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The Phenotype of Recovery V: Does Delay Discounting Predict the Perceived Risk of Relapse among Individuals in Recovery from Alcohol and Drug Use Disorders

Jamie K. Turner[a,b], **Liqa N. Athamneh**[a,b], **Julia C. Basso**[a,b], **Warren K. Bickel**[a,b]

[a]Addiction Recovery Research Center, Fralin Biomedical Research Institute at VTC, VA, USA

[b]Center for Transformative Research on Health Behaviors, Fralin Biomedical Research Institute at VTC, VA, USA

Abstract

Background: Substance use recovery is a dynamic process. Relapse, often part of the recovery process, is a persistent problem for individuals seeking freedom from their harmful substance use and has become a focus of research on the improvement of recovery outcomes. Delay discounting is associated with substance use disorder severity, both its negative outcomes and the propensity to relapse. However, the association between delay discounting and perceived risk of relapse as measured by the Alcohol Warning of Relapse (AWARE) Questionnaire has not previously been examined in a population of those in long-term recovery from substance misuse.

Methods: In this study, using data collected from the International Quit and Recovery Registry, we investigated the association between delay discounting, self-reported time in recovery, and perceived risk of relapse. Data from 193 individuals self-reporting to be in recovery from harmful substance use were included in the study.

Results: Delay discounting rates were significantly negatively associated with length of recovery ($p = .036$), and positively with perceived risk of relapse ($p = .027$) even after controlling for age, gender, education, marital status, ethnicity, race, primary substance, and length in the registry. Moreover, a mediation analysis using Hayes' methods revealed that the association between the length of recovery and perceived relapse risk was partially mediated by delay discounting, accounting for 21.2% of the effect.

Conclusions: Our finding supports previous characterizations of delay discounting as a candidate behavioral marker of substance misuse and may help identify individuals at higher perceived risk of relapse in an extended recovery population.

Correspondence concerning this article should be directed to Warren K. Bickel, Fralin Biomedical Research Institute at VTC, 2 Riverside Circle, Roanoke, VA 24016, wkbickel@vtc.vt.edu.

DECLARATION OF INTEREST

Although the following activities/relationships do not create a conflict of interest pertaining to this manuscript, in the interest of full disclosure, Dr. Bickel would like to report the following: W. K. Bickel is a principal of HealthSim, LLC; BEAM Diagnostics, Inc.; and Red 5 Group, LLC. In addition, he serves on the scientific advisory board for Sober Grid, Inc. and is a consultant for Alkermes, Inc. and Sandoz Inc.

Keywords

Reinforcer Pathology; Relapse; Delay Discounting; Recovery

INTRODUCTION

Substance use disorder (SUD) is a worldwide public health concern that is characterized by compulsive use of and relapse to substances that results in detriment to one's physical and mental health (Koob and Volkow, 2010). Rates of relapse are estimated to be about 40-60% in the U.S (National Institute on Drug Abuse, 2020). The repeated failure to quit is one of the main drivers for seeking treatment (Melemis, 2015). Relapse is generally considered an increased use after a period of abstinence (Nordfjærn, 2010). Recovery from substance use is a multidimensional process involving not only abstinence, but also the improvement of one's wellness, health, and quality of life (Betty Ford Institute Consensus Panel, 2007; Kelly & Hoeppner, 2015; Laudet, 2008; McLellan, 2010; Ashford et al., 2019). However, what causes and the precipitating factors of relapse have traditionally been difficult to fully detail. According to Gorski and Miller (1982), signs of relapse include cognitive behavioral, and physical signs (Gorski and Miller, 1982; Kelly et al., 2011). Identifying novel markers of relapse and targeting subgroups at higher perceived risk of relapse are important to improve treatment outcomes and increase the likelihood to succeed in recovery. Several individual characteristics are shown to predict the likelihood of relapse. For example, demographic variables including older age (Nordfjærn, 2010; Andersson et al., 2019; Naji et al., 2016), unemployment, (Nordfjærn, 2010; Andersson et al., 2019; Moos and Moos, 2006), family history of substance use and disorder (Chalana et al., 2016; Schuckit, 1986; Domino et al., 2005; Jauhar et al., 2004; Swan et al., 1988; Golestan, 2010; Rustad et al., 2015), being male versus female (Xie et al., 2005), having less education (Moos and Moos, 2006), and smoking status (e.g., current or former smoker)(Nguyen et al., 2020; Quisenberry et al., 2019) have been shown to be associated with increased risk of relapse to substance use. Lack of self-efficacy and coping skills are also thought to contribute to rates of relapse (Moos and Moos, 2006). In addition, increased stress response (i.e., cortisol levels; Wemm and Sinha, 2019), sleep deprivation (Brower and Perron, 2010), depression scores (Nguyen et al., 2020; Cornelius et al., 2003; Hammerbacher and Lyvers, 2006), and lack of social support (Cornelius et al., 2003; Hammerbacher and Lyvers, 2006; Rustad et al., 2015) predicted rates of relapse to substance use. Further, a higher number of pre-treatment quit attempts, higher severity scores, and psychiatric severity predicted relapse in Oxford houses, sober living environments, after treatment (Harvey et al., 2015). For a recent comprehensive review of factors associated with relapse, see Sliedrecht, de Waart R, Witkiewitz, and Roozen (2019). Importantly, while many of those individual characteristics and demographic variables may identify individuals at higher risk for relapse, they may not identify precipitants of relapse, might be hard to modify (e.g., education level, social support, depression), or are not modifiable (e.g., age, race, or ethnicity), and may not function as a target for novel interventions.

