The Relationship of Self-Control and Abstinence Maintenance: An Exploratory Analysis of Self-Regulation

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Abstract

Studies of self-regulation suggested that self-control requires finite resources which, in turn, may present a significant challenge for those trying to recover from or control addictive behaviors. The present study examined the relationships between self-regulation and abstinence maintenance among adults in recovery ($n = 606$: 407 men, 199 women; M age = 38.5 years) residing in self-governed, communal living, abstinent homes across the United States. Self-regulation scores (controlling for sex and age) were positively related to length of abstinence. In addition, a factor analysis of self-regulation scores resulted in some differentiation between general self-discipline and impulsivity in self-control related to addiction. The relationship between impulsivity and length of abstinence was stronger than the relationship derived between general self-regulation and length of abstinence.

Keywords

Oxford House; self-regulation; change over time; mutual support

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Research on *self-regulation ability* suggested a number of important properties characteristic of an individual's ability to control their behavior. For instance, the greater a person's self-regulation resources the greater likelihood for maintaining a successful lifestyle that person will experience (Tangney, Baumeister & Boone, 2004). High self-control has been correlated with better academic performance (Tangney et al., 2004), mastery at cognitively challenging tasks (Muraven, Tice & Baumeister, 1998) and the capacity to control aggression (DeWall, Baumeister, Stillman & Gailliot, 2007). Higher self-regulation scores also correlated with lower likelihood to overeat (Tangney, et al., 2004) and greater resistance towards drinking alcoholic beverages (Muraven, Collins, & Nienhaus, 2002). Furthermore, individuals who reported strong self-control claimed better adjustment and fewer reports of psychological distress (Tangney et al. 2004). This depletion effect has been described as comparable to "muscle fatigue" (Muraven & Baumeister, 2000). Thus, self-regulation has dynamic properties related to capacity, usage, and replenishment (Muraven, Shmueli & Burkley, 2006)

Self-regulation is characterized by behavior consequences suggesting it operates as a finite but renewable resource supporting a significant relationship between strength of self-regulation and beneficial behaviors. The utilization of the self-regulation resource has been tested with the effects of social exclusion (Baumeister, DeWall, Ciarocco, & Twenge, 2005), self-presentation (Vohs, Baumeister & Ciarocco, 2005), intellectual performance (Schmeichel, Vohs & Baumeister, 2003), and decision making (Ferrari & Pychyl, 2007).

These studies demonstrate the breadth of self-regulation's association across multiple domains of an individual's social well-being. Overall, these studies found that cognitively challenging tasks required discipline that may tax one's self-regulatory resource.

It should be noted that much of the previous research on self-regulation used college students as participants. Little is known how adult men and women, who may experience difficulties in life to regulate their desires, such as persons in recovery for substance abuse (Muraven et al., 2002) may report changes in self-regulation. The present paper examined scores on this measure among a sample of adult individuals who were maintaining abstinence and living in communal housing where abstinence maintenance required self-control and relapse rates were high (Jason, Olson, Ferrari, & Lo Sasso, 2006). Studies focused on resisting temptations within addictive behaviors, such as alcohol (Muraven & Shmueli, 2006) and fattening snacks (Tice, Bratslavsky, & Baumeister, 2001), indicated that after being challenged to resist temptation, individuals on average, perform less well on tasks or decision-making that taxed analogous cognitive processes.

Addictions, Recovery, and Self-Regulation

Baumeister (2002) discussed a theoretical role for self-regulation failure in impulsive behavior. From the perspective of self-regulation, an individual with addictive behaviors may appear to be an exemplar of self-regulation failure. That is, persons addicted to substances generally share two characteristics that are often cited in addiction theory (Becker & Murphy, 1986)—*impulsive consumption*, behaviors that significantly exceed normal levels, and a *failure to assess future consequences* of their behavior. Research on discount rates (how individuals evaluate current versus future rewards) indicated addicts have almost twice the discount rate of a non-addict control group (Kirby, Petry & Bickel, 1999). These results suggest that addicts tend to dismiss future consequences in making current decisions when compared to those without past addictions. In addition, the expected hedonic reward (of using) requires significant self-control to resist consumption. Studies on risky, gambling choices using a control group, a group of substance dependent individuals and a group of individuals with ventromedial lesions resulted in the substance dependent individuals performing midway between the control group and those with ventromedial lesions (Bechara, Dolan & Hindes, 2002; Bechara & Damasio, 2002). Those participants with ventromedial lesions went for greater but riskier payoffs, and showed no responsiveness to future consequences. The control group learned a balanced strategy that resulted in near optimal payoffs. Substance dependent individuals were biased most strongly with an anticipation of a large, current reward, thereby overvaluing the current expectation and not weighting future negative consequences as highly as the control group.

