Will Delay Discounting Predict Intention to Quit Smoking?

Liqa N. Athamneh,
Addiction Recovery Research Center, Virginia Tech Carilion Research Institute, Roanoke, VA, USA

Jeffrey S. Stein, and
Graduate Program in Translational Biology, Medicine, and Health, Virginia Tech, Blacksburg, Virginia, USA

Warren K. Bickel
Addiction Recovery Research Center, Virginia Tech Carilion Research Institute, Roanoke, VA, USAGraduate Program in Translational Biology, Medicine, and Health, Virginia Tech, Blacksburg, Virginia, USADepartment of Psychology, Virginia Tech, Department of Neuroscience, Virginia Tech, Faculty of Health Sciences, Virginia Tech, Department of Psychiatry and Behavioral Medicine, Virginia Tech Carilion School of Medicine

Abstract

Intention to quit cigarette smoking is significantly associated with making quitting attempts and actual quitting. Delay discounting is significantly associated with smoking initiation and success in quitting. To our knowledge, no studies have investigated the relationship between delay discounting and intention to quit smoking. In two separate observational, cross-sectional studies, the current investigation examines the relationship between delay discounting and intention to quit smoking within groups of smokers. Experiment 1 used data collected online and an adjusting-delay discounting task; Experiment 2 used data collected in the laboratory and an adjusting-amount discounting task. A total of 242 participants and 142 participants completed the online and on laboratory experiments, respectively. In both studies, participants with higher intention to quit smoking had significantly lower rates of discounting. These associations between intention to quit smoking and rates of delay discounting further support recent characterizations of delay discounting as a candidate behavioral marker of addiction. Understanding cognitive factors affecting treatment initiation such as intention to change, and the effects of delay discounting on these factors, in addition to the mechanisms by which they influence treatment outcomes might be essential to developing, disseminating, and implementing treatment interventions.

Keywords

Intention; Quit; Delay discounting; Cigarette smoking; Discounting Rates

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Public Significance Statement: In this study, delay discounting, which measures the extent to which individuals choose smaller, sooner over larger, delayed rewards, was significantly associated with intention to quit cigarette smoking. That is, smokers with higher intention to quit cigarette smoking had lower delay discounting rates compared to those with lower intention to quit. This finding supports the recent characterizations of delay discounting rates as a candidate behavioral marker of addiction. This information may serve as a base to better identify and target subgroups that need tailored or additional interventions to address their higher impulsivity and increase their likelihood of quitting or attain better treatment outcomes.

Given the negative health consequences of smoking (World Health Organization 2011; Courtney 2015), addiction science has sought to identify measures that are predictive to quit attempts. One approach has recognized that a quit attempt is often preceded by an intention to change (DiClemente et al. 1991). Indeed, several important conceptual frameworks in social and health psychology propose that intentions to change lead directly to behavior change (Webb and Sheeran 2006; Ajzen 1991; Carver and Scheier 2001; Gibbons et al. 1998; Locke and Latham 1990)). Importantly, among cigarette smokers, having an intention to quit smoking is significantly associated with making quitting attempts (Hyland et al. 2006; Pai and Edington 2008) and actual quitting (Pai and Edington 2008b; Li et al. 2010)

Behavioral economics, which integrates psychology and economics, studies the effects of psychological, cognitive, social, and emotional factors on healthy and unhealthy decision-making (Bickel, Moody, and Higgins 2016). Among the most studied decisional process within behavioral economics is delay discounting (Bickel, Johnson, et al. 2014). Delay discounting, which measures the extent to which individuals choose smaller, sooner over larger, delayed rewards (Madden & Bickel 2010) is strongly associated with cigarette smoking. For example, delay discounting co-varies with smoking status, with current smokers discounting delayed rewards more steeply compared to demographically matched non-smokers (Baker, Johnson, and Bickel 2003; Bickel, Odum, and Madden 1999; Heyman and Gibb 2006; Mitchell 1999; Ohmura, Takahashi, and Kitamura 2005; Reynolds and Fields 2012; MacKillop et al. 2011). Moreover, some data suggest that ex-smokers discount monetary rewards less steeply compared to current smokers (Bickel, Odum, and Madden 1999; Odum et al. 2002). Finally, several studies have shown that delay discounting measured at the beginning of a quit attempt is predictive of therapeutic outcome (Sheffer et al. 2014; Yoon et al. 2007; Sheffer et al. 2012; Krishnan-Sarin et al. 2007). Despite these efforts, the relationship between delay discounting and intention to quit has not been examined.

