

Examining differences in health perceptions, subjective experience, and personality
across smoking groups

by

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Abstract

Many people in the United States continue to smoke or cannot quit even when they try despite having clear knowledge that it is unhealthy. While most research examines the role of knowledge and policy on smoking behavior, other factors such as personality traits and implicit motives may drive smoking in ways that cannot be altered by knowledge or external pressures. For example, smoking, low education and dropping out of school could be interrelated through personality traits like impulsivity, rebelliousness or sensation seeking. Some research has examined these issues, but without examining the fundamental relationship among these variables. Study 1 asked current smokers, non-smokers, and former smokers who quit, across differing levels of education to rate smoking on a variety of dimensions. Smokers thought that smoking was less unhealthy and more enjoyable, and dropouts of all ages were more likely to smoke. Study 2 replicated these effects, finding that smokers thought smoking was less unhealthy and more enjoyable, but they were not more impulsive on a variety of tasks, casting doubt on common assumption about tobacco addiction. Importantly, quitters had different reasons for smoking than current smokers, as they were more driven by image enhancement and the drive to experiment than the sheer enjoyment of the behavior or its role in stress reduction. Overall, those who still smoke have different beliefs about smoking and reasons for starting and maintaining the behavior that need to be recognized to reduce rates of smoking.

Keywords: health beliefs, smoking, education, personality traits, delay discounting

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In 1982, the United States (U.S.) Surgeon General reported that cigarette smoking was the major single cause of cancer mortality in the U.S., and this statement holds true today (American Cancer Society [ACS], 2013). Tobacco use is currently responsible for 1 in 5 deaths, and accounts for 87% of all lung cancer deaths in the U.S. (ACS, 2013). Additionally, it is a main contributing factor in other deadly health concerns, such as heart disease, aneurysms, bronchitis, emphysema, and stroke (ACS, 2013). According to the National Health Interview Survey from 2008, approximately 43 million adults in the U.S. smoke cigarettes (U.S. Department of Health and Human Services [DHH], 2010), and today, one-fourth of all high school seniors and 1 in 3 adults under the age of 26 are current smokers (DHH, 2012). More men (22%) than women (17%) smoke, and the highest rates of cigarette smoking are among persons with low levels of education and socioeconomic status (DHH, 2010; Winkelby, Fortmann, & Barrett, 1990). Forty-four percent of those with a General Educational Development (GED) diploma smoke compared to only 6% of those with graduate degrees (DHH, 2010). Despite the high prevalence of cigarette smoking and tobacco use in the U.S., smoking is an acquired behavior, that is, an activity people consciously choose to do; therefore, smoking is also the most preventable cause of death in our society (ACS, 2013).

Due in large part to massive efforts by the government and public health groups to broadcast the health risks of smoking and to prevent the media from exposing people—particularly children—to appealing images of smoking, the rates of smoking have declined from 42% in 1965 to approximately 20% within the past few years (Romer, Peters, Strasser, & Langleben, 2013). For example, the Master Settlement Agreement of

1998 prevented tobacco companies from using billboard and transit advertising to directly targeted children and teenagers (DHH, 2012). Furthermore, many states have employed comprehensive smoke-free laws that prohibit smoking in all indoor areas, such as worksites, restaurants, and bars to protect non-smokers from second-hand smoke (Tynan, Babb, MacNeil, & Griffin, 2011). Not only do these regulations make smoking in such public places illegal, they also make it inconvenient and socially stigmatized, which can in turn inhibit the behavior. Moreover, the taxes on cigarettes and other tobacco products by the federal, state, and local governments have been gradually increasing, such that a pack of cigarettes can now cost upward of \$8.00 in many states (Boonn, 2012). As a result, smoking has become prohibitively expensive, particularly for individuals in low-income groups who are prone to smoke, given that every 10% increase in cigarette prices results in a 4% decrease in consumption (Fielding, 1985).

There are many additional and ongoing attempts to reduce the prevalence of smoking by informing the public about the health hazards of smoking, through the media, advertising, and educational programs. For example, policy makers have developed warnings labels to place on cigarette packaging that explain the health consequences of smoking to consumers. In 1972 the following warning was required on all cigarette packages: “Warning: The Surgeon General Has Determined that Cigarette Smoking Is Dangerous to Your Health”, and more recently, the U.S. Food and Drug Administration (FDA) suggested placing larger, graphic pictorial warnings on the front and back of cigarette packages (Beltramini, 1988; Romer et al, 2013). However, research has shown that although these health warnings enhanced the aversion to smoking, they did not impact smokers’ decisions to quit (Loken, 1982; Romer et al, 2013).

Furthermore, state and national governments have provided millions of dollars to fund large-scale anti-smoking campaigns. Within the past year, the federal government launched a new 54 million dollar anti-smoking ad campaign featuring graphic and shocking portrayals actual smokers who are suffering from smoking-related diseases (Hayes, 2012). However, this campaign has been met with much resistance. While federal health officials argue that it is important for people to see the true consequences of smoking, viewers are reporting that the ads are too graphic causing them to simply turn away from the television or change the channel (Hayes, 2012).

At the same time, schools have been working to implement smoking education programs for grade-school students, like the Project Towards No Tobacco Use (TNT) and Students Helping Others Understand Tobacco (SHOUT), which focus on health consequences and social pressures surrounding smoking (Wakefield, Flay, Nichter, & Giovino, 2003; DHH, 2000). The increase in didactic health messages, particularly those delivered through school programs, has allowed for education to replace gender as the major socioeconomic predictor of smoking (Pierce et al., 1989). Although the prevalence of smoking has decreased across all groups of people, smoking rates have declined 5 times faster among people with high, compared to low, levels of education (Pierce et al., 1989). Accordingly, high school dropouts are more likely to smoke compared to their peers of the same age who are still in school (Pirie, Murray Russel & Luepker, 1988). Thus, it is assumed that the continued incidence of smoking is due to the fact that not all people are equally exposed to the educational and informational approaches to smoking prevention that are delivered during traditional education.

However, education may not be the only relevant factor. For example, novel methods to reduce rates of smoking are continually being implemented; however there

have not been consistent upward trends in smoking cessation (Zhu et al., 2012). Nearly every person now knows that smoking is considered unhealthy, and all smokers have access to the surgeon general's warning on their cigarettes, but 20% of the American population continues to smoke (DHH 2010). Moreover, up to 90% of these smokers do report trying to quit, but only 5% are successful each year (Romer et al., 2013). Surely one factor that makes quitting difficult is the pharmacological addiction that many people have to nicotine from their chronic use (DHH, 2010); however, since some people do successfully quit it would be advantageous to determine factors besides addiction that may segregate the successful from the unsuccessful quitters.

