminal justice viewpoints.

Risk factors for substance-use problems include characteristics of individuals' personalities and social environments. Two such risk factors include low self-control (personality) and substance-using friends (social). While many studies support the link between each risk factor and substance misuse, few studies have simultaneously examined both risk factors, and fewer yet have investigated whether the strength of these relationships varies across the lifespan.

1.1 Risk Factors for Substance Misuse: Self-control and Friends

Self-control is generally defined as the ability to regulate one's behavior in order to pursue long-term goals (Vohs & Baumeister, 2004). Theories of self-control in the fields of psychology and criminology posit that low self-control is a principle cause of many risky behaviors, including substance misuse (Baumeister, Heatherton, & Tice, 1994; Gottfredson & Hirschi, 1990). Individuals with low self-control may be more likely to experiment with substances and to develop substance-use problems. Much empirical research using diverse methodologies supports the link between low self-control and problems related to alcohol, marijuana, cocaine, opiates, and other substances (de Wit, 2008; Lejuez, et al., 2010; Verdejo-Garcia, Lawrence, & Clark, 2008).

The social characteristics (e.g. irresponsibility) associated with low self-control may render individuals likely to be rejected by conventional peers and, subsequently, more likely to associate with peers who engage in antisocial behavior, including substance misuse. Studies find that low self-control is correlated with association with substance-using friends, in samples of adolescents and adults (Donohew et al., 1999; McGloin & Shermer, 2008; Xiao, 2008; Yanovitzky, 2005; Longshore, Chang, Hsieh, Messina, 2004).

Association with substance-using friends has also been empirically linked to individuals' own substance-use problems. Studies of adolescents have consistently found that peers' use is related to adolescents' own substance misuse in samples of juvenile offenders (Longshore et al., 2005) as well as non-offender samples (Oetting & Beauvais, 1987; Curran, Stice & Chassin, 1997; Duan, Chou, Andreeva & Pentz, 2009; Dinges, 1993). While fewer studies have examined this relationship in adults, there is some evidence that friends remain influential into adulthood in samples of offenders (Longshore et al., 2004) and non-offenders (Bullers, Cooper, & Russell, 2001; Bohnert, Bradshaw, Latkin, 2009;)

1.1.2 Self-control, friends' use and substance misuse: Evidence for meditational model—There is disagreement on how to best understand the relationship of self-control and substance-using peers with individuals' own substance misuse. Some argue that the observed relationship between friends' use and individuals' own substance use is spurious; it is fully explained by the underlying link to self-control (Gottfredson & Hirschi, 1990). However, an alternative model suggests that substance-using friends may mediate the relationship between self-control and substance misuse (McGloin & Shermer, 2008).

Several studies of adolescent non-offender samples have found that when self-control is taken into account, the relationship between friends' and individuals' own substance misuse and antisocial behavior is reduced, but remains significant (Perrone, Sullivan, Pratt, Margaryan, 2004; Brownfield & Sorenson, 1993), thus casting doubt on the relationship being spurious. In contrast, the mediational model has received some empirical support in

studies of adolescents' use of alcohol and marijuana (Yanovitzky, 2005; Donohew et al., 1999). To our knowledge, only one study has examined the mediational relationship in adults. In a longitudinal study of adult criminal offenders, participants' reports of their friends' substance use and a measure of moral belief fully mediated the relationship between self-control and subsequent use of alcohol and illegal drugs (Longshore et al., 2004).

1.1.3 Moderation by age—The importance of these relationships may vary by age. Theories of antisocial behavior have suggested that friends emerge during adolescence as a principal source of social influence, but that this influence declines during early adulthood due to the introduction of other sources of social influence (e.g. spouse)(Thornberry, 1987; Sampson & Laub, 2005). Whereas there is ample empirical evidence that association with substance-using friends relates to adolescents' substance use, fewer studies have investigated this relationship into adulthood. And, although some evidence from non-offender samples suggests a relationship between friends' substance use and adults' own substance use (Bullers et al., 2001; Bohnert et al., 2009), there is preliminary evidence that the strength of the relationship declines during early adulthood (Jang, 2002).

The link between friends' use and own use is not the only path of the mediational model that might differ depending on age (Figure 1). Age may also moderate self-control's relationships with substance-using friends and with own substance misuse. While Gottfredson and Hirschi asserted that self-control remains influential throughout the lifespan, we are aware of no empirical evidence supporting this claim in adult samples.

Another question unaddressed by previous studies is whether the mediational model holds for alcohol and different illicit drugs. Alcohol, marijuana, and cocaine vary in terms of availability and prevalence of use. Because friends may facilitate access to and influence attitudes concerning substances, we may expect that friends may be relatively less influential for substances that are widely available and normatively used.

