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The Effects of Self-Regulation and Self-Efficacy on Substance Use Abstinence

Jesus Chavarria, B.A.

DePaul University, Center for Community Research, Chicago, IL, 60614, USA

Edward B. Stevens, M.A.

DePaul University, Center for Community Research, Chicago, IL, 60614, USA

Leonard A. Jason, Ph.D.

DePaul University, Center for Community Research, Chicago, IL, 60614, USA

Joseph R. Ferrari, Ph.D.

DePaul University, Department of Psychology, Chicago, IL, 60614, USA

Abstract

Previous research found that self-regulation and self-efficacy were linked to substance use abstinence. The present study examined the relationships between changes in self-regulation and self-efficacy as predictors of substance use abstinence. A total of 150 adult individuals (62% female; M age = 37.1 SD = 8.1; 38% male) in substance abuse recovery participated in a randomized, longitudinal study comparing a communal housing model versus usual aftercare. Both the change in self-regulation ($p = .014$) and the change in self-efficacy ($p = .032$) were significantly predictive of the likelihood of abstinence. Additionally, changes in self-regulation and self-efficacy were largely independent. These findings suggest future research for examining change in self-regulation and self-efficacy substance abuse research.

Keywords

Oxford House; Recovery homes; self-regulation; self-efficacy; substance abuse

Self-regulation is a vital process that allows people to behave and eat properly, accomplish tasks in a timely manner, and refrain from activities that may be detrimental to one's livelihood (Baumeister, Heatherton, & Tice, 1994). Broadly defined, self-regulation is an individual's ability to alter a response or override a thought, feeling, or impulse (Baumeister et al. 1994; Baumeister & Heatherton, 1996). Tangney, Baumeister, and Boon (2004) found that higher self-regulation scores correlate with less alcohol abuse, a higher grade point average, better psychological adjustment, and more optimal emotional responses.

Self-regulation is used in a number of processes including: regulating emotions, controlling thoughts, and physically restraining actions or behaviors (Baumeister, Bratslavsky, Muraven, & Tice, 1998; Vohs et al., 2008). Researchers recently proposed a limited-resource model that compares self-control to a muscle (Muraven & Baumeister, 2000; Vohs

Correspondence should be sent to: Leonard A. Jason, at DePaul University, Center for Community Research, 990 W. Fullerton Ave., Chicago, IL, 60614, (tel.) 773-325-2018, ljason@depaul.edu.
chavarria@psy.fsu.edu
esteven5@depaul.edu
ljason@depaul.edu
jferrari@depaul.edu

& Heatherton, 2000). Like exercising a muscle, consecutive uses of the self-regulation resource leads to decreases in performance (Muraven & Baumeister, 2000; Muraven, Tice, & Baumesiter, 1998; Vohs & Heatherton, 2000); however, over extended periods of time, such as use every day over the course of a week, use of the resource may lead to larger self-regulation strength reserves. For example, a study by Muraven, Baumeister, and Tice (1999) found that individuals who performed consistent self-regulation exercises over a 2 week period performed significantly better on a self-regulation task given at the end of the study. These studies demonstrate that self-regulation can be increased and strengthened over time.

Self-regulation plays an important role in abstaining from and abusing substances (Baumeister et al. 1994; Brown, 1998; Muraven, Collins, Morsheimer, Shiffman, & Paty, 2005; Muraven, Collins, & Nienhaus (2002)). For example, Ferrari, Stevens, and Jason, (2009) found that self-regulation scores were positively related to length of abstinence; as individual's self-regulation scores rose, so did their length of abstinence. Muraven et al. (2002) also found individuals who depleted more of their self-regulation had higher blood alcohol concentration scores than those who didn't deplete as much of their self-regulation.

Another important factor involved with problem substance use is *self-efficacy*. Self-efficacy may be defined as the belief a person has to achieve a desired outcome (Bandura, 1977). It is self-efficacy that determines the amount of energy one puts into the process of attempting to change an undesired behavior (Bandura 1977; Bandura, 1982; Bandura, 1999). Additionally, the level of self-efficacy is predictive of how persistent an individual will be at a task if he or she fails initially.