Researchers have come to agree that many factors underlie a person's decision to smoke (Loken, 1982). According to Ikard & Tomkins (1973), many sources of affect, both positive and negative in valence, serve as determinants of smoking behaviors. Without feelings of arousal from sources of positive affect (e.g. curiosity) or the reduction of undesirable feelings from sources negative affect (e.g. conformity) people would not continue smoking. Furthermore, various personality traits have been found to influence people's smoking habits. For example, a meta-analysis revealed that current smokers are higher on neuroticism and extraversion compared to non-smokers (Munafó et al., 2006). Other personality and psychological evaluations of smokers and nonsmokers have shown that smokers are less well integrated, are easier to anger, are more likely to have Type A personalities, show more irritability, depression, and insecurity compared to nonsmokers (Blair et al., 1980). Additionally, smokers are more likely to display deviant personality characteristics, like rebelliousness (Doran et al., 2011), and to have higher scores on measures of sensation seeking and impulsivity (Carton, Jouvent, Widlocher, 1994; Mitchell, 1999), while showing a loss of subjective value for delayed outcomes

compared all compared to non-smokers (Bickel, Odum & Madden, 1999). These personality traits, specifically impulsivity and rebellion, also influence several variables related to smoking, such as education. Namely, high school dropouts are more likely to be impulsive and have a non-dominant value system (Kelly & Veldman, 1964).

However, research has yet to properly investigate the degree to which smokers, non-smokers and quitters have different attitudes about smoking. To date, very little research has been conducted in the U.S. to examine differences in smoking beliefs between the general population of smokers and non-smokers, and to our knowledge there is not any literature on attitudinal differences about smoking between current smokers, non-smokers and quitters. Further exploration of the differences between these smoking groups could help elucidate the factors which may lead to different beliefs about the healthiness of smoking behaviors and different motivations for engaging in the behavior, such as greater actual enjoyment of the behavior. Different opinions regarding the health and pleasure derived from smoking may be important in determining why some people smoke, why certain individuals are able to quit, and why others never smoke.

Consequently, our first study attempts to determine the degree to which smokers, non-smokers, and quitters differ in their attitudes about smoking. To do so, all participants were asked to rate various smoking behaviors on multiple dimensions including how much they value it, enjoy it, and perceive it to be healthy. Participants were then placed into groups according to their smoking status (i.e., current smoker, non-smokers, quitter), level of educational attainment (i.e., some high school, completed high school, some college, completed college, some post-graduate studies, post-grad degree), and by whether or not they dropped out of school. We hypothesized that smokers and school dropouts, who are both more likely to smoke, will have the most positive ratings

of smoking, and that these positive attitudes influence smoking behaviors. It was predicted that smokers will have more positive ratings of smoking compared to non-smokers, with quitters in the middle and that smoking ratings will correspond to levels of education, i.e., individuals with the least amount of education will have the most positive ratings of smoking. Until now research on school dropouts has only been conducted among high school students, however, we predict that people who drop out of school at any age, not just high school, will be more likely to smoke and have more positive attitudes about smoking compared to non-dropouts.

In this case, the connection between dropping out of school and smoking may be more dependent on psychological factors or personality traits than one's level of educational attainment than was originally believed. For example, smoking and high levels of dropping out of school could all be related through impulsive personality traits, the need to rebel or to seek sensations. More research is needed to investigate how the fundamental relationship between these psychological and attitudinal variables drive smoking behaviors in ways that cannot be altered by increasing knowledge or external pressures to quit. Accordingly, psychological factors and personality traits may be a third variable that explains both why certain individuals are more likely to smoke and to drop out of school, which is not mediated by their external influences, like access to information about the health hazards of smoking. These interactions have not been examined in ways that are designed to test the underlying relationship among these variables.

Study 2 was then used to replicate the results from study 1 and to test the prediction that school dropouts smoke more because they are impulsive, rebellious and, or high sensation seekers, which would also underlie the decision to drop out of school.

Participants were, again, asked to rate smoking behaviors on multiple dimensions of health and pleasantness. Additional smoking behaviors were included in the ratings task to further elucidate the patterns about when smokers do and do not enjoy smoking. New questions were added to the survey to determine the reasons why people begin smoking, the factors that commonly perpetuate smoking habits, and the circumstances that drive people to quit. Participants also took several questionnaires, which assessed levels impulsivity, sensation seeking, and rebelliousness, followed by several behavioral discounting tasks. We hypothesized that people who smoke and drop out of school do both because they are more impulsive, rebellious, and/or sensation seeking. It was predicted that (a) smokers will, again, have more positive ratings of smoking compared to non-smokers, with quitters in the middle; (b) smokers and quitters will differ in their reasons for starting to smoking and cite different motivations for continuing to smoke; (c) smokers and school dropouts will display higher levels of impulsivity, sensation seeking, and rebellion compared to non-smokers and quitters and non-school dropouts, respectively; (d) smokers and school dropouts will discount at higher rates than non smokers and quitters and non-school dropouts, respectively.

Through the collection of data on people's smoking habits, educational status, and various measures of personality traits, we hope to uncover the reasons why people start smoking and continue to smoke, despite the widely known health consequences on the behavior, in order to provide results allowing for the development of more effective ways to prevent more people from starting to smoke, and to help current smokers successfully quit.

Study 1

Methods

Participants. Study participants were 295 (92 male and 200 female) adults between 18 and 70 years of age ($M = 34.29$, $SD = 13.686$) living in the United States. The majority (73%) of the participants were Caucasian, with 9% Hispanic/Latino, 7% multi-racial, 6% African American, 5% Asian, and 1% American Indian.

Participants were recruited online through the Amazon Mechanical Turk (MTurk) community. The participants were first informed about the basic intentions of the study and asked to provide electronic consent because of potentially sensitive information that would be collected about their smoking habits. Regardless, participation in the study was completely anonymous, because the data were collected through Qualtrics software and never linked to the worker identification number provided by Mturk. Participants were compensated for their participation with \$0.30-\$0.50.

General procedure. After consenting, participants were directed to complete a health behavior object-ratings task. To encourage honest answers, participants were reminded that their responses were confidential and that they were able to skip questions they felt uncomfortable answering. As a validity check, three check questions were placed throughout the tasks and questionnaires to ensure participants were actively reading and accurately responding to the questions. After finishing the ratings task and health and demographic surveys, participants read an electronic debriefing form and received a six-digit code they could use to receive their payment on MTurk. The entire task took approximately 30 minutes per participant.