1.2 Present Study

The purpose of this study is 1) in a unique sample of jail inmates to replicate previous research demonstrating that association with substance-using friends mediates the relationship between self-control and inmates' post-incarceration substance misuse; 2) to extend this research by investigating whether age serves as a moderator for the pathways of this model; and 3) to examine whether the model holds for different types of substances. In order to strengthen the test of the causal ordering proposed in this meditational model, we will control for pre-incarceration substance misuse. Thus, our outcome variable represented changes in inmates' substance misuse from pre-incarceration to post-release.

Hypothesis 1	Association with substance-using friends will mediate the relationship between self-control and misuse of illicit substances (marijuana and cocaine). This mediational pathway, however, may not hold for alcohol. Because alcohol is easily accessible and use is normative, one may not need to seek out and use with specifically deviant friends.
Hypothesis 2	The relationship between self-control and both the mediator and outcome will be invariant by age. Age will neither moderate the link between self-control and friends' substance-use (Figure1: pathway a) nor the link between self-control and individuals' own substance misuse (pathway c').
Hypothesis 3	Age will moderate the path between association with substance-using friends and own substance misuse (pathway b), such that the relationship will be stronger for younger adults than for older adults.

2. Materials and Method

2.1 Participants

Participants were 485 (329 male) adult inmates held at a metropolitan area county jail. The sample was diverse in terms of race/ethnicity (44.9% African American, 34.4% Caucasian, 9.5% Hispanic/Latino, 11.2% 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 on-going longitudinal study of moral emotions and criminal recidivism (Tangney, Mashek, & Stuewig, 2007). Participants were selected who were likely to serve a sentence of at least 4 months in the jail (i.e. at least one felony charge), who were assigned to the jail's general population (i.e. not solitary confinement), and with language proficiency in either English or Spanish. Participants in the parent project completed a five-session baseline assessment at the beginning of incarceration, an assessment just prior to release into the community, and a follow-up assessment at one-year post-release. The results presented here are from the baseline (Time 1) and one-year follow-up assessments (Time 2).

2.2 Assessments

Enrollment for the study occurred between 2002 and 2007. Eligible inmates were approached shortly after incarceration. All participants underwent a process of informed consent, which stressed the voluntary nature of participation and the confidentiality of data. Participants were informed that data are protected by a Certificate of Confidentiality from Department of Health and Human Services. All research procedures were approved by the Institutional Review Board at the researchers' university.

Baseline interviews were conducted in secure areas of the jail that ensured privacy and confidentiality. Baseline questionnaires were administered using touch-screen computers not requiring computer literacy (e.g., no keyboard, no mouse). Approximately one year following release, participants completed a follow-up interview over the phone (or face to face with participants who had been re-incarcerated). At follow-up, trained interviewers read all questions to participants and recorded their responses. Participants received honoraria of $15–18 at baseline and $50 at the one-year follow-up.

Of the 628 inmates who consented and were enrolled in the study (74% of those who were approached), 553 provided valid baseline measures of self-control, 508 of which completed valid essential portions of the initial assessment (i.e. were not transferred or released to bond before the assessments could be completed) and were followed longitudinally. At the time of analyses, 485 participants had been eligible for the one-year post-release assessment (e.g. were not still incarcerated). We re-interviewed 332 (68.5%) eligible participants. This retention rate compares very favorably with other longitudinal follow up of inmates (Brown, Amand & Zamble, 2009; Howerton, Burnett, Byng & Campbell, 1999; Inciardi, Martin & Butzin, 2004). Please see figure 2 for a consort diagram of participant attrition[1].

Attrition analyses on data collected as of 5/1/10 evaluated baseline differences on 34 variables comparing eligible individuals who were re-interviewed vs. those who were not (not found, refused, and withdrew). Variables were from a variety of domains including demographics (e.g. sex, education), mental health (e.g. schizophrenia, borderline), psychological (e.g. shame, self-control), criminality (e.g. criminal history, psychopathy), and substance dependence (e.g. alcohol, cocaine). Attrition analyses indicated that out of 34 background variables tested, there was only one difference. Those individuals who were missed at one-year post-release tended to be Hispanic.

2.2.1 Self-control—was assessed at baseline using a 13-item self-report measure (Brief Self-Control Scale) (Tangney, Baumeister, Boone, 2004). Participants rated how well statements described them (i.e. "I am good at resisting temptation") on a 5-point scale. Participants were instructed to consider whether each "statement describes what you are like" and were not given a specific time frame. This measure has been shown to be reliable and valid in the current offender sample (α = .85) (Brown, Malouf, Stuewig, Tangney, 2009).