Understanding the decision-making process in substance misuse (e.g., preference for short-term reinforcers from substance use over long-term reinforcers from abstinence) is important

to prevent relapse during recovery. The Reinforcer Pathology perspective on relapse explained by Bickel and Athamneh (2020) asserts that substance misuse stems from the temporal window (i.e., the distance into the future to which one looks and integrates to make a present decision) and the valuation of reinforcers (Bickel and Athamneh, 2020). Within this framework, a limited window of integration (i.e., excessive discounting of the future rewards) causes an increase in the valuation of a substance at present (i.e., excessive valuation). The more severe the substance use, the more an individual tends to discount delayed future rewards (i.e., the shorter their temporal window). Delay discounting, which measures the temporal window (i.e., the reduction in the value of a reinforcer as a function of delay to its receipt (Yi et al., 2010), is a candidate behavioral marker of substance misuse (Bickel et al., 2014b; Bickel et al., 2012; Bickel et al., 2019; Koffarnus et al., 2012).

Delay discounting has been established as a predictor of substance dependencies (Bickel et al., 2014a; Yi et al., 2010; Kirby et al., 1999; Bickel et al., 1999) and substance use and gambling severity (Amlung et al., 2017; Alessi and Petry, 2003; Reynolds, 2006). It may also predispose one to a SUD (Poulton and Hester, 2020). Similar to risk of relapse, delay discounting is associated with individual characteristics and demographic variables including age (Steinberg et al., 2009), education (Jaroni et al., 2004), poly-substance use (Moody et al., 2016), family history of substance misuse (Athamneh et al., 2017a; VanderBroek et al., 2016), abstinence self-efficacy (Athamneh et al., 2019), intention to quit (Athamneh et al., 2017b), and depression scores (García-Pérez et al., 2020; Imhoff et al., 2014). Longer time in recovery is associated with lower rates of discounting (Tomlison et al., 2020; Athamneh et al., 2019). Previous longitudinal studies examining the association between DD and relapse risk over follow-up intervals of a year or more (MacKillop and Kahler 2009; Washio et al., 2011; Yoon et al., 2007; Sheffer et al., 2012) indicated that impulsivity measures were related to relapse. In addition, delay discounting has been shown to be predictive of both short and long term post-treatment outcomes including relapse and treatment retention (Krishnan-Sarin et al., 2007; Domínguez-Salas et al., 2016; Stevens et al., 2014; Stevens et al., 2015) among both smokers and those with a SUD at a follow up of six months (Sheffer et al., 2012; Sheffer et al. 2014) or one or more years (MacKillop and Kahler 2009; Yoon et al., 2007; Washio et al., 2011; Sheffer et al., 2012). However, this relationship has not been seen in marijuana use and in some poly-drug use studies (for review see Domínguez-Salas et al. 2016) and has less consistent associations in young adult drinking (Lemley et al., 2016). Moreover, delay discounting did not predict abstinent versus stable moderation outcomes at 6 months to 1 year among those in natural recovery (Tucker et al., 2016). Therefore, further research is needed to clarify the relationship between delay discounting and risk of relapse in long-term recovery populations. To our knowledge, the association between delay discounting and perceived risk of relapse among those in long-term recovery has not been previously examined. Given that delay discounting is modifiable (e.g., Snider et al., 2016; Dassen et al., 2016; Lin and Epstein, 2014; e.g., Snider et al., 2016; Stein et al., 2016; Stein et al., 2018), establishing the association between delay discounting and perceived risk of relapse among individuals in long-term recovery might help identify individuals who may be at greater perceived risk of relapse and, importantly, provide a novel target for interventions.