Rating task. Data were collected as part of a larger online health-behaviors rating task that had 115 items. For the purposes of this study, participants rated four smoking related items: taking a smoke break, social smoking, second-hand smoke, and quitting smoking. Each item was rated on five different dimensions: (a) it is extremely healthy,

(b) it is extremely enjoyable, (c) it is part of well lived life, (d), I engage in this behavior, (e) I am interested in changing this behavior. Ratings were on a 9-point scale from -4 (*strongly disagree*) to 4 (*strongly agree*). The order that the smoking items were presented was randomized across participants, however the dimensions appeared in the same order for each smoking item within a participant, to help participants answering the questions more easily. As a validity check, two questions instructed participants to check strongly agree or neutral for all five statements to ensure participants were reading and accurately responding to each question.

Health and demographic survey. After the smoking ratings task, all participants completed an online demographic and health survey. The survey consisted of eight basic demographic questions concerning gender, age, socioeconomic status (SES), income and education. The remaining seven questions assessed overall health and smoking habits.

Analysis

Exclusionary Criteria. Participants who missed two or more of the three check questions and participants who did not complete the study were omitted from analysis. Consequently, 105 participants' data were removed leaving 295 participants for the following analyses. Cronbach's alpha (α) was set at .05 for all analyses.

Participant Grouping. Participants were placed into groups according to self-reported smoking habits, SES, and level of educational attainment on the health and demographic survey. These groupings were later used as independent variables to predict differences in attitudes and behaviors.

Participants were categorized into the following types of smokers: (a) smokers, who currently smoked cigarettes; (b) non-smokers, who have never smoked cigarettes; (c) quitters, who previously smoked cigarettes but since quit.

Socioeconomic was assessed using the MacArthur scale of Subjective Social Status, which provides a summative measure of social status based on wealth, education, and occupation. Participants were shown a picture of a ladder with 10 rungs that was described as follows: “Think of this ladder as representing where people stand in the United States. At the top are the people who are best off—those who have the most money, the most education and the most respected jobs. At the bottom are the people who are the worst off—who have the least money, least education, and the least respected jobs or no job”. They were instructed to click the bubble next to the rung of the “social ladder” that best represents their self-perceived position in society. SES was used as a continuous variable, with 0 (*upper class*) at the top of the ladder and 9 (*lower class*) at the bottom of the ladder

Participants were also grouped according to their levels of educational attainment, determined by the following categories: some high school, completed high school, some college, completed college, some graduate school, and completed graduate school. Participants who were not currently students and indicated that their highest level of education was some high school, some college, or some graduate school were classified as school dropouts. Those who completed their highest level of education were classified as non-dropouts.

Inferential Statistics. To determine if the smokers, non-smokers and quitters differed in gender, income, SES and education, as they do in the larger American population, chi-square (χ^2) tests and one-way ANOVAs with Tukey Honestly Significant Differences (HSD) *post hoc* tests were performed. Given that the highest rates of smoking occur among those with the lowest levels of education, specifically high school dropouts, chi-square tests were used to determine if smokers, non-smokers and quitters

differed in their likelihood of being a school dropout. An additional chi-square test was repeated with only the high school participants to determine if the established relationship between dropping out of high school and smoking replicated in the data. A final chi-square test was conducted without the high school students to determine if high school students drive the association between dropping out of school and smoking or if the effect can be seen across all levels of education.

Mean scores for the five dimensional ratings of each smoking behavior were computed to determine the general attitude towards the smoking behaviors across participants. Subsequently, one-sample *t* tests were conducted to determine if the mean ratings were significantly different from 0 (*neutral*).

To investigate the effect of smoking and education on the perceptions of smoking, each dimensional rating for all four smoking behaviors was compared between smoking and education groups using one-way ANOVAs with Tukey (HSD) *post hoc* tests. Similarly, independent sample *t* tests were used to determine the effect of dropping out of school on attitudes towards smoking behaviors.

Results

Frequencies of gender, income and educational status across all participants and by smoking status are provided in Table 1. Unlike the larger United States population the percentage of participants that were smokers did not differ by gender ($\chi^2(10, N = 289) = 3.829, ns$), but as expected there was an effect of smoking on SES, $F(2, 289) = 4.714, p = .010$. Non-smokers were significantly higher in SES ($M = 4.67, SD = 1.98$) than smokers ($M = 5.38, SD = 1.79$) and quitters ($M = 5.33, SD = 1.84$), who were similar to one another. However, quitters had significantly larger household incomes than smokers and non-smokers, who were similar to one another, $F(2, 289) = 4.29, p = .015$.

Furthermore, there was a significant relationship between education and smoking, χ^2 (10, $N = 289$) = 23.642, $p = .009$. Non-smokers were more likely to have higher levels of education compared to smokers and quitters. Across all levels of education, the relationship between dropping out of school and smoking was significant, χ^2 (2, $N = 286$) = 17.81, $p < .000$. Smokers were more likely to drop out of school than non-smokers and quitters, and this relationship was not altered when high school students were excluded from analysis, χ^2 (2, $N = 245$) = 18.08, $p < .000$. In fact, the relationship between dropping out of high school and smoking was not even present among the participants in this study (χ^2 (2, $N = 41$) = 1.54, *ns*), because there were not enough high school students in the sample to conduct statistical analyses on this group of individuals.

Smoking Items. Mean ratings for the five dimensions of each smoking behavior are provided in Table 2. There was statistical agreement among participants that taking a smoke break, social smoking and second-hand smoking were unhealthy, unenjoyable, not part of a well-lived life, not engaged in often, and should be done less (compared to 0). Also, quitting smoking was generally viewed as healthy, unenjoyable, part of a well-lived life, not done often, and close to neutral for the desire to change (statistically compared to 0) (see Table 2 for details).

However, there were effects of smoking and education on the perceptions of smoking behaviors (see mean differences and statistical comparisons between groups in Tables 3-6). As expected, smokers engaged in all smoking behaviors, while non-smokers and quitters did not participate in these behaviors. Participants in all three groups wanted to reduce their engagement in smoking behaviors, however, smokers had the greatest desire to lessen their participation in these behaviors. Despite the greatest desire to reduce their involvement with smoking, smokers rated the smoking behaviors as the least

unhealthy and most desirable (i.e., enjoyable, part of a well-lived life), followed by quitters and non-smokers. All smoking groups rated quitting smoking as healthy, but smokers compared to non-smokers and quitters had significantly lower ratings of quitting as part of a well-lived life and significantly lower ratings of how enjoyable quitting would be. Smokers did not frequently engage in quitting smoking nor they did not have a desire to start quitting (see Table 3 for details).