In two separate studies, we sought in the current investigation to assess for the first time the relationship between delay discounting and intention to quit cigarette smoking. We expected to find significantly lower rates of discounting among individuals more interested in quitting. Study 1 used data collected online from Amazon Mechanical Turk (mTurk), an

online crowdsourcing service, with an adjusting-delay discounting task, a brief but accurate method of obtaining discount rate (Koffarnus and Bickel 2014). Use of online data collection has been validated by many studies reporting results similar to laboratory-based data collection (e.g., Paolacci, Chandler, and Ipeirotis 2010; Buhrmester, Kwang, and Gosling 2011; Suri and Watts 2011; Birnbaum 2000). Most relevant to the present study, mTurk studies have replicated many discounting-related phenomena observed in traditional laboratory studies, including cross-sectional differences in delay discounting related to obesity (Bickel, George Wilson, et al. 2014), cigarette smoking and alcohol use disorder (Johnson, Herrmann, and Johnson 2015; VanderBroek et al. 2016; Jarmolowicz et al. 2012), as well as experimental demonstrations of the magnitude effect (Mellis et al. 2017), episodic future thinking (Sze et al. in press), preference reversals (Yi et al. 2016), and other phenomena (Chivers et al. 2016; Michaelson et al. 2013; Meredith et al. 2016). Study 2 sought to validate and generalize the results of Study 1 by examining data collected in the laboratory with an adjusting-amount discounting task, a more standard and lengthier method of obtaining discount rate (Mazur 1987; Du, Green, and Myerson 2002).

Method

Participation in both studies was voluntary and participants gave written informed consent before enrollment. These studies were approved by the Institutional Review Board (IRB) at Virginia Polytechnic Institute and State University.

Study 1 (Online)

Participants, instrument, setting and area—Study 1 was carried out using data collected online from mTurk, a crowdsourcing service in which employers post Human Intelligence Tasks (HITs) which may be completed in exchange for a monetary payment. Participants were tested individually and received $3 compensation upon completion of the study. Using a brief screening questionnaire, participants were eligible to accept the posted HIT if they were aged 18 years or older and smoked at least 10 cigarettes per day. Eligible participants then completed a demographics questionnaire followed by a 5-trial adjusting delay discounting task (Koffarnus and Bickel 2014).

Study variables—The main explanatory variable was intention to quit smoking. To identify intention to quit smoking in this study, we used the Contemplation Ladder, a validated instrument that was designed to assess smoker's readiness to consider smoking cessation (Biener and Abrams 1991). This instrument asks participants to rate their intention to quit smoking on an 11-point Likert scale, providing the following instructions: "Each number on the scale below represents where various smokers are in their thinking about quitting. Mark the number that indicates where you are now:" (where 0= *no intention to quit* and 10= *currently taking action to quit*).

We also examined potential confounders of the association between intention to quit smoking and discounting among smokers. These variables include number of cigarettes per day, age, monthly income, gender (male, female), race (white, African American, Asian, other), ethnicity (Hispanic, non-Hispanic), and education level (Table 1).

The main outcome variable in this study was delay discounting rate. Delay-discounting tasks are used to determine the indifference point at which a smaller immediate and a larger delayed reward have approximately the same subjective value.

Discounting of delayed money in Study 1 was assessed using an adjusting-delay task (Koffarnus and Bickel 2014). Adjusting-delay task determines the delay at which the larger reward is devalued by approximately 50% compared to its immediate value. In the adjusting-delay task, a series of hypothetical choices between a delayed $1000 and an immediately delivered $500 were presented to participants. The larger reward was delayed by 3 weeks on the first trial and either increased or decreased on subsequent trial, depending on the prior choice. This process continued for a total of five choice trials (Koffarnus and Bickel 2014). The delayed and immediate rewards were randomly positioned at the left or right side of the screen on each trial.