These studies evaluating future consequences and assessing current rewards were consistent with the nature of impulsivity (Baumeister, 2002) and impulsive behavior (Tice, Bratslavsky & Baumeister, 2001). Controlling impulses means resisting short-term rewards or pleasures in order to achieve longer term goals. Impulsive behavior may result from goal conflict (current pleasure versus goals), lack of self-monitoring (an accurate assessment of current benefits and future consequences) and inadequate self-regulation resources (Baumeister, 2002). These conditions are descriptive of an addict inaccurately assessing both the hedonic pleasure of current usage of an addictive substance and the objective longer-term consequences. This multidimensional nature of impulsivity in abstinent alcoholics (*disinhibition* and *discounting*) was also investigated by Dom et al. (2006). Similar findings have been found in other impulsivity measures with substance dependent populations (Dawe, Gullo & Loxton, 2004). Impulsivity may be considered a common process underlying substance abuse and other behavioral disorders has been researched as well (Bornovalova, Lejuez, Daughters, Rosenthal & Lynch, 2005). These studies suggested a strong link between impulsivity and addictive behaviors.

The present study examined impulsivity by trying to separate general qualities of self-discipline from those more closely related to impulsivity. Tangney, Baumeister and Boone (2004) found by factor analysis that the full version of self-regulation reduced to five factors; those generally related to self-discipline, resistance to impulsivity, healthy habits, work ethic and reliability. Because of the stability the correlations between the factors, Tangney et al. (2004) utilized a self-report measure to tap these five domains. However, in the present study our participant sample consisting of individuals who previously abused substances and were now seeking to maintain abstinence. We investigated the dimension of impulse control explicitly and were interested in whether the Tangney et al self-regulation measure captured dimension of impulsivity when scored by a relatively large sample of adults with histories of substance abuse. Based on prior research of self-regulation (e.g. Muraven, Baumeister & Tice, 1999; Muraven & Shmueli, 2006), we expected a positive association between self-regulation and length of abstinence. Also, we expected a component of self-regulation, resistance to impulsivity, would be positively associated with length of abstinence.

Method

Participants

A total of 606 adult residents (407 men, 199 women) living in one of 170 communal living settings across the U.S. called Oxford Houses served as participants in the present study. These participants were part of a larger, longitudinal Oxford House study who participated in the second wave of data collection (Jason, Davis, Ferrari, & Anderson, 2007). At present, there are more than 1,200 *Oxford Houses* operating across the United States. Each Oxford House is a communal residence that is a rented, single-family house for people recovering from substance abuse (Ferrari, Jason, Sasser, Davis & Olson, 2006). The houses are resident-funded, democratically governed, without restrictions on length of stay, and operate with minimal rules other than economic sufficiency and a zero tolerance for substance usage (Ferrari, Jason, Davis, Olson & Alvarez, 2004). Permission to do this study was granted by the DePaul Institutional Review Board.

Participant's mean age was 38.5 years (*SD*=9.4). Most respondents were Caucasian (59.7%) or African American (31.4%), single (51.5%) or divorced (29.5%), and reported on average 12.6 years of education (*SD* = 2.1). Time in residence at an Oxford House averaged 11.7 months (*SD* = 15.7), while average time since last alcohol use averaged 1.7 years (*SD* = 2.8) and drug use was 2.0 years (*SD* = 3.0). Respondents averaged 2.6 (*SD* = 4.0) and 2.8 (*SD* = 3.0) treatment episodes for alcohol and drugs, respectively.

Procedure

Participants were recruited by advertisement in an Oxford House newsletter mailed in 2001 to each house across the U.S. that existed at the time of the study. In addition, participants were recruited through telephone inquiry to Oxford House Presidents in five targeted geographical areas that had the highest density of Oxford Houses (Washington/Oregon, Pennsylvania/New Jersey, North Carolina, Illinois and Texas. All participants were informed about the purpose, objectives and methodology of the study, and advised of the voluntary nature of the study before signing and returning a consent form. Each participant then completed the self-report measures of self-regulation, addiction-recovery history, and abstinence maintenance. Upon completion of the surveys, each participant was paid $15. More details about the study methodology can be found in Jason et al. (2007).