2.2.2 Friends' Drug Use—was assessed at one year post-release. Participants indicated how many of their friends "used alcohol," "used marijuana" and "used other drugs" during the year after incarceration. Response options were 1="none", 2= "a few", 3= "about half", 4= "most", and 5="all." These three items capture the proportion of friends who use each substance, rather than the absolute number of friends in either category. Proportional measurement of friends' behavior has been found to relate to individuals' own substance use and antisocial behavior (Yanovitzky, 2005; Marcos, Bahr, Johnson, 1986).

2.2.3 Frequency of substance use and symptoms of dependence—were assessed at baseline and at the one-year follow-up using the Texas Christian University Correctional: Residential Treatment Form, Initial Substance Use Assessment (TCU-CRTF) (Simpson & Knight, 1998). Participants indicated how often they used alcohol, marijuana, and cocaine during the year prior to arrest (Time 1) and the year following release (Time 2) on a scale ranging from 0='Never' to 8='More than once a day.' Additionally, participants rated how often during each of those years they experienced symptoms of substance dependence in different domains as specified by DSM-IV (American Psychiatric Association, 2000). For example, for the domain of tolerance participants answered the question "How often did you find that your usual number of drinks had much less effect on you or that you had to drink more in order to get the effect you wanted?"). Item responses ranged from 0 = "never" to 4 = "7 or more times." Four substance dependence scales were created to assess dependency on alcohol (17 items, α = .93), marijuana (8 items, α = .92) and cocaine (14 items, α = .98). For domains with multiple items, 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).

2.3 Data Analysis

Analyses were performed using MPlus, which provided full information maximum likelihood estimation (FIML) of model parameters. This method estimates parameters based on covariance matrixes incorporating all available data including cases with incomplete data. Moderated mediational models were estimated based on data from all 485 participants with a valid measure of self-control and who were eligible for follow-up (were not still incarcerated). FIML is thought to be superior to other methods of handling missing data (i.e. listwise deletion) (Enders, 2001; Muthén, Kaplan, Hollis, 1987). Due to violations of normality for some variables, models were fitted using Maximum Likelihood estimation with robust standard errors (MLR).

The length of time between baseline interview and 1-year post release follow up varied across participants (*M*=991 days, SD=585.3). To account this variation, the number of days between baseline and follow-up was added as a covariate in mediation and moderated-mediation models.

2.3.1 Mediation analyses—To control for pre-incarceration substance misuse, variables of use and dependence measured at post-release were regressed on each corresponding variable measured at baseline. Residualized scores of frequency and dependence were then

used as indicators for the latent dependent variables of changes in alcohol misuse, marijuana misuse, and cocaine misuse. To account for overlap in symptoms of dependence between alcohol, cocaine, and marijuana, correlations between the disturbance values of each dependence indicator variable were specified. To test the mediational model, self-control was entered as the independent variable and the frequency of friends' use of the corresponding substance ("alcohol", "marijuana," "other drugs") was entered as mediator. Mediation was determined by the significance of the overall indirect path from the independent variable to the dependent variable via the mediator variable (MacKinnon, Fairchild, Fritz, 2007). The overall models were evaluated using the χ^2 test along with other fit indices. A Root Mean Square Error of Approximation (RMSEA) close to .06, a Comparative Fit Index (CFI) over .95, and a Standardized Root Mean Square Residual (SRMR) under .08 indicate close fitting models (Hu & Bentler, 1999).

2.3.2 Moderated mediation Analyses—Moderated mediation may occur in multiple forms, depending on the type and number of moderators and which path or paths are moderated (Preacher, Rucker, Hayes & 2007; Edwards & Lambert, 2007). We ran a model testing for moderation by age of all three pathways involved in the mediation model for each substance (Figure 1, Equations 1&2).

$$M = \beta_0 + \beta_1 X + \beta_2 Mo + \beta_3 XMo + \varepsilon \tag{1}$$

$$Y = \beta_4 + \beta_5 X + \beta_6 M + \beta_7 Mo + \beta_8 XMo + \beta_9 MMo + \varepsilon \tag{2}$$

Self-control (X), friends' substance use (M), and age (Mo) were each mean-centered prior to analyses. Moderated mediation was said to occur if either of the paths comprising the indirect effect were moderated by age. Specifically, moderated mediation was determined by the presence of either: a) a significant interaction of self-control and age ($\beta_3 XMo$) when predicting friends' substance use or b) a significant interaction of friends' drug use and age ($\beta_9 MMo$) when predicting participant substance misuse. Additionally, this model tests moderation of the direct relationship between self-control and substance misuse, which was said to occur if the interaction term between self-control and age ($\beta_8 XMo$) had a significant effect on the relationship between self-control and substance misuse.