Discount rate can be calculated using the following hyperbolic equation, (Mazur 1987)

$$V = \frac{A}{1 + kD}$$

In this formula, V refers to the discounted value of a delayed reward; A represents the amount of the delayed reward; D equals the delay of the award; and k represents the delay-discounting rate (Mazur 1987). A higher k *value* means steeper discounting curve and reflects greater impulsivity, while lower k value means shallower discounting curve with less impulsivity.

Statistical analysis—In the adjusting-delay task, the indifference point (expressed in days) provides a measure of ED_{50}, or the delay expected to reduce the value of the larger reward by 50%. We calculated the inverse of this ED_{50} ($1/ED_{50}$), which provided an estimate of k (Koffarnus and Bickel 2014; Yoon and Higgins 2008). This inverse expression is mathematically equivalent to solving for k when $V = 500$ (amount of the smaller option), $A = 1000$ (amount of the larger option), and $D =$ the indifference delay (in days). As the observed k values were non-normally distributed (positive skew), the natural log transformation of k was used in analyses.

Descriptive statistics, chi-square, and t-test analyses were used to determine the frequencies and associations of sample characteristics with discounting rates. Bivariate linear regression analyses of sample characteristic were carried out with the outcome variable (discounting rates), and results were presented as unadjusted coefficients with 95% confidence intervals (CI). All independent variables with p<0.2 in the unadjusted analysis were included in the stepwise multivariate linear regression model. All the statistical analysis were conducted using Stata 13.1 (Stata Corp, 2013) at a significance level of 0.05.

Study 2 (Laboratory-Based)

Participants, instrument, setting and area—Data were collected at the Addiction Recovery Research Center (ARRC) in Roanoke, VA by administering surveys in person to

willing adult participants at the ARRC lab. We recruited adult current cigarette smokers through newspaper advertisements and by fliers posted in prominent public places. Participants were seated individually in a small quiet room to complete the study. This study was part of a battery of assessments in which, participants were tested individually and received $25 compensation for an approximately 2-h session. Similar to the first study, using a screening questionnaire, participants were eligible to participate if they were aged 18 years or older and smoked at least 10 cigarettes per day. A total of 153 participants completed the study. Eleven subjects were excluded from the analysis because their discounting data were identified as nonsystematic according to standardized criteria (Johnson and Bickel 2008). Specifically, discount functions for participants were considered nonsystematic if they did not discount the immediate reward by at least 10% at the longest delay (no discounting occurred), or if one indifference point or more had a greater value than the preceding one that exceeds 20% of the immediate reward (inconsistent preferences).

Study variables—Similar to Study 1, the main explanatory variable was intention to quit smoking. To identify intention to quit smoking, we asked two separate questions. The first one was the same Contemplation Ladder question completed in Study 1, while in the second question, participants were asked a question that was adopted from the stages of change (Trans-theoretical model; see_DiClemente et al. 1991; Prochaska, DiClemente, and Norcross 1992): _"Are you seriously considering quitting tobacco within the next 6 months?" to which participants answered "yes" or "no."

Similar to Study 1, potential confounders of the association between intention to quit smoking and delay discounting (i.e., number of cigarettes per day, age, gender, and education level) were examined.

The main outcome variable in Study 2 was delay discounting rate, estimated using the the adjusting-amount discounting task (Mazur, 1987). The adjusting-amount task determines the amount of a smaller immediate reward that is considered approximately equal to a larger delayed one.

The adjusting-amount discounting task determines the amount of smaller but immediate money that is approximately equal to a larger amount of money delivered after several discrete delays (1 day, 1 week, 1 month, 3 months, 1 year, 5 years, and 25 years), and presented in random order. At each delay, the participant is asked to choose between a delayed $1000 and a smaller, immediate monetary amount. Depending on the choice made, the immediate amount is either increased or decreased and a new choice is presented (see Du, Green, and Myerson 2002). As in the adjusting-delay task, the delayed and immediate rewards are randomly positioned at the left or right side of the screen on each trial. In addition, participants completed other surveys, including the Alcohol Use Disorders Identification Test (AUDIT), substance use and medical history questions, and the Beck Depression Inventory (BDI-II) which were not reported in this study for brevity.