Psychometric Measures

All participants completed the *Addiction Severity Index-Lite* (ASI; McLellan, et al., 1992), which assessed common difficulties associated with substance abuse (e.g. drug use, alcohol use, and illegal activity). This instrument has been used extensively over the last 15 years and has demonstrated excellent test-retest reliability (≥ 0.83; McLellan et al., 1992). Utilizing only sub-sections of the scale has been deemed appropriate and psychometrically sound by McLellan, et al. (1992) and for the present study socio-demographic data and substance abuse history were obtained. Objective questions measured the number, extent, and duration of problem symptoms for both the person's lifetime and within the last 30 days. This instrument also collected information on length of current abstinence period for both drug and alcohol usage. Makela (2004) found high internal consistency for medical status, alcohol use and psychiatric status, and the *ASI* has been used successfully in previous outcome studies with Oxford House residents (e.g. Jason, Davis et al., 2007; Jason, Olson et al., 2006).

Participants also completed the *Alcohol & Substance Abuse—Form 90 Timeline Followback* (Miller, et al., 1994) which collects information regarding general health care utilization, residential history, and alcohol and drug usage over the prior 90 days. Reliability on this instrument was found to be good-to-excellent for all summary measures of alcohol consumption and illicit drugs that were most frequently used, *retest r* ≥ 0.90 for both alcohol usage and drug usage (Tonigan, Miller, & Brown, 1997). This instrument has been used in previously in Oxford House studies (Jason, Davis et al., 2007).

Self-regulation was examined by having participants complete the *Self-Regulation Scale* (Tangney, Baumeister, & Boone, 2004) which consists of 13 items scored on a 5-point Likert scale (1=*not at all*, 5=*very much*). Examples of questions include *I do certain things that are bad for me, if they are fun* and *I am able to work effectively toward long-term goals*. Tangney et al. reported that this measure had good internal consistency (alpha *r* = 0.83 to 0.85), and with the present sample Cronbach's alpha was 0.82 (*M*= 44.1; *SD*= 8.2).

Results

Factor Analysis of Self-Regulation Items

We factored the self-control scale to investigate whether a logical underlying dimension of impulse control could be isolated. Tangney et al. (2004) in developing this self-control scale used factor analysis and extracted five relevant dimensions (self-discipline, inclination towards non-impulsive behavior, healthy habits, work ethic, and reliability). Nevertheless, the authors used the scale as a uni-dimensional measure. In the present study, factor analysis extracted dimensions using a *maximum likelihood process with varimax rotation*. A two factor solution, shown in Table 1, accounted for 34.3% of the total variance and was statistically significant, $\chi^2 (53) = 201.5$, $p < .001$. The relatively low explanation of variance results from the items of this scale mostly being weakly positively correlated overall (*interclass r* = 0.224, *mode* = 0.110, *range* = 0.010 to 0.460); thus these questions were mostly additive to the overall scale and provided unique contributions to the overall variance. The between factors correlation was *r* = 0.149. Although the total variance explained by the factor analysis was less than optimal, the prior findings (Tangney et al., 2004), statistical significance, and average unique variance of the individual questions in the instrument made the exploratory use of the factor results acceptable.

Nine of the thirteen questions made up the first factor. This factor, called *general self-discipline*, focused more on general patterns of behavior. For example, questions included *I am lazy* and *I have trouble concentrating*. The reliability of this scale was good with a Cronbach's *alpha* = 0.80 (*M* = 31.1. *SD* = 6.25). The second factor, labeled *impulse control*,

consisted of the remaining four questions (e.g., *I am good at resisting temptation* and *I am able to work effectively toward long-term goals*). This measure had a Cronbach's *alpha* = 0.69 (*M* = 12.9. *SD* = 3.27).

Multiple Regression Analysis

To test the relationship between the self-regulation factors and time abstinent, a multiple regression was performed that controlled for the demographic variables of sex and age. Sex and age were demographic variables that were significant covariates with time abstinent, but not the self-regulation factors. Time abstinent was normalized using a natural log transformation to preserve rank order and achieve a normal distribution of reported durations of abstinence. The independent variables consisted of *general self-discipline* and *impulse control*. The resulting model was significant, $R^2 = .131$, $F(4,601) = 22.594$, $p < .001$. With respect to the standardized coefficients for the self-regulation factors, the *general self-discipline factor* was insignificant, $\beta = -.007$, $t(601) = -.172$, $p = .863$. The factor associated with resisting temptation was significant, $\beta = .164$, $t(604) = 4.246$, $p < .001$. These results supported the expectation that resistance to impulsive behaviors would be positively related to abstinence time.