The current study examined the association between delay discounting and perceived risk of relapse (as measured by the Alcohol Warning of Relapse Questionnaire; AWARE; Gorski and Miller 1982) among individuals in recovery from SUD Data were collected from the International Quit and Recovery Registry (IQRR), an ongoing online registry that aims to study the recovery process and its different domains and phenotypes. We hypothesized that delay discounting would predict the perceived risk of relapse for those in recovery from substance misuse. It is expected that the higher one's discounting rate (more impulsive), the higher their perceived risk of relapse. Additionally, the effect of delay discounting on the association between length of recovery and the perceived risk of relapse was assessed. Establishing delay discounting as a tool to identify the perceived risk of relapse could benefit treatment providers in identifying those who may need special treatment or unique interventions and further the understanding of the role of delay discounting in addictive behavior and relapse.

MATERIALS AND METHODS

Participants and Procedure

Participation in the current study was voluntary. Individuals who join the registry and respond to survey invitations imply consent to participate through the completion and submission of the survey. The study was approved by the Institutional Review Board at Virginia Polytechnic and State University.

Participants were recruited from the International Quit and Recovery Registry (IQRR) available at https://quitandrecovery.org. The IQRR is an ongoing online registry for those self-identifying as being in recovery from substance misuse or a behavioral addiction. The registry aims to provide support and online resources for those struggling with harmful substance use and to study the process and phenotypes of recovery. The IQRR members can share their recovery stories and experiences with others going through the same struggle. In addition, registrants have access to a social platform where they can connect with others in recovery and they have access to compensated monthly assessments that aim to advance our understanding of the recovery process. More specifically, IQRR assessments pursue the composition of the phenotype of recovery and examine the role of decision-making processes in recovery outcomes. By completing the monthly assessments, which are emailed to all registrants through a monthly newsletter, participants earn a special badge that can be presented on their profile and a set of points (400-1000 points, depending on the assessment’s content and length) that they can redeem for money ($4-$10, respectively). Only those who completed the current survey were included in the study. Individuals can redeem points for a cash payment through PayPal.

The present study recruited a sample of 205 individuals from the IQRR. Participants were excluded if they reported a non-substance related addiction (e.g., excessive shopping, gambling, etc.; n = 12); thus, the final sample consisted of 193 participants self-identifying as being in recovery from substance misuse.

Measures

Demographics.—Participant characteristics including age, race, ethnicity, annual income, gender, marital status, and education level were collected using a standardized questionnaire.

Substance Use History.—The primary substance was determined by asking, “What was your primary addiction?” and allowing for selection of a behavior or substance including nicotine, alcohol, cannabis products, opioids, cocaine, stimulants, prescription pain relievers, hallucinogens, dissociative anesthetics, tranquilizers/depressants, inhalants, caffeine, gambling, overeating, binge eating or other eating disorders, excessive shopping, excessive sexual activity, excessive video gaming, excessive viewing of pornography, and excessive preoccupation with activities on the internet and others. The date of last use was measured by asking participants to report the date (i.e., year, month, and day) they last engaged in misuse of their primary substance. “Days since last use” was calculated by subtracting the date of last engagement from the date the survey was completed. Ongoing use was measured by asking a participant, “Do you consider your use of the above substance/behavior currently ongoing?”