Statistical analysis—In the adjusting-amount task, we fit the hyperbolic equation to participants' indifference points (expressed in discounted monetary value) to provide an estimate of k, for which the natural log transformation was used in analyses. Descriptive

statistics, chi-square, and t-test analyses were used to determine the frequencies and associations of sample characteristics with discounting rates. Bivariate linear regression analyses of sample characteristic were carried out with the outcome variable (discounting rates), and results were presented as unadjusted coefficients with 95% confidence intervals (CI). All independent variables with p<0.2 in the unadjusted analysis were included in the stepwise multivariate linear regression model. All the statistical analyses were conducted using Stata 13.1 (StataCorp, 2013) at a significance level of 0.05.

Results

Study 1 (Online)

A total of 242 participants completed the online questionnaire. The distribution of the sociodemographic characteristics for cigarette smokers who participated in Study 1 is shown in Table 1.

The stepwise regression results indicated that intention to quit smoking measured by the contemplation ladder (*coef.* −0.125; *CI:* −0.240, −0.010; *p*=0.033) was significantly associated with delay discounting rates even when controlling for gender, race, ethnicity, age, monthly income, education, and number of cigarettes per day. Smokers with less intention to quit had higher delay discounting rates compared to those with higher intention to quit. In addition, gender (*coef.* 0.732; *CI:* 0.203, 1.261; *p*=0.007) was significantly associated with discounting rates; that is, women discounted more than men (Table 2).

Study 2 (Laboratory-Based)

A total of 142 participants were included in the analysis for Study 2. The distribution of the socio-demographic characteristics for cigarette smokers who participated in Study 2 is shown in Table 1. Discounting data were well described by the hyperbolic equation, with median R-squared values of 0.895 and mean discount rate of −3.565 across all participants.

The final results for the stepwise linear regression indicated that intention to quit smoking measured by the Contemplation Ladder (*coef.* −0.210; *CI:* −0.378, −0.042; *p*=0.015) was significantly associated with discounting rates even when controlling for gender, race, ethnicity, age, monthly income, education, and number of cigarettes per day (Table 3). Participants with higher intention to quit smoking had lower discounting rates compared to those with lower intention to quit. Overall, in this study sample, the prevalence of having smokers with an intention to quit cigarette smoking specifically in the next 6 months was 66.9%. Chi square test and t-test results showed no significant difference in the socio-demographic characteristics included in the study between those who had intention to quit cigarette smoking in the next 6 months and those who did not (Table 4). Intention to quit smoking in the next 6 months (*coef.* −1.196, *CI:* −2.015 −0.377, *p*=0.005) remained significantly associated with discounting rates after controlling for gender, race, ethnicity, age, monthly income, education, and number of cigarettes per day (Table 5). Smokers with intention to quit in the next 6 months had significantly lower mean delay discounting rate (M=−4.05) compared to those with no intention to quit (*M*= −2.62), *p*= 0.002 (Figure 1).

The mean delay discounting indifference points calculated for each of the seven points of time are presented in Figure 2.

Discussion

In this study, we investigated for the first time how cigarette smokers with different levels of intention to quit smoking discounted delayed monetary rewards. We used adjusting-delay and adjusting amount tasks to assess delay discounting in online and laboratory-based studies, respectively. Replicating these results across online and in-laboratory participants provides additional support for the use of online samples. The results across two different delay discounting tasks suggest that smokers with higher intention to quit discount money less steeply than those with less or no intention to quit. We also found that gender was significantly associated with discounting rates. Below, we discuss these findings in turn.

The finding that smokers with higher intention to quit smoking discount monetary rewards less than do smokers with less or no intention to quit in both studies is interesting. Prior data indicate that ex-smokers discount monetary rewards either less steeply than current smokers (Bickel et al. 1999) or at levels intermediate between current smokers and those who have never smoked (Odum et al. 2002). These findings can be interpreted in one of two ways: (1) with the hypothesis that smokers who discount less are more likely to quit (i.e., less discounting leads to quitting), or (2) with the hypothesis that smokers who quit, in turn, discount less (i.e., abstinence leads to less discounting). As having an intention to quit is a predictor for quitting attempts (Hyland et al. 2006b) and of actual quitting (Pai and Edington 2008c), the findings of the current investigation correspond with the first hypothesis indicating that smokers with lower rates of discounting are more likely to quit.