3. Results

3.1 Descriptive Statistics

Participants reported relatively high rates of substance use and dependence during the year following incarceration. Almost a third reported marijuana use (33.1%), and 28.2% reported using cocaine. Alcohol was used by 74.5%. Regarding substance use problems, 43.0% reported at least one symptom of any substance dependence, with 18.7% endorsing at least one symptom of alcohol dependence, 22.9% marijuana dependence and 21.6% dependence on cocaine/opiate.

Correlations among all variables are presented in Table 1. Self-control was significantly negatively related to all pre-incarceration and one year post-release substance use and dependency variables (except alcohol use at post-release). Self-control was also significantly negatively correlated with friends' substance-use variables, which in turn were significantly positively related with respective variables of participants' use and dependence.

3.2 Mediation Analyses

In preliminary analyses, latent variables of changes in substance misuse were regressed on self-control. The bivariate relationships of self-control with *changes* in substance misuse were not significant for cocaine ($\beta = -.11$, $p=.06$), marijuana ($\beta=-.04$, $p=.45$), or alcohol ($\beta= -.02$, $p=.78$). Model fit indices for the SEM of mediation indicated adequate model fit (χ^2 (25)= 59.029, p=.00, CFI= .963, RMSEA= .053, SRMR=.049) for the hypothesized model. Because the mediator and outcome variables of the hypothesized model were measured concurrently, an alternative model was tested in which substance misuse mediated the relationship between self-control and friends' use. Model fit indices showed poorer model fit for the alternative model (χ^2 (25)= 71.862, p=.00, CFI= .949, RMSEA= .062, SRMR=.068) than for the hypothesized model.

Results from the hypothesized model indicated that individuals with lower self-control were more likely to be associating with friends who used alcohol ($\beta = -.15$, $p= .01$), marijuana ($\beta = -.23$, $p= .00$), and other drugs ($\beta = -.33$, $p= .00$) one year post-release. Additionally, association with substance-using friends' was related to dependent latent variables of changes in participants' own substance misuse (indicated by frequency of use and symptoms of dependence on each substance). Association with substance-using friends during the year post-release, was related to increases in participants misuse of alcohol ($\beta = .44$, $p=.00$), marijuana ($\beta =.42$, $p= .00$), and cocaine ($\beta = .43$, $p= .00$). The indirect pathways from self-control to changes in alcohol ($\beta =-.07$, $p= .01$), marijuana ($\beta = -.10$, $p= .00$), and cocaine misuse ($\beta =-.14$, $p= .00$), through the corresponding variable of friends' use was significant for each substance. The direct relationship between self-control and misuse was non-significant for alcohol ($\beta =.06$, $p= .25$), marijuana ($\beta = .04$, $p= .54$), and cocaine ($\beta =-.03$, $p= .65$).

3.3 Moderated Mediation

To determine if the mediational relationship between self-control, association with substance-using friends, and changes in participant's substance misuse depended on participant age (i.e. if relationships were stronger or weaker for younger adults compared to older adults), we tested if age moderated each pathway (see Figure 1). Model fit indices suggested adequate fit ($\chi 2$ (58)= 91.910, $p= .00$, CFI=.966, RMSEA=.035, SRMR=.046). Mediational models held when age was added as a moderator: both steps of the indirect pathway between self-control and misuse of each substance remained significant. The direct relationship between self-control and misuse of each substance remained non-significant.

Age significantly moderated two pathways: the paths between friends' use and changes in individual's own misuse of marijuana and cocaine (see Figure 3). Plotting of these relationship showed that the link between associating with marijuana-using friends and changes in participants' marijuana misuse was stronger for younger participants than for older participants (see Figure 4) while conversely the relationship between friends' use of "other drugs" and changes in participants' cocaine/ misuse was stronger for older participants than for younger participants (see Figure 4).

4. Discussion

We examined a mediational model where association with substance-using friends mediated the relationship between self-control and changes in substance misuse. Furthermore, we extended this model by considering the impact of age on model pathways (Figure 1) and by examining whether the model holds for different substances. Results contribute to our understanding of risk factors for substance use problems.

4.1 Contribution to knowledge of misuse of alcohol, marijuana and cocaine

Meditational models of the relationship between self-control and substance misuse by friends' use were supported for all substances. Following release, offenders with lower self-control were more likely to associate with friends who used alcohol, marijuana, and other drugs. In turn, offenders who associated with substance-using friends were more likely to misuse alcohol, marijuana and cocaine, even when controlling for prior substance misuse. Once the mediating variables were included, the direct relationship between self-control and changes in substance misuse was not significant for any of the substances. This mediational model held when age was added as a moderator of all model pathways.

Age did not moderate any pathway of the alcohol model, suggesting that the strength of all model pathways were invariant by age. These results indicate that association with substance using friends is influential on individuals' misuse of a legal and widely available substance. Furthermore, this indirect relationship is significant for both older and younger adults alike.