Length in Registry.—Registry membership length was determined by subtracting the date that they joined the registry from the date they complete the survey. This variable was included in the analysis because being in the registry may function as a supportive intervention since the registry gave participants access to a social platform where they could connect with others in recovery and complete compensated monthly assessments aimed at advancing the understanding of the recovery process. In order to stabilize variance, we log-transformed length in recovery for the analysis.

Number of Relapses.—Number of relapses since beginning recovery was measured by asking the following question. “Approximately how many times have you relapsed since you have been in recovery?” Participants were asked to enter a whole numerical value.

Recovery Length.—Time in recovery was measured using the question, “Approximately how long have you been in recovery from your primary addiction? (Please specify the number of years, months, and days).” The length of recovery was converted to total days in recovery and log-transformed for the analysis to stabilize the variance.

Delay Discounting.—Delay discounting was measured by a hypothetical adjusting delay discounting task (Koffarnus and Bickel, 2014). Participants were presented with two options and asked if they would prefer a smaller amount now or a larger amount in the future at a specified delay in time (e.g., $500 now or $1000 in 3 weeks). The delays would titrate over five-choice trials either earlier in time if they chose the immediate reward (i.e., $500 now), or further in time if they chose the delayed reward (i.e., $1000 at some delay). The ED50 (i.e., the delay at which the value of the larger reward is expected to be reduced by half) and the inverse ED50 (1/ED50) were calculated with the indifference points (i.e., number of days corresponding to the amount) from the adjusting-delay task to approximate the k (i.e., discounting rate) using Mazur’s hyperbolical equation (Mazur, 1987). The natural logarithm

of the k was used for analysis due to the positive skew of the k values (Koffarnus and Bickel, 2014).

The Advance WArning of RElapse (AWARE).—The AWARE questionnaire was designed by Gorski to measure warning signs of relapse (Gorski and Miller, 1982). The AWARE score was found to be a good predictor of the perceived risk and occurrence of relapse ($r = .42$, $p < .001$) in a prospective study of relapse following outpatient treatment for alcohol abuse or dependence (Miller et al., 1996). The original version of the scale included 37-items that were later refined to include a 28-item scale (version 3.0; used in the current study; Miller and Harris, 2000). Participants were asked, on a 7-point Likert scale from "never" to "always", how often they have feelings and thoughts that have been shown to contribute to relapse, such as "I think about using my drug of addiction, I feel nervous or unsure of my ability to stay sober, etc." The overall score was calculated by totaling the numbers chosen for all items but reversing the scores for five items as described in Miller and Harris (2000). Scores range from 28 (lowest possible) to 196 (highest possible) with higher scores indicating a higher number of warning signs of relapse (i.e., higher perceived risk of relapse).

Statistical Analysis

Descriptive statistics were used to determine the means and frequency of sample characteristics. Univariate linear regression analysis of delay discounting was run to determine the association between delay discounting and the AWARE scores, and time in recovery and results were presented as unadjusted coefficients with 95% confidence intervals (CI). Next, demographics (i.e., age, gender, education level, marital status, ethnicity, race, primary substance, and length in the registry), in addition to ln(k), were included in a multivariate stepwise regression, and results were presented as adjusted coefficients with 95% CI. Then, mediation analysis was conducted using Hayes' (Hayes, 2017) methods to explore whether discounting rate mediates the association between time in recovery and the perceived risk of relapse (AWARE score). A bootstrapping technique (with 10,000 bootstrap samples) to estimate 95% confidence intervals (CI) was used. A 95% CI for the product of an indirect path coefficient that does not include zero provides evidence of a significant indirect effect (Preacher et al., 2007). All analyses were conducted using IBM SPSS Statistics Version 26 (IBM Analytics, Armonk, NY; (George and Mallery, 2019) and macro-program PROCESS 3.4 (Hayes, 2009, 2017) at a significance level of 0.05.