Of particular interest to researchers in substance abuse recovery is perceived abstinence *self-efficacy*. Abstinence self-efficacy is the belief an individual has that he or she will be able to abstain from participating in an undesired action; especially in situations where one had a high tendency to partake in a given activity (Lee & Oei, 1993; Young, Oei, & Crook, 1991). Self-efficacy is involved in abstaining from numerous habitual behaviors, including smoking, using illicit substances, and excessive drinking. Researchers showed that among individuals who attempt to quit smoking, those individuals with higher self-efficacy scores have better outcomes (Shiffman et al., 2000; Stuart, Boland, & McMurray, 1994). In another study involving heavy smokers who recently quit smoking, DiClemente (1981) found that at a 5 month follow-up abstainers had significantly higher self-efficacy than those persons who relapsed. Self-efficacy also plays a role in abstaining from alcohol and illicit and prescription drugs. One study by Burling, Reilly, Moltzen, and Ziff (1989) found that abstainers had higher self-efficacy scores than persons who relapsed at a follow up assessment; other studies showed that higher self-efficacy scores upon discharge from a treatment center predicted later abstinence (Goldbeck, Myatt, Aitchison, 1997; Greenfield et al., 1998). In a study conducted by Ilgen, McKellar, and Tiet (2005), persons who completed the program a score of 100 percent on a self-efficacy scale was the strongest predictor of abstinence at a 1 year follow up for participants in a substance use treatment facility. However, others have argued that 100 percent and other very high scores on self-efficacy questionnaires may connote denial or overconfidence; this over confidence can lead to negative consequences, such as relapse (Burling et al., 1989; Stone, 1994).

The Oxford House model has also been shown to have positive effects on substance use disorders (Jason, Davis, Ferrari, & Anderson, 2007; Jason & Ferrari, 2010; Jason, Olson, Ferrari, Majer, Alvarez, & Stout, 2007). Oxford Houses are self-governed, self-run, recovery homes for individuals who have problems with alcohol and drugs (Jason, Olson, & Foli, 2008). There are over 1,400 houses in the United States, as well as houses in Canada and Australia. In order to be admitted into an Oxford House, a prospective resident must be voted in by an 80% majority of existing members (Oxford House Inc., 2008). Once admitted

the new resident must be able to pay his or her share of the house expenses or face possible eviction. The most important rule of an Oxford House is the zero-tolerance of substance use among residents. According to the Oxford House Inc. Manual (2008), the use of any substance is grounds for immediate dismissal from the house.

Jason, Davis, et al. (2007) used a national data set to examine the relationship between residency at an Oxford House, self-efficacy, and self-regulation. The investigators found that residents who resided in an Oxford house for more than 6 months showed significant gains in self-efficacy (Jason, Davis, et al. 2007). In addition, another study using the same data set found a positive relationship between self-regulation and length of abstinence (Ferrari et al., 2009). Jason, Olson, et al. (2007) also found individuals, regardless of age, who resided in an Oxford House for at least 6 months had the highest self-regulation scores. None of the prior Oxford House studies have investigated the predictive effect of changes in the levels of self-regulation and self-efficacy on substance use abstinence. Research has previously demonstrated that the first 6 months of residence in an Oxford House may be critical in affecting self-efficacy, self-regulation, and maintaining substance abstinence (Aase et al., 2006–2007; Jason, Davis, et al. 2007; Jason, Olson, et al. 2007). Aase et al. (2006–2007) examined the effects of length of time in an Oxford House and found that individuals who resided for at least 6 months versus those that resided in an Oxford House for less than 6 months, had lower rates of alcohol use at a the 1-year follow up. Based on these studies, we hypothesized that increases in scores from the baseline to the 6 month interview for both self-regulation and self-efficacy would lead to significantly higher abstinence at the 12–24 month follow-ups. In addition, as each of these independent variables might have both main and interactive effects, we hypothesized that the interaction of self-regulation and self-efficacy change scores from baseline to 6 months would significantly predict abstinence at the 12–24 month follow-ups.