The moderated mediation analyses indicate that age moderated the relationship between friends' use of marijuana and offenders' own marijuana misuse. Offenders with lower self-control are more likely to associate with marijuana users following release, regardless of age. However, association with marijuana-using friends is more strongly related to own misuse for younger offenders than for older offenders. This result supports hypothesis 3, that friends' influence would decline with age, which was based on developmental theories of antisocial behavior (Thornberry, 1987; Sampson & Laub, 2005).

Age also moderated the relationship between friends' use of cocaine and offenders' own cocaine misuse. However, the direction of this moderation was opposite: friends' substance use was more strongly related to own cocaine misuse for older offenders than for younger offenders. This surprising result contradicted hypothesis 3. This reversal may be explained by the highly addictive nature of cocaine. Long-term use of cocaine may be more detrimental to social functioning than use of other substances. Over the years, adults using cocaine may be less likely to maintain relationships with non-users than adults using less addictive substances. Additionally, moderation by age may reflect different social norms among older and younger substance users. Differences in drug expectancies and/or motivations (e.g. coping motives vs. social motives) associated with these different social norms may strengthen or attenuate the relationship between substance-using friends and participants' own substance misuse.

4.2 Contribution to knowledge about risk factors: Self-control and Friends

These results contribute to our understanding of two key risk factors for substance use problems: self-control and association with substance using friends. Consistent with theory of self-control's stability as a predictor of antisocial behavior, we hypothesized that self-control's relationship with mediators (association with substance using friends) and outcomes (individuals' own substance misuse) would be invariant by age. In support of our hypothesis, we found that age did not moderate self-control's relationship with either variables in models of alcohol, marijuana, and cocaine misuse. To our knowledge, this study provides the first empirical support for the stability of self-control's relationship with these variables across adulthood. Additionally, this study provides further support for the importance of self-control's indirect relationship with substance misuse. While Gottfredson & Hirschi's model proposes that self-control's relationship with antisocial behavior is direct, we found no evidence for a significant direct relationship between self-control and changes in substance misuse.

Overall, these results emphasize the importance of considering adult's friend-relationships. Friends appear to remain influential on changes in adult ex-offenders' substance misuse

following incarceration above and beyond prior substance history and self-control. However, age and type of substance appear important when considering the relative importance of friends' influence. Friends may be more influential on marijuana misuse during early adulthood and cocaine use during later adulthood.

4.3 Limitations/ Future directions

This study had several noteworthy limitations. The first limitation concerns the unidirectional nature of the mediational model. Our model presents a sequence in which self-control influences friends' substance use, which influences participants' substance misuse. However, researchers have proposed alternative interpretations of directionality (Kirby & Petry, 2004; Bauman & Ennett, 1994). The causal ordering presented here is supported in part by the longitudinal data: self-control was measured prior to measures of friends' use and participants' post-release misuse. By controlling for pre-incarceration substance misuse in all analyses we further support our proposed causal order. However, both friends' substance-use and participants' substance misuse were assessed concurrently during the 1-year follow-up interview, which limits some of the conclusions. Secondly, although there was a wide age range in this sample, it may be that the moderating influence of age would have been more evident if younger groups were included. Thirdly, this study did not involve manipulation of either variable of interest (self-control or association with substance using peers). Although this study speaks to the observed relationship of these variables to substance misuse, further research is needed to confirm that manipulation of either is associated with decreases in substance misuse.

Regarding measurement, this study employed self-report measures, which are potentially subject to biased recall. Future research in this area would be strengthened by additional measurement techniques (e.g. urinalysis and/or informant report.)

Finally, while it is important to replicate these findings in different samples, we also believe that this sample represents an important population of interest. Research finds that incarceration is not uncommon among individuals who experience symptoms of substance abuse or dependence; individuals who misuse alcohol or illicit substances are at higher risk for arrest (Office of Applied Studies, 1998). Additionally, jail inmates are not isolated from mainstream society; they have briefer criminal histories and sentence-length compared to their counterparts in prison. Each year, 13.7 million inmates are released from correctional facilities back into society. The vast majority of these inmates (12.9 million) are released from jails, not prisons (Minton, 2010; West, Sabol, & Greenman, 2010).

This sample of jail inmates represents a special population *within* mainstream society at high risk for substance abuse. Understanding the processes or mechanisms involved in decreasing substance abuse among this population may help individuals transition back into the community and reduce the burden on both the public health and criminal justice systems.

Acknowledgments

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Highlights

- We examined self-control's relation with changes in inmate's substance-misuse.

- This relation was fully mediated by association with substance-using friends.