Results of the present investigation indicating that smokers with low discounting rates are more likely to express an intention to quit smoking complement previous research findings indicating that smokers in cessation treatment with low discounting rates are also more likely to achieve success in treatment for smoking cessation (MacKillop and Kahler 2009; C. Sheffer et al. 2012; Yoon et al. 2007; Dallery and Raiff 2007; Sheffer et al. 2014; Stanger et al. 2012). For example, in a study by Sheffer et al. (2014), higher delay discounting rates were significantly associated with faster relapse. In a lab-based study by Dallery and Raiff (2007), smokers who failed to maintain abstinence in a laboratory model of incentivized smoking cessation had higher initial discounting rates compared to those who remained abstinent. Similar results were reported in discounting assessments collected from female smokers who quit smoking as a result of pregnancy (Yoon et al. 2007).

Delay discounting rates in the current study were able to distinguish between those interested in changing the smoking behavior from those who were not and were significantly associated with the level of intention to quit (from 0–10), with lower rates of discounting among individuals with more interest in quitting. Therefore, combined with prior data, this investigation further supports and extends recent characterizations of delay discounting rates as a candidate behavioral marker of addiction (Bickel, Koffarnus, et al. 2014; Bickel et al. 2012).

Determining an individual's readiness to accept a specific intervention is the basis of any behavioral treatment effort (DiClemente et al. 1991). Examining differences among smokers can have critical treatment implications in terms of both matching smokers to appropriate and maximally effective treatments and predicting the likelihood of treatment success (Pickett and Bains 1998). Understanding cognitive factors affecting treatment initiation such as intention to change, and the effects of of delay discounting on these factors, in addition to the mechanisms by which they influence treatment outcomes might be essential to developing, disseminating, and implementing treatment interventions.

Our results also showed that gender was significantly associated with delay discounting. Some prior studies have reported gender differences in delay discounting, with women discounting at lower rates compared to men (Kirby and Marakovi 1996; Kirby and Marakovi 1995), but other studies have not reported this relation (Allen et al. 1998). A meta-analysis on gender differences in impulsivity reported no aggregate effect of gender on delay discounting across studies.(Cross, Copping, and Campbell 2011). However, gender differences in delay-discounting specifically among smokers have hardly been addressed. In this study, gender was significantly associated with discounting among smokers in the mTurk study only, but not the laboratory one. Future investigations into specific conditions (e.g., smoking status, age) under which gender may modulate delay discounting might be beneficial to better understand and verify these findings.

Our investigation has some potential limitations. In both studies, the participants were almost exclusively non-Hispanic (95.9% and 96.5% in Studies 1 and 2, respectively), with a high proportion of Caucasian population (93.8% and 60.6% in Studies 1 and 2, respectively). Generalizing the results to broader populations should be done with those characteristics in mind and future research with broader populations are necessary. In addition, using the cross sectional design in this study limited our ability to predict the temporal precedence and association between smoking and delay discounting. However, we note that the differential exposure to nicotine or other tobacco constituents as a function of intention to quit cannot explain our results for two reasons. First, we observed no significant association between the number of cigarettes smoked per day and rates of delay discounting among participants in both studies. Second, cigarettes per day did not differ between those with intention to quit in the next 6 months and those without in Study 2. These points notwithstanding, future longitudinal studies that track covariance in delay discounting and intention to quit smoking across time might be beneficial to address the cause-effect relationship. Furthermore, we relied on participants' self-reported data, which might contain some potential sources of bias such as selective memory and social desirability bias. However, self-reporting about smoking status has been validated in prior studies (Wong et al. 2012; Rebagliato 2002). As the first study to investigate the relationship between delay discounting and intention to quit smoking we believe the present study contributes new knowledge that has substantial implications for understanding the variables that contribute to desire for smoking cessation and perhaps improving efforts to reduce smoking and help smokers quit.