Method

Participants

Informed consent was obtained from all participants, and the DePaul University IRB provided institutional approval to conduct this study. Participants were recruited from residential treatment facilities in the greater Chicagoland area. Recruitment occurred over a 1½ year period where participants were asked to take part in a 2-year longitudinal study assessing post-treatment recovery patterns for substance users (for more details, see Jason, Olson, Ferrari, & Lo Sasso, 2006). To be involved in the study, participants had to agree to be randomly assigned to either the Oxford House or usual aftercare condition.

The total recruitment for the study was 150 participants, with only 4 individuals turning down the offer to participate. Both the Oxford House (46 women, 29 men) and the usual aftercare (47 women, 28 men) conditions had 75 participants. Of the entire population, 62% were women and 38% were men, 77% were African American, 11% were Caucasian, 8% were Latino, and 3% identified themselves as “other.” The participant's age ranged from 18 to 60 years old ($M=37.07$, $SD=7.96$), with 61% of the population at least finishing high school.

Procedure

Recruitment for the study took place over a period of a year and a half. A baseline interview was given to individuals, who agreed to take part in the study, 2 to 3 days before they were to be released from the treatment facility. A total of 5 interviews were administered over a period of 2 years, with 6 month intervals between each interview (i.e. baseline; 6 months; 12 months; 18 months; 24 months). This study only looked at the changes in scores from the

baseline to the 6 month interviews due to prior research showing the importance of residing in an Oxford House for at least 6 months for greater improvements (Aase et al., 2006–2007; Jason, Davis, et al., 2007; Jason, Olson, et al. 2007). Participants were compensated for their time with a payment of 40 dollars for each interview completed

Participants in the Oxford House condition—House interviews were arranged for all the individuals randomly assigned to the Oxford House condition in one of the Illinois Oxford Houses. In order to be accepted into the house, the participant had to garner an 80% majority vote of acceptance from the current house members. All, but one, of the participants who interviewed for an Oxford House gained admittance into the first house attempted. The participant who was not voted into the first Oxford House was accepted when taken to a second Oxford House.

Participants in the usual aftercare condition—Individuals assigned to the usual aftercare condition were referred by their case managers to alternative aftercare treatments. These treatments included, but were not limited to, outpatient treatment centers, self-help groups, and other recovery homes.

Participants of the Oxford House condition averaged an amount of time of 256.2 days (range 8–730) in an Oxford House (see Jason et al. 2006 for more details). Two individuals in the usual care condition decided to apply and gain admission to an Oxford House under their own volition. They had come to this decision after leaving the treatment facilities and spending time at other treatment sites. These individuals were left in the usual aftercare condition as according to the intent-to-treat rules. Both the Oxford House (89%) and the usual aftercare (86%) conditions had a comparable completion rate over the 2 years of interviewing.

Psychometric Measures

Self-Control Scale (SCS)—All participants completed the Self-Control Scale (Tangney et al., 2004), a 36-item 5-point scale (1 = *not at all like me*, 5 = *very much like me*) used to assess an individual's self-control (self-regulation). The questions ask how much the statement reflects how the participant is (i.e. “I am good at resisting temptation.” or “I am lazy.”). The scale has five factors with little systematic variation in their correlations; therefore, following the recommendation from Tangney et al. (2004), the total summary score was used. Lower scores on the scale were indicative of better self-regulation. At baseline, the summary score portrayed good internal consistency with an alpha of .87 ($M = 2.96$, $SD = .53$) for the current sample. An individual could obtain a total score from 36 to 180. The change in self-regulation scores were calculated by taking the total score at baseline and subtracting the total score at 6 months.