- Age did not moderate self-control's relation with changes in substance misuse.

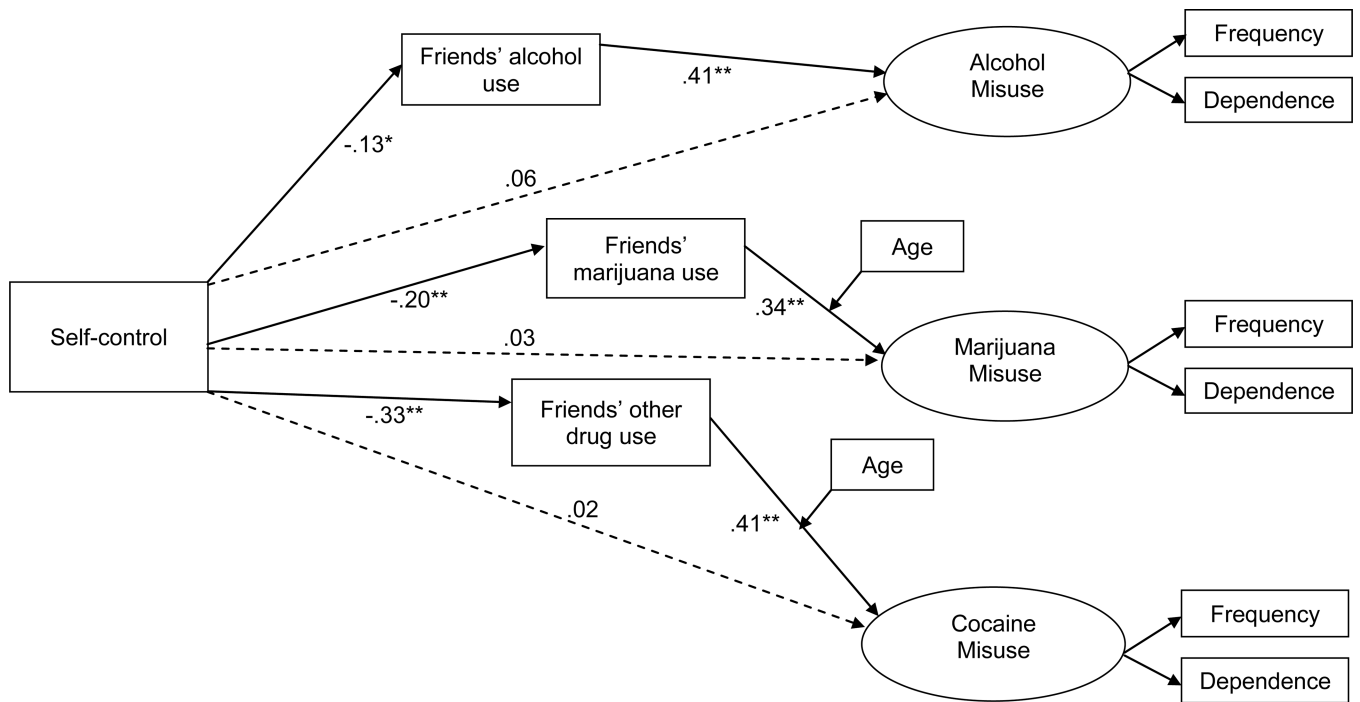- Age did moderate relation between friends' use and inmates' own substance misuse.