Those with the lowest level of educational attainment (some high school) generally found the smoking behaviors to be less unhealthy and more desirable than those with more education (see Table 4 for details). Specifically, participants with some high school education thought that second-hand smoke was less unhealthy, and they were more neutral in their desire to change their involvement with second-hand smoke compared the other groups, who wanted reduce their involvement compared to all other groups.

In general, participants who did not drop out of school rated smoking behaviors as the most unhealthy and least desirable compared to those who dropped out of school (see Table 5 for details). Non-dropouts engaged in smoking behaviors less often than dropouts, and dropouts wanted to reduce their involvement in smoking behaviors. Non-dropouts rated quitting smoking as more healthy and part of well-lived life compared to dropouts. Both groups thought quitting smoking was unenjoyable. Neither group engaged in quitting smoking very often and they were both neutral in their desire to change this behavior.

Study 2

Method

Participants. Study participants were 242 (116 male and 126 female) adults between 18 and 71 years of age ($M = 36.19$, $SD = 13.89$) living in the United States. The majority (75%) of the participants were Caucasian, with 8% Asian, 5% African American, 5% Hispanic/Latino and 8% were multi-racial.

As in study 1, participants were recruited and consented through Mturk. Participants were compensated for their participation with \$0.40.

General procedure. After providing electronic informed consent, participants were directed to complete the ratings task, the health and demographic questionnaires, personality questionnaires, and behavioral choice tasks. The order in which each task was presented remained constant across all participants, however the order of individual items was randomized within each task. As a validity check, three check questions were placed throughout the tasks and questionnaires to ensure participants were actively reading and accurately responding to the questions. After finishing all of the tasks, participants read an electronic debriefing form and received a six-digit code they could use to receive their payment on MTurk. The entire task took approximately 20 minutes per participant.

Smoking ratings task. Similar to the ratings task in study one, the task examined attitudes about 15 smoking-related behaviors, which were expanded to obtain more information about when participants enjoyed smoking (e.g., smoking inside, smoking during times of stress, smoking after a meal) (full list provided in Table 10). For each smoking item, participants responded, on a 7-point scale from 1 (*strongly agree*) to 7 (*strongly disagree*), to the following statements: (a) is extremely healthy, (b) it is extremely enjoyable, (c) it is part of a well-lived life. Additionally, they rated how often they engaged in the behavior from 1 (*never*) to 7 (*frequently*) and their feelings about their current engagement in the given behavior from 1 (*too little*) to 7 (*too much*).

Health and demographic survey. Participants completed the same health and demographic survey from study. However, multiple questions were added to assess reasons for starting to smoke, reasons for continuing to smoke, and reasons for quitting, if applicable.

Trait measures. Participants completed a battery of personality trait questionnaires to assess levels of impulsivity, sensation seeking and rebelliousness, followed by two delay discounting tasks and one probability discounting task as behavioral measures of impulsivity and risk preference.

Barratt's Impulsivity Scale, version 11 (BIS-11: Patton & Stanford, 1995). The BIS-11 is a widely used psychometric tool to measure impulsive personality traits. The questionnaire consists of 30 items, which ask participants to rate how often specific statements apply to them on a scale from 1 (*rarely/never*) to 4 (*always*). Scores were summed to yield the three second-order factors of impulsivity: Attention, Motor, and Non-planning. Summing the three sub-scores generated a total score for impulsivity.

Sensation Seeking Scale (SSS, Form V: Zuckerman, Eysenck, & Eysenck, 1978). This 40-item, forced-choice questionnaire is commonly used to measure the personality constructs of sensation seeking and risk preferences. Scores create four dimensions of sensation seeking: Thrill and Adventure Seeking, Dis-inhibition, Experience Seeking, Boredom Susceptibility.

Authoritarianism-Rebellion Scale (ARS: Kohn, 1972). This scale is an objective personality measure originally created to assess the authoritarian attitudes or right wing individuals and the antiauthoritarian, rebellious attitudes of left wing individuals. Factors analysis of the ARS yields five factors, including rebelliousness and general right-wing authoritarianism. Only questions loading onto Factor 1, which is interpreted as

rebelliousness, were used. Accordingly, participants were presented with 16 questions assessing rebellion to be answered on scale from 1 (*strong disagreement*) to 6 (*strong agreement*). As recommended, taking the average of all 16 questions with higher scores indicating greater rebellion generated the ARS-rebellion score.

Behavioral Tasks. The delay discounting tasks were used to assess behavioral impulsivity by determining how much one devalues monetary rewards as a function of delay. Most people discount the value of a reward when the reward is coupled with a long delay or low probability of occurrence (Rachlin, Raineri, & Cross, 1991). More specifically, everyone would choose a larger amount of money over a smaller one, but most individuals shift their preference to the smaller reward when a delay is coupled with the larger reward (Reynolds, Richards, Horn, & Karraker, 2003). People who shift their preference to the smaller reward sooner are considered more impulsive than those who wait longer to shift their preference to the smaller reward (Bickel, Odum, & Madden, 1999). Similarly, the probability-discounting task was used to assess risk-seeking tendencies under the assumption that smokers are greater risk seekers compared to non-smokers.

The first task was a temporal discounting task formerly used by Bartels & Urminsky (2011). Participants read a paragraph about purchasing a computer that was expected to decrease in price throughout the next following year and were asked to choose between five timing options, ranging from buying the laptop now for \$2,000 to waiting one year and paying \$1,000, with a savings of \$250 for every three months they were willing to wait. The length of time participants were willing to wait to purchase the laptop was interpreted as a measure of impulsivity. Participants who waited longer to

purchase the computer were considered less impulsive. Participants' current need for a laptop was used as a covariate in analysis (see appendix A for the complete task).

The second behavioral measure was an inter-temporal choice task originally used by Bartels & Rips (2010), in which participants were sequentially shown nine annuities and asked to choose one. For each choice, participants were faced with a tradeoff between a smaller, sooner reward and a larger, later reward across three time intervals: 5 to 15 years, 15 to 25 years, and 25 to 35 years. Each interval had a different discount factor, .85, .90, and .95, respectively, which allowed for participants to be coded into four possible ordinal categories of impulsivity. If they chose all three smaller, sooner rewards in an interval, they were given a score of 1. If participants chose all of the smaller, sooner rewards except for the one with the smallest discount factor (.85), they were given a score of two. If they chose all of the larger, later rewards except for the reward with the largest discount factor (.95), they were assigned a score of three. Alternatively, if they circled all three larger, later rewards, they were given a score of four. Lower scores suggest greater behavioral impulsivity. Trials were randomized across participants. There were 34 inconsistent sets of responses, which were replaced by the middle value on the scale (2.5), as in the original study. These inconsistent responses made up less than 5% of the data and omitting them did not affect the results (see Appendix B for the complete task).