Drug and Alcohol Abuse Self-Efficacy Scale (DAASE)—The AASE and DASE are 20-item inventories assessing abstinence self-efficacy from alcohol and drug use (DiClemente, Carbonari, Montgomery, & Hughes, 1994). The questions ask of the participant's confidence in abstaining from (*not at all* = 1 to *extremely* = 5) drinking or using drugs in a number of situations (i.e. “When I have a headache.” or “When I see others drinking at a bar or at a party.”). The scale was administered twice, once using the words “drink alcohol” and second using the words “use drugs,” to assess for both alcohol and drug abstinence self-efficacy. The two measures had alpha scores of .97 ($M = 3.87$, $SD = .99$) and .96 ($M = 3.79$, $SD = .99$) respectively, demonstrating strong internal consistency. An individual could obtain a total self-efficacy score from 20 to 100. In order to measure the participant's efficacy against the substance they had more difficulty with, change in self-efficacy scores were calculated by taking the lower of the two total scores (AASE or DASE)

at baseline and subtracting the 6-month total score (same scale, AASE or DASE, used at baseline). Although this method does bring into the equation either alcohol or drug self-efficacy, this approach allows us to focus on which type of substance produces the most difficulties for our participants.

Addiction Severity Index (ASI)—All the participants completed portions of McLellan's (1992) 5th edition of the Addiction Severity Index-Lite. The instrument assesses problems affected by drug and alcohol use (i.e. education and criminal activity). As the data were skewed, we create a dichotomous variable (0 = no use, 1 = use) to determine if the participant had remained substance free from the 12 month interview through the 24 month interview. The time period of the 12 month interview to the 24 month interview was chosen to determine how factor changes during the first six months affect substance abstinence thereafter.

Results

It was predicted that changes in both self-regulation and self-efficacy scores would have a significant effect on substance use abstinence. Because higher change scores in self-regulation and self-efficacy (which would indicate positive change over time) were predicted to be related to more non-use (and as non-use was scored 0), the hypothesized beta in Table 1 would be negative. Table 1 indicates that this prediction was confirmed. Change in self-regulation scores was found to have a significant effect with a significance of .014, a beta of $-.034$, and a standard error of .014. The odds ratio of .967 for change in self-regulation scores show that a one point change has an effect of about 3% on abstaining from using substances. The change in self-efficacy scores shows a significance of .032, a beta of $-.024$, and a standard error of .011. The odds ratio of .977 shows that for every one point change in self-efficacy scores there is a 2% effect on abstaining from using substances.

A binary logistic regression was used to assess the relationship between and the change in self-regulation scores (SCS) and the change in self-efficacy scores (AASE and DASE) on abstaining from substance use. The naïve model initially classified that 100% of the participants would report using a substance during the 12 month through 24 month interviews as the overall relapse rate was 54.3%. When the variables of the equation were added into the model, the prediction percentage rose to 66.1% and had a Cox and Snell R square of .172. As shown in Table. 1, the interaction between the change in self-regulation scores and the change in self-efficacy scores was significant at the .042 level. Additionally, the interaction had a beta of .001 and a standard error of .001. The odds ratio of this interaction was $-.1\%$, showing the slightest attenuation effect of the interaction on substance use abstinence. Although these findings were statistically significant, the odds ratio suggests the effect size is extremely small.

Lastly, the Oxford House condition had a significant relationship with reduced likelihood of relapse. The treatment condition variable had a significance of .012, a beta of -1.001 , a standard error of .396, and an odds ratio of .368. According to the analysis, the treatment condition had an effect of 63% on abstaining from using substances.

Discussion

The current investigation focused on the hypotheses that changes in self-regulation and abstinence specific self-efficacy would be predictive of future substance use disorders. This research found that an individuals' internal trajectory was a significant predictor of future behavior, regardless of the individual's overall levels which have been examined in prior studies as between subjects research. Prior research has found that high levels of self-

regulation are associated with length of abstinence and better alcohol abuse outcomes (Ferrari et al., 2009; Tangney et al., 2004). Additionally, this study investigated a possible interaction between self-regulation and self-efficacy on substance use abstinence which resulted in relative independence between the effects of a global competency, e.g. self-regulation and a domain specific measure of self-efficacy.