Conclusion

Delay discounting is significantly associated with intention to quit cigarette smoking, with smokers with higher intention to quit cigarette smoking having lower delay discounting rates compared to those with lower or no intention to quit. This finding supports the recent characterizations of delay discounting rates as a candidate behavioral marker of addiction. This information may serve as a basis to better identify and target subgroups that need tailored or more intensive interventions to address their higher impulsivity and increase their likelihood of quitting or attain better treatment outcomes.

Acknowledgments

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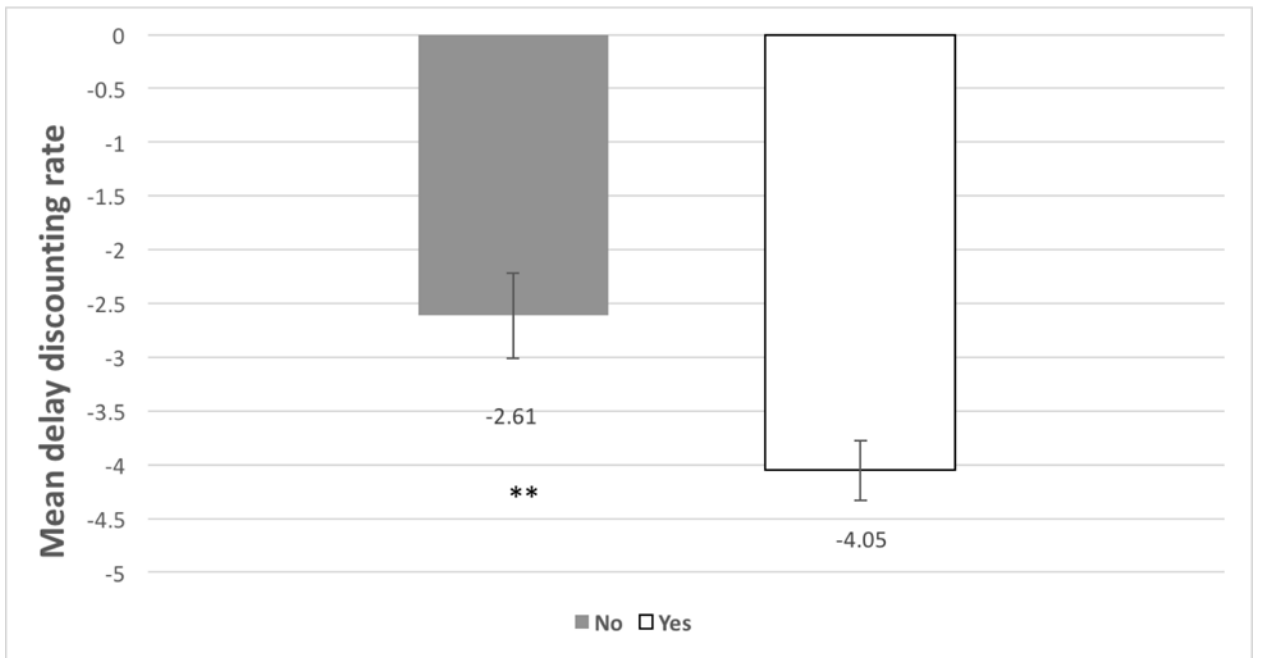
Figure 1.
Mean delay discounting rate for smokers with intention to quit in the next 6 months
compared to those with no intention to quit in the next 6 months in study 2.
Error bars represent standard error.
** p<0.01
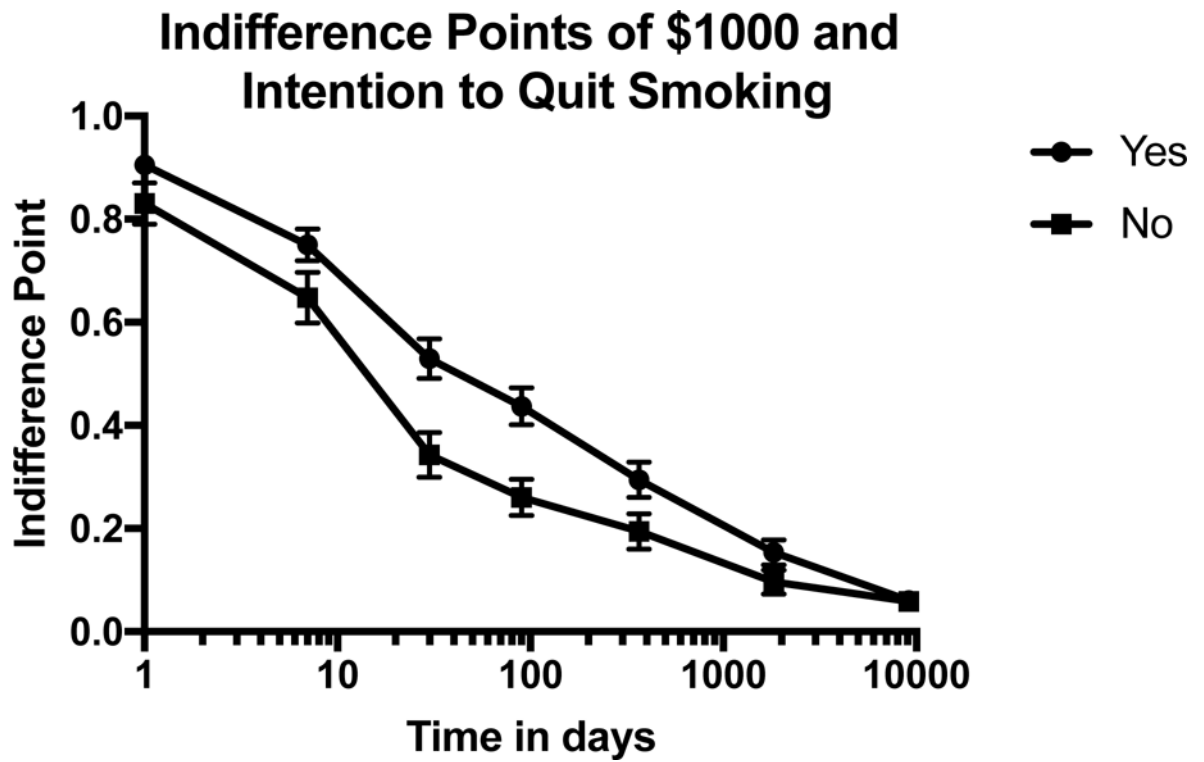
Figure 2.
The mean delay discounting indifference points of $1000 calculated for each of the seven
points of time used in study 2 in the adjusted amount discounting.
Error bars represent standard error.