The third behavioral task was a choice-inferred probability-discounting task, which was originally used by Hsee & Weber (1999) to assess risk preference. Participants were given two sets of questions, each consisting of seven trials. In each trial participants were presented with a sure payoff (e.g. winning \$500) and probabilistic payoff (e.g. winning either \$3000 or nothing with equal probabilities). The first set consisted of

choices with larger monetary outcomes, and the second set had smaller monetary outcomes. The first set was always presented first, however the questions within each set were randomized. Participants were given a Risk Preference (RP) Index, ranging from 1 (*most risk-averse*) to 8 (*most-risk seeking*) based on his or her choices in each set of questions. If the participant chose the sure option in all seven question, his or her RP Index would be 1, whereas a participant choosing the risky option in Question 1 through Question $i-1$, and the sure option in Question i through Question 7 would be given a RP Index of i (see Appendix C for the complete task).

Analysis. Participants who missed two or more of the three check questions, did not finish the study and, or took less than 10 minutes to complete the study were omitted from analysis. Accordingly, 30 participants were excluded from the dataset, leaving 242 participants. Cronbach's alpha (α) was set at .05 for all analyses.

As in study 1, participants were categorized as a smoker, non-smoker, or quitter. Similarly, they were grouped according to their levels of educational attainment and whether or not they dropped out of school. For some analyses current smokers were further characterized according to their desire to quit smoking (i.e., smokers who do want to quit and smokers who do not want to quit). This categorical distinction was made to investigate potential differences within smokers that may influence the ability of certain individuals to quit.

Chi-square tests were again used to examine the effect of gender and education on smoking. One-way ANOVAs with Tukey Honestly Significant Differences (HSD) *post hoc* tests were used to substantiate the observed differences in income and SES among smokers that were found in study 1.

Multiple analyses were used to investigate the smoking patterns of smokers and quitters. To determine the factors that frequently cause people to start smoking, continue smoking and quit smoking, smokers and quitters were asked to rate on a scale from 1 (*none*) to 4 (*a lot*) how much various items, predetermined by the authors, (e.g., work, friends, family) influenced their smoking decisions (see Table 8 for complete list). Mean scores for all variables causing participants to start, continue, and quit smoking were computed separately for smokers and quitters and ranked in order of magnitude. Independent sample *t* tests then were conducted to determine if smokers or quitters were more greatly influenced by specific variables. This analysis was repeated between smokers who want to quit and smokers who do not want to quit, in order to ascertain whether these groups of smokers are distinct from one another.

Smoking item ratings. To ensure that the perceptions of smoking behaviors replicated from study 1 mean ratings for the five dimensions of each smoking behavior were computed (i.e., for healthiness, enjoyableness, well-lived life, engagement, and desire to change) (see Table 10). One-sample *t* tests were used to determine if the mean ratings were statistically different from 4 (*neutral*).

Study 1 provided evidence to suggest that smoking and education groups differed in their attitudes towards various smoking behaviors, accordingly a Principal Components Analysis (PCA) was conducted to identify the inter-correlations between smoking behavior ratings. Since smokers are the only individuals that currently engage in smoking behaviors, the engage and desire to change ratings were not included as items in the PCA, as they specifically target smokers. The remaining healthy, enjoyable and well-lived behavior ratings were examined for factorability, and the following criteria provided evidence to suggest that they were appropriate items to enter into the PCA: (a)

the Kaiser-Meyer-Olkin measure of sampling adequacy was .93, which is above the commonly recommended value of .60; (b) the Bartlett's test of sphericity was significant, $\chi^2(990) = 10,490.92, p < .001$; (c) the communalities were all greater than .30, suggesting that the items shared variance with other items.

Accordingly the PCA, with varimax rotation, was conducted with 45 items and revealed seven factors with eigenvalues greater than 1. Factors with eigenvalues less than 1 explained less information than a single item in the ratings task and were excluded from further analysis. The first two factors explained a majority of the variance, 43% and 11%, respectively. The remaining factors described an additional 20% of the variance.

Factors scores were saved as variables to give each participant a mean score for each factor. In order to determine if there was an effect of smoking on scores for each of the seven factors, one-way ANOVAs with Tukey *post hoc* tests were used. Similarly, independent sample *t* tests were conducted to investigate the effect of dropping out of school on scores for all seven factors.

Personality measures. To investigate differences in personality traits between smokers, non-smokers and quitters, total scores and sub-scores from the BIS-11, SSS, and ARS questionnaires were compared between groups using one-way ANOVA with Tukey (HSD) *post hoc* tests. Similarly, independent sample *t* tests were used to compare these personality traits between dropouts and non-dropouts, and between smokers who do want to quit and smokers who do not want to quit.

Results

Descriptive statistics. Frequencies of gender, income and education across all participants and by smoking status are provided in Table 6. Unlike study 1, there was an effect of gender on smoking, $\chi^2(2, N = 242) = 8.209, p = .016$. Males were more likely

to smoke, compared to females who were more likely to be non-smokers or quitters. As in study 1, quitters had significantly larger household incomes than current smokers, with non-smokers non-significantly in-between ($F(2, 233) = 3.333, p = .037$) however, in this study quitters were also significantly higher on SES than current smokers, with non-smokers non-significantly in between, $F(2, 239) = 4.753, p = .009$. Like participants in study 1, non-smokers had significantly higher levels of education than smokers and quitters, $\chi^2(10, N = 242) = 21.933, p = .015$. Smokers were more likely to drop out of school, across all levels of education, compared to non-smokers and quitters, $\chi^2(2, N=200) = 6.625, p = .036$. This relationship was, again, replicated when high school students were excluded from analysis, $\chi^2(2, N=170) = 8.49, p = .014$. Again, the known relationship between dropping out of high school and smoking was not evident in the data ($\chi^2(2, N = 30) = 0.94, ns$) because there were not enough high school students in the sample to conduct statistical analyses on this group of individuals.

Smokers versus quitters. The full list of factors that influenced smokers and quitters' decisions to begin smoking, continue smoking and quit smoking are listed in order of magnitude according to mean score in Table 8. For both groups the three most important factors in the decision to begin smoking were: 1) friends, 2) curiosity and 3) stress. Smokers and quitters did not differ in any of their reasons for beginning to smoke. The three most influential factors in the decision to continue smoking were: 1) enjoyment, 2) friends and 3) stress. Smokers were more influenced to continue smoking because they enjoy it, while quitters were more concerned with maintaining their persona. Finally, the three most influential factors in the decision to quit smoking were: 1) health, 2) money and 3) less enjoyment. However, smokers (who were trying to quit) were significantly

more influenced by money, compared to quitters who simply did not enjoy smoking as much.