Specific results found that as self-regulation increased, the likelihood of the participants remaining abstinent also increased. Prior research displaying that self-regulation may resemble a muscle shows promise for individuals who want to remain abstinent from substances (Muraven & Baumeister, 2000; Vohs & Heatherton, 2000). Over time, people attempting to remain abstinent may be exercising their self-regulation “muscle” and increasing their likelihood to succeed and remain abstinent in the future. Though it may be difficult for individuals to remain substance free in the beginning of their sobriety, the struggles may be an important part of remaining abstinent later in life. Importantly, this research suggests that an individual's perception of change in self-regulation is associated with a better recovery outcome.

Similarly, increases in self-efficacy were found to lower the likelihood of substance relapse. The results support a finding by Shiffman et al. (2000) which stated that within-subject changes in self-efficacy predicted smoking relapse. These findings shed light on the importance of an individual believing he or she can overcome the power of addiction and remain substance free. This finding supports a perspective of evaluating an individual's belief changes (strengthening or weakening) as a possible important factor in assessing specific domain competencies.

The interaction between the changes in self-efficacy and self-regulation on substance use abstinence was extremely small. It appears that the relationship between the two change variables is about one to one with the slightest overlap. This finding signifies the importance of focusing on both self-regulation and self-efficacy. However, increasing both scores at the same time will not give the exponential positive effects on substance abstinence that was originally hypothesized. It is important to note that this finding suggests that building global self-regulatory resources (e.g. self-control, general discipline, reduced impulsivity) may enhance an individual's prospects for substance use disorder recovery.

We found that participants in the Oxford House condition achieve better outcomes, in terms of substance abstinence, than participants in the usual aftercare condition. This finding is understandable as one would assume that individuals who go into a controlled environment that puts an emphasis on the 12-step model would be more resistant to using substances. Of the individuals assigned to the usual aftercare condition, 22% went to a staffed recovery home or a substance use disorder clinic. The rest of the participants went to a relative's home, a partner's or spouse's home, their own home or apartment, a homeless shelter, or a friend's home where they may, or may not have, sought further substance use disorder treatment (Jason, Olson, et al., 2007).

One important limitation in the present study is the self-reporting method by which substance abstinence was evaluated. Substance use was assessed by asking the participant to self-disclose at every wave, as well as by asking a member of the participant's social network who was listed on the 24-month follow-up assessment, to confirm the participant's abstinence at the -year assessment. However, previous research has found that self-reporting is a good indicator of a substance use disorder when compared to a hair analysis (Ledgerwood, Goldberger, Risk, Lewis, & Price, 2008). In addition, this study used a convenient sample of people who were finishing their program at a treatment center, and therefore might have been more motivated to abstain from substance use. Finally, all the

Odds Ratios were extremely close to 1, and although statistically significant, the effects are quite small.

Despite these limitations, the present study shows that increases in self-regulation and self-efficacy are related to remaining abstinent from using addictive substances. This is important for individuals who enter treatments with low self-regulation and self-efficacy. The study shows that the increase in these scores, regardless of their initial level, is an important factor in abstaining from addictive substances. Future studies should investigate and determine the factors that augment self-regulation and perceived abstinence self-efficacy.

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Table 1

Logistic Regression Predictors of Substance Abstinence

Variable	Beta	Standard Error	Wald	Significance	Odds Ratio
Change in Self-Regulation score	-.034	.014	6.081	.014	.967
Minimum change in AASE/DASE scores	-.024	.011	4.577	.032	.977
Change in Self-Regulation X Change in Self-Efficacy scores	.001	.001	4.152	.042	1.001
Oxford House condition	-1.001	.396	6.373	.012	.368
Constant	.891	.318	7.872	.005	2.438