Table 1

Sample characteristics for studies 1 and 2

Characteristics	Frequency (%)	
	Study 1 (mTurk)	**Study 2 (laboratory based)**
Total	N=242	N=142
Gender		
Male	110 (45.45)	74 (52.11)
Female	132 (54.55)	68 (47.88)
Race		
Asian	4 (1.65)	2 (1.40)
African American	10 (4.13)	49 (34.50)
White	227 (93.80)	86 (60.56)
Other	1 (0.41)	5 (03.52)
Ethnicity		
Hispanic	10 (4.13)	5 (3.57)
Non-Hispanic	232 (95.87)	137 (96.53)
Education level		
Did not finish high school	3 (01.24)	20 (14.10)
Finished high school	043 (17.77)	75 (52.81)
Some college	115 (47.52)	30 (21.18)
Bachelor	61 (25.21)	13 (9.10)
Advanced degree (MS, PhD)	20 (08.26)	4 (2.81)
Age Mean (±SD)	37.90 (±12.59)	39.89 (±11.07)
Number of cigarettes per day Mean (±SD)	17.12 (±7.12)	21.60 (±9.80)

Note: SD= standard deviation

Table 2

Linear regression results for demographics and intention with delay discounting rates for study 1

Variable	Unadjusted coef. (95% CI)	Adjusted coef. (95% CI)[a]	P Value[b]
Intention to quit smoking	−0.123 (−.243 −0.004)[*]	−0.125 (−0.240 −0.010)[*]	0.033
Gender	0.849 (0.346 1.352)[**]	0.732 (0.203 1.261)[**]	0.007
Ethnicity	−1.975 (−3.237 −0.712)[**]	−1.968 (−3.069 −0.551)[**]	0.003
Education	−0.303 (−0.593 −0.011)[*]	−0.258 (−0.549 0.032)	0.055
Race	0.402 (−.079 0.882)	0.381 (−.100 0.863)	0.146