Further differences in the reasons to begin and continue smoking were found between smokers who want to quit and smokers who do not want to quit. As shown in Table 9, the smokers interested in quitting were significantly more influenced to begin smoking because of friends, stress, work, and the desire to be cool compared to the smokers who were not interested in quitting. However, smokers who wanted to quit also cited stress as a significant factor in their reasons to continue smoking.

Inferential Statistics.

Smoking Ratings. As in Study 1, mean ratings of healthiness, enjoyableness, well-lived life, engagement and frequency for all smoking behaviors across all participants are provided in Table 10. Across all participants, there was statistical agreement that all smoking behaviors were less healthy, less enjoyable, and less part of well-lived life than average, and that quitting smoking was healthier, less enjoyable, and more part of a well-lived life than average (each compared to a neutral rating of 4). However, there was disagreement about the enjoyableness of smoking while drinking. Overall, participants did not often engage in smoking behaviors, but there was disagreement concerning the desire to change one's level on engagement in smoking behaviors.

The top and bottom three items for each factor are displayed in Table 11 with their factor loadings. Factor 1 correlated smoking behavior that were rated the most enjoyable, thus we called this component the *enjoyable* factor. Smoking with a meal, taking a smoke break, and smoking outside on a nice day are examples of smoking

behaviors with high enjoyable factor loadings. In contrast, quitting smoking had a low enjoyable factor loading.

Factor 2 correlated smoking behaviors rated the most part of a well-lived life. We called this component the *well-being* factor. Smoking, smoking with a meal and smoking before bedtime are examples of behaviors with high well-being factor loadings. Conversely, quitting smoking had a low well-being factor loading.

Factor 3 correlated the smoking behaviors that were rated as the least unhealthy, thus we called this component the *healthy* factor. Taking a smoke break, smoking, and smoking outside on a nice day are examples of smoking behaviors with high healthy factor loadings.

Factor 4 correlated all of the second-hand smoke behavior ratings (i.e., enjoyable, healthy, and well-lived ratings). Accordingly we called this component the *second-hand smoke* factor.

Factor 5 correlated healthy smoking behaviors that are often done alone. We called this factor the *solitary* factor. Smoking outside in bad weather, smoking in the morning and smoking alone are examples of smoking behaviors with high solitary factor loadings. In contrast, smoking inside and social smoking are behaviors with low solitary factor loadings.

Factor 6 correlated all of the quitting smoking behavior ratings (i.e., enjoyable, healthy, well-lived ratings). Accordingly we called this component the *quitting* factor.

Finally, Factor 7 correlated unenjoyable smoking behaviors, thus we called this factor the *unenjoyable* factor. Smoking in a designated area and quitting smoking are examples of smoking behaviors with high unenjoyable factor loadings. In contrast, smoking inside and smoking while drinking have low unenjoyable factor loadings.

There was a significant effect of smoking on the enjoyable factors ($F(2, 215) = 56.10, p < .001, \eta^2 = .343$), well-being factors ($F(2, 215) = 11.24, p < .001, \eta^2 = .095$), and healthy factors ($F(2, 215) = 3.43, p = .034, \eta^2 = 0.03$). Smokers had the largest scores on the enjoyable factor ($M = 0.84, SD = 0.70$), followed by quitters ($M = -0.56, SD = 0.79$), and non-smokers ($M = -0.12, SD = 0.94$). Smokers had significantly higher scores on the well-being factor ($M = 0.46, SD = 1.39$) compared to non-smokers ($M = -0.25, SD = 0.49$), and quitters ($M = -0.14, SD = 10.87$), however non-smokers and quitters did not significantly differ. Additionally, smokers had larger scores on the healthy factor ($M = 0.25, SD = 1.57$), compared to non-smokers ($M = -0.14, SD = 0.47$), with quitters non-significantly in-between ($M = -0.09, SD = 0.71$). Smokers' scores did not differ in any of the other factor loadings, $F(2, 215) < 1.09, ns$.

Additionally, the desire to quit smoking had an effect on the enjoyable factor scores, $t(64) = -2.01, p = .049$. Smokers that did not want to quit smoking had higher scores ($M = 1.03, SD = 0.58$) compared to smokers that wanted to quit ($M = 0.69, SD = 0.77$).

There was also an effect of dropping out of school on the solitary factor, $t(175) = 2.35, p = .020$. Dropouts had higher solitary factor scores ($M = 0.12, SD = 0.84$) compared to non-dropouts ($M = 0.15, SD = 0.67$). Dropping out of school did not have an effect on any of the other factor, $t(175) < 0.54, ns$.

Personality variables. Smokers and quitters had higher total sensation-seeking scores on the SSS compared to non-smokers ($F(2, 223) = 5.87, p = .003, \eta^2 = .050$) with significantly higher subscale scores on dis-inhibition ($F(2, 236) = 11.08, p = .000, \eta^2 = .086$), experience-seeking ($F(2, 235) = 4.19, p = .016, \eta^2 = .034$), and thrill-seeking ($F(2, 234) = 3.12, p = .046, \eta^2 = .026$), but not boredom-susceptibility ($F(2, 233) = .939,$

ns). There were no differences between groups on scores of trait impulsivity (BIS-11) ($F > 0.45$, *ns*) or rebellion (ARS) ($F(2, 226) = 0.85$, $p = .428$). The desire to quit smoking did not have an effect on trait scores of sensation seeking ($t > 0.29$, *ns*), impulsivity ($t > .127$, *ns*), or rebellion ($t(68) = 0.48$, *ns*). Furthermore, there was no effect of dropping out of school on trait scores of sensation seeking ($t > 0.50$, *ns*), impulsivity ($t > 0.59$, *ns*), or rebellion ($t(190) = 0.31$, *ns*).

Behavioral tasks. Smoking did not have an effect on performance for any of the behavioral measures of impulsivity or risk preference, ($F < 1.73$, *ns*). Similarly, dropping out of school did not have an effect on any of the behavioral tasks ($t < -0.627$, *ns*). However, trait impulsivity scores (BIS-11) correlated with performance on several of the behavioral tasks, which indicates that they were accurate measures of those constructs despite the observed null effects (see Table 13). Nonetheless, the desire to quit smoking had an effect on the indifference task scores across 15-25 year interval ($t(73) = -2.39$, $p = .019$) and the 25-35 year interval ($t(69) = -2.39$, $p = .045$). Smokers that did not want to quit demonstrated less impulsivity at the 15 to 25 year interval and the 25 to 35 year interval compared to smokers who wanted to quit.