RESULTS

The final sample included 193 participants. Means and distribution of the participant characteristics, delay discounting, AWARE score, length in registry, ongoing engagement in primary substance misuse, number of relapses since beginning recovery, and length of recovery are shown in Table 1. Of the 193, 121 (62.4%) reported alcohol as their primary substance of misuse, 24 (12.4%) opioids, and 49 (25.2 %) stimulants and others. The average age (SD) was 44.68 (14.87) and the sample was primarily female 116 (59.8%) and white 153 (79.3%). Of the 193 participants, 19 reported ongoing use (answered yes to the question: "Do you consider your use of the above substance/behavior currently ongoing?")

of their primary substance and the mean number of relapses (answering the question: “Approximately how many times have you relapsed since you have been in recovery?”) was 4.31 (SD =18.08). The current study sample is comparable in age, sex, race, and education demographics to that of the larger registry sample (data not shown).

The univariate linear regression analysis showed that delay discounting rates were a significant predictor of the perceived risk of relapse as measured by the AWARE score (b = 3.632, p < .001), and a significant predictor of length of recovery (b = −.100, p < .001); Table 2, Figure 1). The stepwise multivariate linear regression analysis indicated that delay discounting rates were a statistically significant predictor of the AWARE score and length of recovery (Table 2) even after controlling for age, gender, education level, marital status, ethnicity, race, primary substance, and length in the registry. The mediation analysis results suggested a significant indirect association between length of recovery and the perceived risk of relapse, through delay discounting (point estimate= −2.742, 95%CI=−4.996 −1.100). Overall, the discounting rates (lnk) accounted for 21.2% of the total effect between the length of recovery and the perceived risk of relapse (Figure 2).

DISCUSSION

The present study examined the association between discounting of delayed monetary rewards, perceived risk of relapse, and length of recovery in a sample of individuals in recovery from substance misuse from the International Quit and Recovery Registry. Greater rates of discounting were associated with a higher perceived risk of relapse. In addition, the current findings indicate lower discounting rates among those with a longer time in recovery. Overall, the discounting rates accounted for 21.2% of the total effect between the length of recovery and the perceived risk of relapse. These results extend the findings of previous research by reporting a significant association between rates of discounting and perceived relapse risk among individuals in long-term recovery from harmful substance use. The current findings support the recent characterization of delay discounting as a behavioral marker of substance misuse (Bickel et al., 2014b). Below, we discuss the current findings in more detail.

In line with our first hypothesis, we found that in individuals in recovery, delay discounting predicts the perceived risk of relapse, as measured through the AWARE scale (Kelly et al., 2011). This finding is consistent with previous research indicating that greater delay discounting rates at baseline were significantly associated with an increased likelihood of smoking relapse at a six-month follow-up (González-Roz et al., 2019) and expands it to assess the association between delay discounting and perceived risk of relapse among individuals in long-term recovery. Considering that delay discounting predicts the warning signs of relapse even after being in years of recovery, this importantly suggests that at-risk individuals can be pre-identified for special treatment or unique interventions.

In line with our second hypothesis, we found that delay discounting mediated the relationship of time in recovery on the perceived risk of relapse. Our findings indicate that the longer one abstains or remains in recovery, the lower the rate of discounting, with this reduction accounting for 21.2% of the reduced perceived risk of relapse after controlling for

demographic variables associated with perceived risk of relapse. In our study, participants had varying lengths of time in recovery with an average of about 8 years. The length of recovery was significantly associated with a reduction in delay discounting. This relationship was also found in a study on the effect of self-efficacy on the perceived risk of relapse; those who reported being in recovery longer had lower rates of discounting, a higher level of education, greater income, and better self-efficacy (Athamneh et al., 2019). Our findings are in line with other research that has shown that in smoking cessation, reduction in rates of discounting in long-term follow-up was significantly associated with abstinence and reduction of depressive symptoms (García-Pérez et al., 2020).

Implications of Study Results

The results of this study suggest that delay discounting could potentially be used to indicate perceived risk of relapse throughout the recovery process. A significant strength of the current study was the opportunity to use data from the IQRR, which affords a diverse sample of individuals in long-term recovery from substance misuse. The current study suggests several areas for future research. Further investigation is needed to determine the predictive utility of delay discounting not only of the perceived risk of relapse but actual relapse. Also, examining the ability of delay discounting to predict relapse in other types of behavioral addiction (e.g., gambling, overeating) may be beneficial. Moreover, longitudinal studies are needed to determine the association between changes in delay discounting over time and changes in the relapse/remission status.