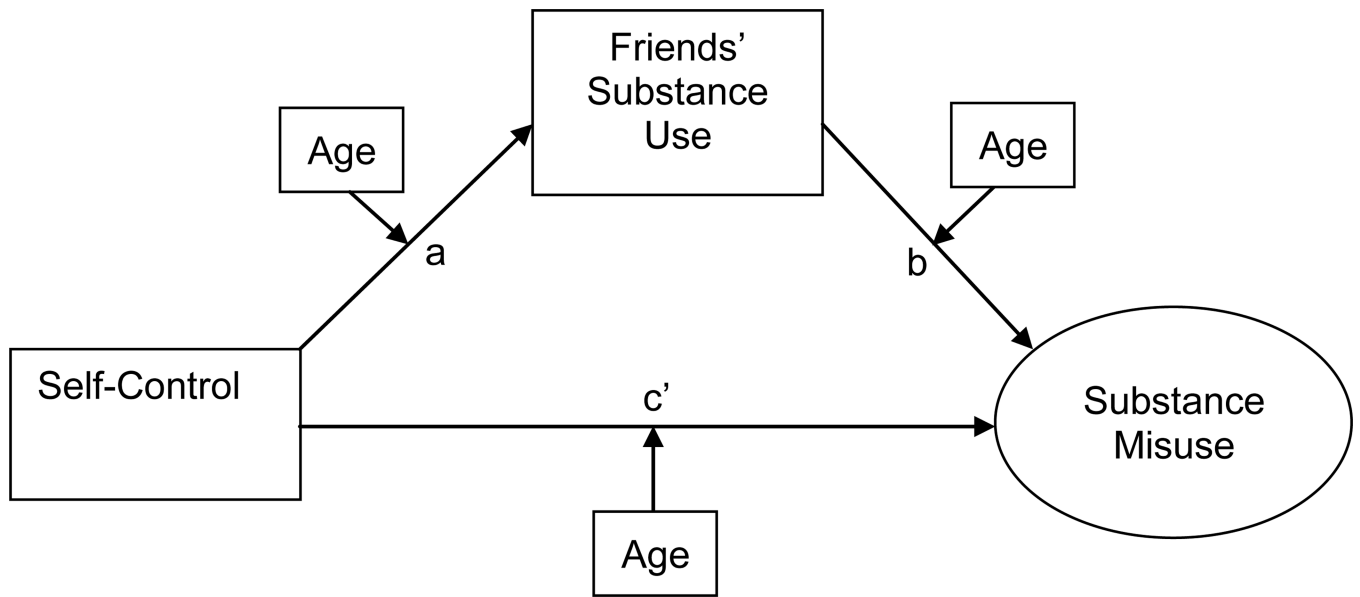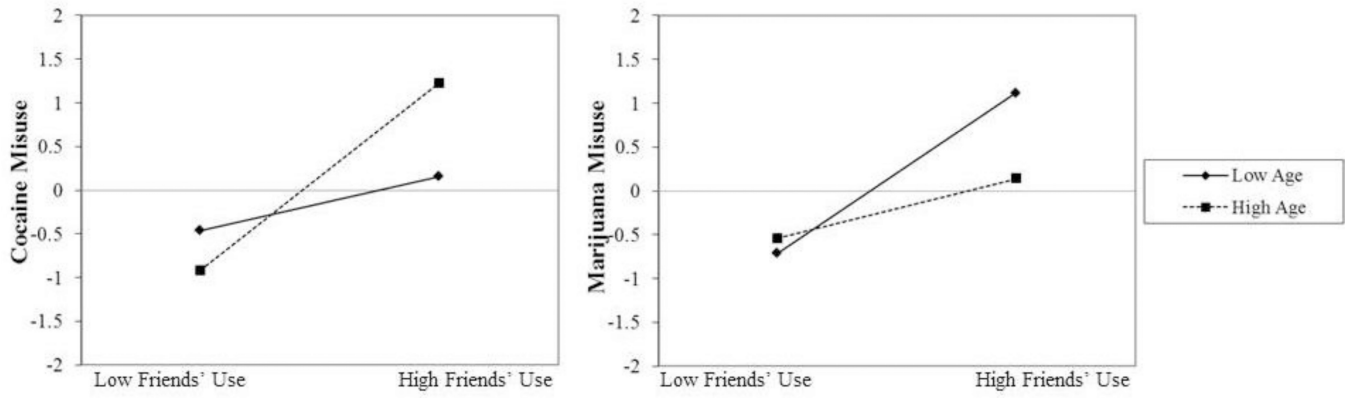
Figure 1.
Theoretical moderated mediation model
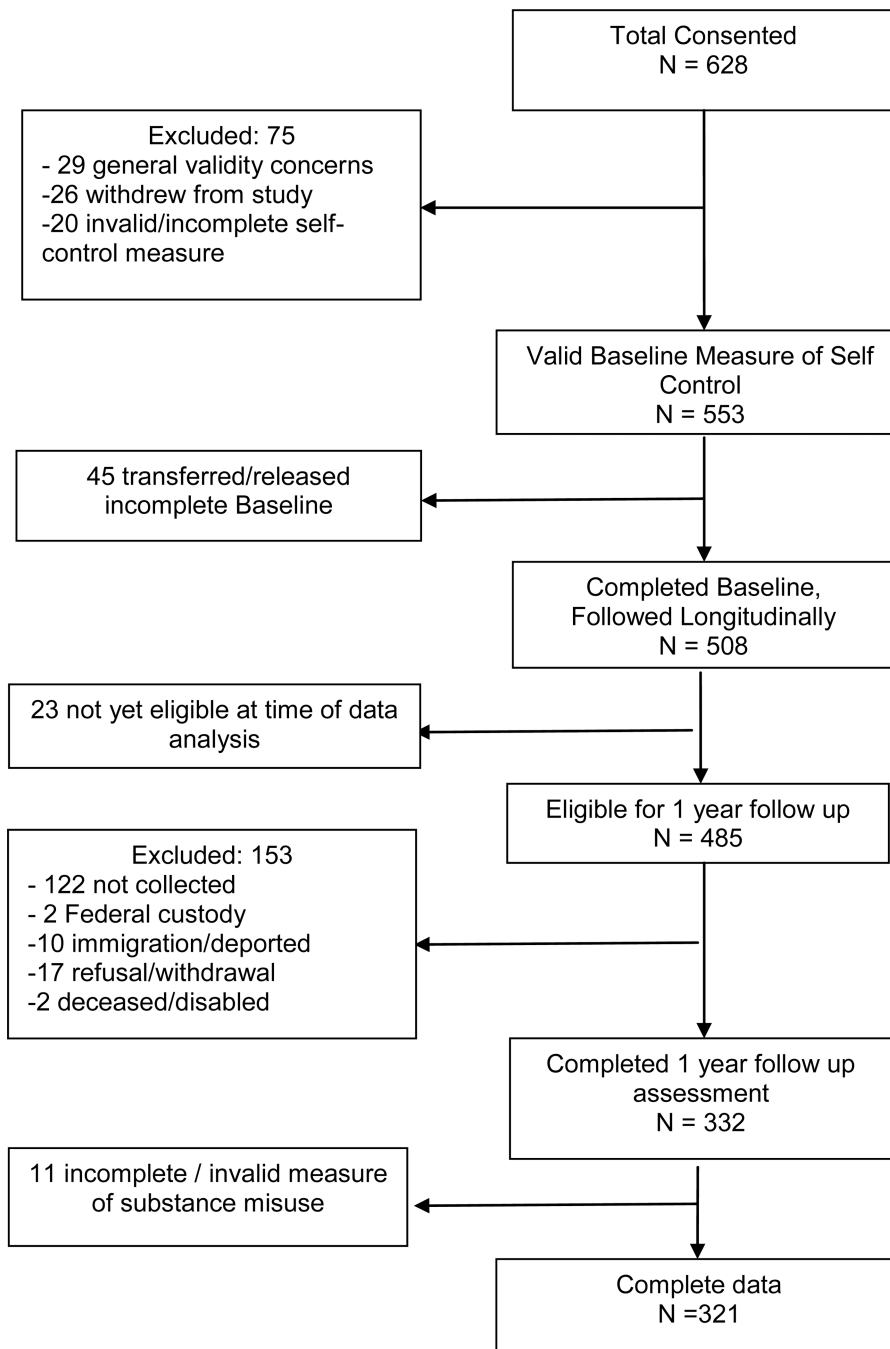
Figure 2.
Consort diagram study participants