Discussion

These studies investigated differences in health perceptions, attitudes, education, and personality traits between various groups of individuals, in order to determine why certain people continue to smoke and why others have been able to quit. By examining the attitudes, motives and personality traits that influence smoking, we hoped to determine the factors that drive people to start and continue smoking that have yet to be addressed. The resulting data led to the general conclusion that those who smoke have

different beliefs about smoking and reasons for starting and maintaining the behavior compared to those who do not smoke and those who were able to quit.

Considerable research has previously compared smoking beliefs internationally, historically, and between specific ethnicities, socioeconomic classes, professions, age groups and genders. However, fewer studies have investigated attitudinal differences between smokers, non-smokers and quitters. Loken (1982) found that non-smokers were the least likely to believe that smoking would lead to favorable outcomes (e.g. weight management, tension relief, relaxation) compared to heavy smokers, and heavy smokers were the least likely to believe that smoking would lead to unfavorable outcomes (e.g. bad breath, health problems, addiction) compared to non-smokers, with light smokers in the middle. A study conducted in Australia, found evidence to suggest that fewer smokers believe smoking causes disease and smokers maintain more self-exempting beliefs about smoking, compared to quitters (Chapman, Wong, & Smith, 1993). Similarly, Weinstein (1998) suggests that smokers do not believe that they are as much at risk as other smokers for experiencing negative health effects or becoming addicted. Nonetheless, previous research has mainly focused on differing health beliefs about smoking between smokers and non-smokers or smokers and quitters. To our knowledge, this is the first study to investigate attitudes about smoking, beyond health beliefs, between smokers, non-smokers and quitters in the U.S.

The results from the current study suggested that, first, smokers believe smoking to be less unhealthy and more enjoyable than non-smokers and quitters. The smoking behavior ratings in study 1 and 2 demonstrated that everyone agreed that smoking was unhealthy, unenjoyable and not part of well-lived life; however, smokers perceived smoking to be the least unhealthy and the most desirable, compared to non-smokers and

quitters, supporting the prediction that smokers view the behavior more favorably. Similarly, quitting smoking was uniformly rated as healthy, part of well-lived life, and unenjoyable, but again smokers thought that quitting smoking was more unenjoyable and less part of a well-lived life than the others. Additionally, smokers displayed higher scores on the enjoyable, well-being, and healthy factors compared to non-smokers and quitters, which further suggests that smokers believe that the behavior provides some benefit to them, possibly making it difficult to quit. Taken together, it seems that smokers understand the costs and benefits of smoking and quitting, but they like and value the behavior more while underweighting the costs relative to people who do not smoke.

Of course, smokers' more positive attitudes toward smoking may be, in part, an attempt to reduce the cognitive dissonance they feel about continuing to smoke despite being aware of the health hazards (Festinger, 1962). Thinking that smoking is healthier, more enjoyable and part of a well-lived life may well be a strategy for smokers to rationalize their smoking habits, so that their behaviors become consistent with their beliefs (Festinger, 1962). Thus, on the basis of these results alone we can not determine whether (a) the smokers actually value smoking more than those who quit, which explains why they persist in the behavior and the others were able to let it go; or if (b) the current smokers are simply reporting that smoking is more healthy and enjoyable to justify the behavior. However, quitters, who have less of a reason to reduce cognitive dissonance given that they already quit, still rate smoking more positively than non-smokers, which suggests that a genuine enjoyment of the activity may at least partially separate out who does and does not engage in it.

Secondly, we predicted that the smokers and quitters would also differ in their reasons for starting, continuing, and quitting smoking. In support of this, smokers

reported being more likely to start smoking for its enjoyment while successful quitters were more likely to start smoking for external reasons (i.e., to maintain their image). In contrast, the reason that current smokers gave for wanting to quit were more practical (i.e., to save money), while successful quitters simply did not enjoy it as much any more, further supporting the inference above that enjoying smoking has a fundamental role in its maintenance that overshadows sensible reasons for quitting. This pattern was replicated within current smokers, separating those who did and did not want to quit. Smokers interested in quitting were more likely to start because of external factors (i.e., friends, work, the desire to be cool), compared to those who did not want to quit, because smoking provided them with a way to cope with stress.

We also found that school dropouts are more likely to smoke and view smoking as less unhealthy and more desirable than non-dropouts. The positive attitudes towards smoking found between two groups of people that smoke (i.e., dropouts and smokers) further supports the hypothesis that positive feelings about smoking may drive the behavior. Additionally, the results demonstrating the school dropouts are more likely to smoke replicates previous research demonstrating that those with the lowest levels of education, specifically high school dropouts, were more likely to smoke (Wang, Fitzhugh, Eddy, & Westerfield, 1998). However, our data further suggests that all individuals who dropout of school (i.e., high school dropouts, college dropouts, and graduate school dropouts) are more likely to smoke compared to those that graduated, which indicates that it is not simply one's level of education or knowledge that influences smoking. These results combined with previous evidence that leaving school is associated with more impulsive, rebellious and delinquent personality traits (Steinberg, Blinde & Chan, 1984; Pallas, 1986) confounds the relationship between education and smoking with a possible

problem with either impulsive (valuing present needs over longer-term benefits) or rebellious behavior among smokers.

Accordingly, it was hypothesized that personality factors, such as impulsivity, sensation seeking and rebelliousness, may exist as third variables that explain both someone's tendency to drop out and their decision to smoke, however there was only marginal support for this hypothesis. Smokers as well as quitters did have higher sensation seeking scores than non-smokers on three subscales (dis-inhibition, experience-seeking, thrill-seeking, but not boredom-susceptibility), which accords with prior research on the personality of smokers showing that smokers are high sensation-seekers (Zuckerman & Neeb, 1980). However, smokers were not found to be more rebellious or impulsive. Although the relationship between smoking and rebelliousness has not been thoroughly investigated, many researchers have found a connection between smoking and impulsivity, through both trait and behavioral measures (Reynolds, Richards, Horn, & Karraker, 2003; Bickel, Odum, & Madden, 1999; Mitchell, 1999). Nonetheless, the null effects of impulsivity across groups from this study leads us to believe that this relationship may not be as strong as people assume, especially considering we tested a fairly large sample of diverse participants with valid measures of impulsivity.

We used the BIS-11, a widely used measure to assess trait impulsivity, which has shown to be internally consistent across populations (Patton & Stanford, 1995). Additionally, three experimental measures of delay and probability discounting were included in the study to further assess levels of impulsivity between groups. Evidence suggests that individuals who engage in impulsive behaviors, like smoking, discount the value of delayed rewards more in laboratory tasks (Bickel & Marsch, 2001; Critchfield & Kollins, 2001). The most commonly used laboratory procedures measure discounting by

giving participants two choices: 1) the amount of the delayed reward and 2) the amount of the immediate reward (Rachlin, Raineri, & Cross, 1991). The discounting tasks used in our studies are representative of these common measures, giving us further reason to believe that these tasks were accurate measures of delay discounting, and thus impulsivity.