Limitations

Despite the findings of the current study, several limitations exist. First, although all those in recovery are encouraged to join the IQRR, participation in the registry involves self-selection and might have biased our sample toward those who volunteer to join the research. Second, the online-based registry limited our sample to include members of the IQRR who have an email address and access to the internet. Third, the relationship between the perceived risk of relapse and length of recovery was only partially mediated by delay discounting. Clearly, other factors exist that have the potential to confound effects that were not assessed in this study (e.g., severity of SUD, current or past use pattern, lifetime dependence, etc.) that could contribute to the association between delay discounting and the perceived risk of relapse. Future research including these variables might be warranted to better understand the association of delay discounting and perceived risk of relapse. For example, we did not collect information about lifetime dependence, past or current diagnosis of substance use disorder, measures of craving or demand for SUD, or measures of other variables that predict the perceived risk of relapse beyond demographic or socioeconomic factors. Fourth, even though participation in this study is voluntary and open to all the registry members, it is possible that individuals who are successful in their recovery are more likely to engage and participate in the current research. Future research assessing the effect of recovery status (successful vs unsuccessful recovery) on the association between perceived risk of relapse and DD will be beneficial. Fifth, cross-sectional mediation analysis has limitations. There is a potential for bias and results may not reflect the same relationship seen in a longitudinal mediation analysis due to a lack in temporal precedence (Maxwell et al. 2011). Cross-sectional mediation, however, may provide preliminary evidence of

relationships that can provide a justification for future longitudinal studies, which are warranted. Our results are consistent with the current knowledge on delay discounting and many factors contributing to the likelihood of relapse in the recovery process. Sixth, the IQRR administers monthly assessments with more than one assessment administering the DD task leading to the possible familiarity with the task among the registry members. Future research assessing the association between DD and perceived risk of relapse among individuals naive to the DD task might be needed. Finally, in the current study participants were asked to self-report how long they have been in recovery from their primary substance misuse and the number of times they relapsed. However, the definitions of recovery and/or relapse were not specified. As participants may have defined recovery and/or relapse differently when responding to the study questions, using the self-reported definition of recovery instead of standard measures to assess the recovery and relapse status (e.g., DSM-5, Quality of life measures, etc; Betty Ford Institute Consensus Panel, 2007) is a limitation of the current study. Future research assessing those associations among individuals in recovery as determined by the new evolving definitions (Betty Ford Institute Consensus Panel, 2007; Laudet 2008; Kelly and Hoeppner 2015; Ashford et al. 2019) is needed.

CONCLUSIONS

In conclusion, we found that delay discounting predicts the perceived risk of relapse and that delay discounting partially mediates the relationship between the perceived risk of relapse and length of recovery. That is, given a set of risk factors for relapse, individuals with lower rates of delay discounting may have a higher likelihood of remaining in recovery for longer periods. These findings have important implications for SUD recovery programs. First, delay discounting can be used as a measure to identify individuals who may be at a heightened risk for relapse. Second, delay discounting can be a target for possible interventions to enhance treatment success and lengthen the time in recovery. Interventions that decrease discounting rates, producing greater valuation of the future, may be beneficial to improve success in recovery. Future studies are needed to identify other factors that predict success in recovery as these studies will help identify optimal treatment strategies for harmful substance use, a problem that affects many individuals worldwide and has profound effects on the physical, mental, and psychosocial health not only of the afflicted individual but their family and friends as well.

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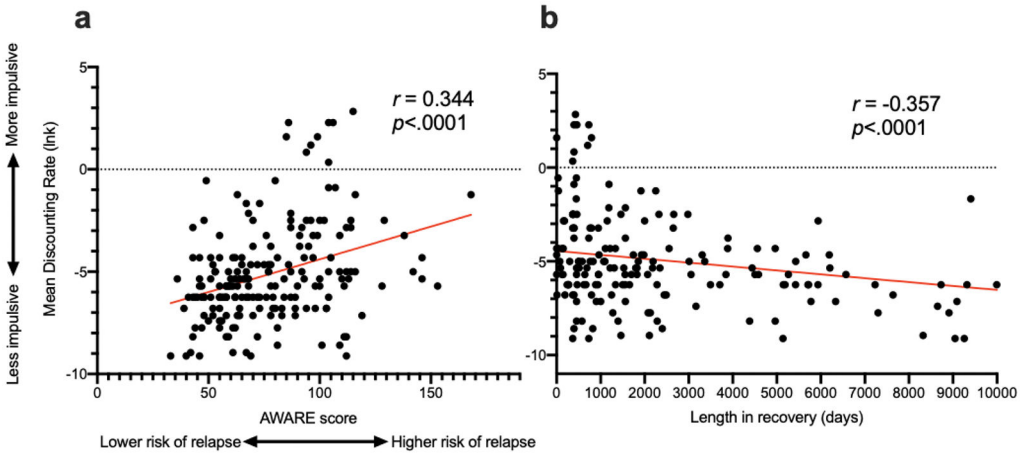