Note: CI= confidence interval

[a] Adjusted to all variables with unadjusted odds ratio with p<0.2

[b] For the adjusted values

[*] p<0.05,

[**] p<0.01

Table 3

Linear regression for demographics and intention with delay discounting rates for study 2

Variable	Unadjusted coef. (95% CI)	Adjusted coef. (95% CI)[a]	P value[b]
Intention to quit smoking	−0.250 (−0.420 −0.079) [*]	−0.210 (−0.378 −0.042) [*]	0.015
Education	−0.350 (−0.562 −0.138) [**]	−0.222 (−0.450 0.007)	0.057
Number of cigarettes per day	0.030 (−0.011 0.072)	0.018 (−0.022 0.058)	0.367
Monthly Income	−0.001 (−0.001 0.000) [*]	0.000 (−0.001 0.000)	0.180
Gender	−0.108 (−0.930 0.715)	−0.120 (−0.660 0.901)	0.761
Race	0.262 (−0.148 0.672)	0.190 (−0.224 0.604)	0.365
Ethnicity	−1.677 (−3.890 0.537)	−1.378 (−3.604 0.848)	0.223
Age	0.011 (−0.048 0.026)	0.015 (−0.022 0.051)	0.431

Note: CI= confidence interval

[a] Adjusted to all variables with unadjusted odds ratio with p<0.2

[b] For the adjusted values

[*] p<0.05,

[**] p<0.01

Table 4

Chi- square and T-test results for intention vs. no intention to quit in the next 6 months in study 2

Characteristics	Has an intention to quit in the next 6 months?		
	No (n=47)	**Yes (n=95)**	**P value**
Age (Mean (SD))	38.51 (11.45)	40.57 (10.88)	0.299
Monthly Income (Mean (SD))	687.17 (978.50)	977.45 (1348.60)	0.191
Number of Cigarettes per day (Mean (SD))	22.23 (09.12)	21.28 (10.15)	0.589
Gender (Row %)			0.475
Male	29.7%	70.3%	
Female	36.8%	63.2%	
Race (Row %)			0.389
Asian	0.00%	100.0%	
African American	40.8%	59.2%	
White	30.2%	69.8%	
Other	20.0%	80.0%	
Ethnicity (Row %)			0.727
Hispanic	25.0%	75.0%	
Non-Hispanic	33.3%	66.7%	
Education level (Row %)			0.163
Did not finish high school	55.0%	45.0%	
Finished high school	34.7%	65.3%	
Some college	13.3%	86.7%	
Bachelor's degree	38.5%	61.5%	
Advanced degree (MS, PhD)	25.0%	75.0%	

Note: SD= standard deviation.

Table 5

Linear regression for demographics and proximal intention to quit with discounting rates for study 2

Variable	Unadjusted coef. (95% CI)	Adjusted coef. (95% CI)[a]	P Value[b]
Intention to quit in the next 6 months	−1.430 (−2.270 −0.590)**	−1.196 (−2.015 −0.377)**	0.005
Education	−0.350 (−0.562 −0.138)**	−0.209 (−0.436 −0.018)	0.071
Number of cigarette per day	0.030 (−0.011 0.072)	0.016 (−0.024 0.055)	0.438
Monthly Income	0.001 (0.001 −0.000)**	0.000 (−0.001 0.000)	0.096
Gender	−0.108 (−0.930 0.713)	−0.007 (−0.783 0.770)	0.987
Race	0.262 (−0.148 0.672)	0.179 (−0.232 0.589)	0.391
Ethnicity	−1.677 (−3.890 0.537)	−1.128 (−3.334 1.077)	0.313
Age	0.011 (−0.048 0.026)	0.011 (−0.025 0.048)	0.532

Note: CI= confidence interval

[a]Adjusted to all variables with unadjusted odds ratio with p<0.2

[b]For the adjusted values

*p<0.05