Correlations among endogenous variables and between residuals of dependence indicators are specified but not shown.

Figure 3.
Moderated mediational model

Figure 4.
Relation between friends' use and substance misuse by age

Table 1

Bivariate Correlations

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.
1. Age																
2. Self-Control	.05															
3. Friends' use alcohol	−.30**	−.15**														
4. Friends' use marijuana	−.37**	−.22**	.62**													
5. Friends' use other drugs	−.06	−.34**	.45**	.56**												
6. Alcohol use: Time1	.03	−.19**	.21**	.18**	.09											
7. Alcohol dep.: Time1	.07	−.26**	.11	.05	.04	.60**										
8. Alcohol use: Time2	−.20**	−.09	.48**	.41**	.28**	.49**	.31**									
9. Alcohol dep.: Time2	.04	−.12*	.26**	.27**	.30**	.38**	.51**	.64**								
10. Marijuana use: Time1	−.29**	−.25**	.30**	.41**	.17**	.34**	.18**	.32**	.18**							
11. Marijuana dep.: Time1	−.19**	−.28**	.21**	.35**	.19**	.25**	.26**	.22**	.18**	.64**						
12. Marijuana use: Time2	−.31**	−.15**	.35**	.53**	.25**	.19**	.11	.43**	.29**	.50**	.42**					
13. Marijuana dep.: Time2	−.23**	−.17**	.25**	.34**	.27**	.19**	.22**	.35**	.39**	.42**	.43**	.69**				
14. Cocaine use: Time1	.34**	−.38**	−.06	−.07	.22**	.20**	.21**	−.03	.10	.08	.08	−.05	−.01			
15. Cocaine dep.: Time1	.35**	−.42**	−.12*	−.08	.20**	.18**	.26**	−.05	.12*	.05	.10*	−.06	−.00	.89**		
16. Cocaine use: Time2	.23**	−.27**	.15**	.08	.45**	.11	.18**	.22**	.34**	.03	.13*	.12*	.13*	.47**	.46**	
17. Cocaine dep.: Time2	.23**	−.27**	.11	.08	.46**	.11	.21**	.17**	.37**	.04	.13*	.11	.20**	.47**	.48**	.83**

[a]
*p<.05

**p<.01