Figure 1.

The association between rates of discounting with (a) perceived risk of relapse as measured by the AWARE scale, and (b) length of recovery in days.

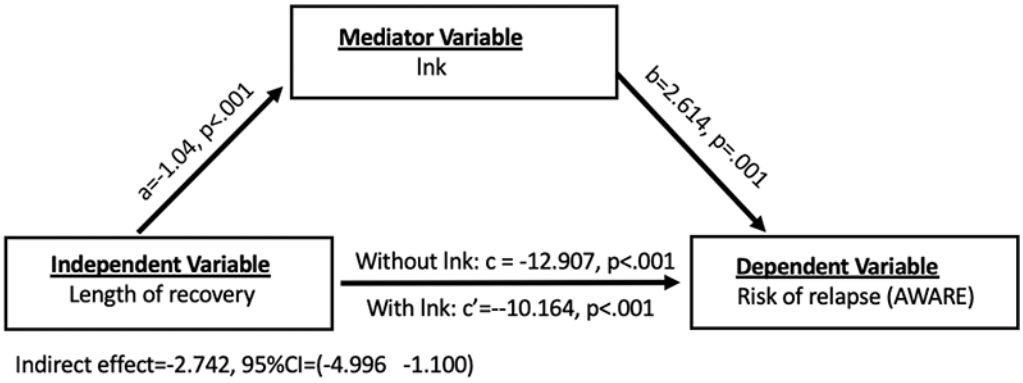

Figure 2.

Mediation analyses for length of recovery and perceived risk of relapse. Given that the indirect effect is statistically significant, it supports partial mediation with delay discounting accounting for 21.2% of the effect.

Table 1.

Sociodemographic Characteristics of Participants (N = 193)

Characteristics	Frequency (%) / Mean (*SD*)
Female (%)	114 (59.1)
Education level (%)	
High school diploma/GED or less	43 (22.3)
Some college or vocational training	62 (32.1)
Completed a 4-year college degree or higher	84 (43.5)
Income (%)	
Less than $30,000	83 (43.2)
$30,000-$49,999	22 (11.5)
$50,000-$69,999	21 (10.9)
$70,000+	47 (24.4)
Race (%)	
Asian	18 (9.3)
Black or African American	9 (4.7)
White	153 (79.3)
Other	13 (6.7)
Hispanic (%)	6 (3.1)
Primary substance (%)	
Alcohol	121 (62.4)
Opioids	24 (12.4)
Other	49 (25.2)
Age (%)	44.75 (14.9)
Time since last use in years (SD)	7.90 (10.2)
Length of recovery in years (SD)	8.86 (10.2)
Length in the registry in years (SD)	1.24 (1.0)
Number of relapses (SD)	4.31 (18.1)
Ongoing use (%)	19 (0.1)
Delay discounting rates (SD)	−5.12 (2.4)
AWARE scores (SD)	77.42 (25.6)

Table 2.

Linear Regression Results for the Association Between Delay Discounting Rates, the AWARE Score, and Length of Recovery

Variable	Unadjusted coef. (95% CI)	P-value	Adjusted coef. (95% CI)[a]	P-value
Length of Recovery (log days)	−.100 (1.142 −.058)	<.001	−.058 (−.111 −.004)	.036
AWARE scores	3.632 (2.203 5.060)	<.001	2.036 (.233 3.840)	.027

Cl= confidence interval

[a]Adjusted for age, gender, education, marital status, ethnicity, race, primary substance, and length in the registry.