A second regression tested the overall self-regulation measure with time abstinent. The model was significant with $R^2 = .114$, $F(3,602) = 25.777$, $p < .001$. The standardized coefficient for the self-regulation score was $\beta = .10$, $t(603) = 2.522$, $p < .05$. Thus, the impulse control score was a better predictor for time abstinent in this sample than the overall self-regulation measure, $\beta_{impulse} = .164 > \beta_{general} = .100$. Overall, the results of this analysis supported the positive relationship between self-regulation and time abstinent. Additionally, the investigation into a relationship between an impulsivity control and time abstinent was supportive of a positive relationship.

Discussion

For our sample of Oxford House residents, this cross-sectional analysis suggested that resistance to impulsivity, as well as overall self-regulation strength had a positive relationship with time abstinence. These results supported the predictions that self-regulation was positively related to time abstinent, and, more specifically, that impulsivity control would have a greater positive association with abstinence. While the average effect sizes were small, these findings are consistent with previous addiction research (Dom, et al., 2006) and research on self-regulation (Tice, Bratslavsky & Baumeister, 2001; Muraven & Shmueli, 2006).

This study benefited from utilizing a sample of Oxford House residents as participants, who were maintaining abstinence. These individuals provided self-report measures of abstinence and self-regulation. Both the general self-control measure and impulsivity resistance factor were significant. The impulsivity resistance factor alone was derived from factoring a scale that was largely additive in nature, thus the proportion of overall variance explained by factoring was less than typically found. Further investigation of impulsivity control and abstinence might benefit our understanding of longitudinal changes of self-regulation during recovery and provide improvements in measures of the concept among adult samples.

Limitations and Future Directions

Limitations of the study include a cross sectional design and the total variance explained by the factor analysis was less than optimal. The findings of the present study, despite limitations, may provide a basis for further study in self-regulation, impulsivity, and behaviors related to addiction and abstinence. For instance, understanding the dynamics of

self-regulation and abstinence maintenance over time might provide an insight on the usage and replenishment of self-regulation resources (Muraven & Baumeister, 2000). This finding might possibly include inclusion of more multidimensional measures of impulsivity control as suggested by Dom et al. (2007) and Dawe et al. (2004).

Another possible path of investigation would be to examine associated behaviors of addiction (e.g. criminal activity, employment stability) with self-regulation and impulsivity to better understand these relationships. Self-regulation has been investigated across a variety of domains (Tangney et al., 2004) including aggression (Wall et al., 2007) with significant results. The relationship between self-regulation, impulsivity, addictive and related behaviors might be significant and predictive. Because all participants in the present study were Oxford House residents, future research might focus on the measurement of self-regulation, impulsivity and abstinent behavior of individuals residing in other recovery treatment living arrangements. Research between housing condition groups might provide some insight on the relationships between residential arrangements and self-regulation.

In short, the present study suggested that self-regulation in general and resistance to impulsivity, more specifically, were positively related to time abstinent in a cross-sectional study of recovering substance dependent participants who resided in Oxford Houses, a communal living arrangement supporting abstinence. Continued research on these relationships might include longitudinal investigations, research of other related addictive behaviors, introduction of varied measures, and different adult samples. These findings have implications for group work because they suggest that self-regulation is an important goal for therapists, and that a variety of group interventions might be helpful in fostering this domain.

Acknowledgments

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Table 1

Factor Loadings for the Tagney et al. (2004) Self-regulation Measure

	Factor 1 *General*	Factor 2 *Impulse*
I am good at resisting temptation		.67
I have a hard time breaking bad habits	.45	
I am lazy	.46	
I say inappropriate things	.54	
I do certain things that are bad for me, if they are fun	.51	
I refuse things that are bad for me		.54
I wish I had more discipline	.42	
People would say I have iron discipline		.64
Pleasure and fun sometimes keep me from getting work done	.59	
I have trouble concentrating	.59	
I am able to work effectively toward long-term goals		.49
Sometimes I can't stop myself from doing something, even if I know it's wrong	.48	
I often act without thinking through all the alternatives	.65	
Eigenvalue	2.56	1.91
Percentage of Variance Explained	19.67	14.67

n=606