Furthermore, our measure of sensation seeking correlated positively with all of the behavioral impulsivity measures and the survey measures of impulsivity correlated with one of the experimental impulsivity measures (the laptop task)—these intercorrelations suggest that the scales did have construct validity and operated in sensible ways within individuals. Interestingly, we did find that smokers who wanted to quit (compared to those who did not) were less impulsive on the two longest intervals of the indifference task (15 to 25 and 25 to 35 years). These results suggest that smokers who want quit smoking are better at delaying future rewards than smokers who do not want to quit. Moreover, the quitters in the study had the highest household incomes, which may provide evidence to suggest that successful quitters are better at perceiving the long-term benefits of delaying monetary rewards for larger gains, which may translate into an understanding that quitting smoking now will lead to greater health benefits in the future.

Then again, the null results in this study may be explained by fact the measures of delay and probability discounting used in this study, although originally successful, were not used with a population of smokers or dropouts. The laptop task (Bartels & Urminsky, 2011) and the annuity task (Bartels & Rips, 2010) were formerly used to demonstrate that differing levels of psychological connectedness between the current and future self contributes to impulsivity. Similarly, the risk preference task (Hsee & Weber, 1999) was

initially used to compare cross-national differences in risk seeking behaviors.

Nonetheless, smokers that did want to quit showed less impulsivity on the annuity tasks.

These conflicting results suggest that further testing is necessary to determine whether or not these behavioral measures were appropriate for the population in question.

Still, the data did not provide evidence to suggest dropouts were more sensation seeking, rebellious, or impulsive compared to non-dropouts, even though prior research finds that high school dropouts are both more deviant and impulsive than non-dropouts (Kelly & Veldman, 1964), and that delinquents, who display similar forms of deviation to dropouts, have a tendency towards impulsiveness and rebellion (Peterson, Quay & Cameron, 1959). Nonetheless, there is little contemporary research examining the correlation between personality traits and dropping out of school. Furthermore, Kelly & Veldman (1964) only examined high school dropouts using psychomotor tasks to investigate impulse control, which could explain why this study demonstrated dissimilar results. Regardless, our data do not support the prediction that smokers and dropouts are necessarily more rebellious or impulsive. More research must be done to determine the source of these null effects, however, the general assumption that smokers are impulsive is now in question.

Taken together, smokers have the most positive beliefs about smoking and are internally driven to maintain the behavior, compared to quitters who have slightly less positive attitudes towards smoking, and are externally motivated to smoke and internally driven to quit. Conversely, non-smokers have the most negative feelings about smoking and do not smoke. These results suggest that smoking behaviors are driven by fundamental perceptions of smoking and are sustained despite societal pressures to quit when there is an internal desire to smoke, such as a primary enjoyment of the behavior

and the sensations it brings. For example, smokers do not think smoking is as unhealthy as non-smokers and quitters, and they truly enjoy smoking, which may overshadow the importance of quitting. Accordingly, improving prevention strategies could be an effective way to reduce rates of smoking, seeing as it is often difficult to get people to quit once they initiate the behavior.

Within the past few years the U.S. Department of Health and Human Services has been targeting the youth population with mass media campaigns and educational programs to prevent the initiation of cigarette smoking among adolescents (DHH, 2012). However, our research suggests that specific demographic characteristics, attitudes, and personality traits make certain people at greater risk for smoking and for maintaining the behavior, while other traits, like delay discounting, make others more successful at quitting. Thus, in addition to targeting the youth, efforts should be made to reach out to the individuals who are at a greater smoking risk. Our data suggests that high-risk individuals can be classified by the following characteristics: (a) low SES, (b) low income, (c) low education, (d) dropping out of school, and (e) high sensation seeking. A possible way to prevent high risk individuals from smoking would be to fulfill their needs to seek sensations by suggesting novel and stimulating activities that are not harmful to one's health, such as playing sports (Rowland, G.L., Franken, R.E., & Harrison, K., 1986) or pursuing a pro-social job in law enforcement, firefighting, emergency room medicine, or other high-sensory environments (Munsey, 2006). Additionally, successful quitters demonstrated that they were better at delaying future rewards, so teaching smokers the skills to better delay future rewards over immediate gains may help them be able to better weigh the future health costs of smoking with the current benefits of smoking.

Nonetheless, this study has several other limitations. First, as with any study using self-report measures, results are based on the assumption that participants were truthful in their responses. Especially in a study that examined smoking, which is socially stigmatized and a sensitive issue with respect to health, participants may not have discussed their smoking habits or beliefs to the full extent. Secondly, most previous research investigating smoking and education utilizes high school participants who are under the age of 18, however the participants in this study were all at least 18 years old in order to provide informed consent. While having a larger age distribution allowed for data that was more generalizable to the larger population, we were not able to replicate the known findings that high school dropouts are more likely to smoke compared to non-dropouts, because there were not enough high school aged participants in the sample. Furthermore, we cannot make any casual claims from this study. While smokers, non-smokers and quitters differ in their attitudes towards smoking, these results are from analyses of previously existing attitudes and behaviors. We can say that attitudes may influence the smoking behaviors of smokers, non-smokers and quitters, however further experimental research would be needed to make any causal claims.

In summary, this study provides evidence to support the notion that smoking behaviors are affected by a multitude of variables. The results provide new information concerning the different perceptions people have about smoking, and the common reasons people start smoking and maintain the behavior. Smokers have more positive attitudes towards smoking and proved to be more internally motivated to smoke compared to non-smokers and quitters. Seeing as cigarette smoking continues to cause the death of approximately 450,000 people each year and costs the nation 96 billion dollars in medical care (ACS 2013; DHH, 2012), it is clear that the current attempts to

reduce smoking rates are not successful. Health professionals and government agencies need to begin recognizing the factors and attitudes that impact smoking behaviors, and adjust their current intervention and educational programs to better reflect the results from this study, in order to improve the health and the economy of the nation.

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Table 1

Socio-Economic and Educational Attainment Distributions and Frequencies Across All

Participants and by Smoking Group, n(%)

Characteristic	Smoker (n = 81)	Non-smoker (n = 163)	Quitter (n = 48)	Total (N = 295)
<i>Gender</i>				
Male	32(40)	46(28)	12(25)	92(31)
Female	49(60)	115(71)	35(73)	200(68)
<i>Income</i>				
< \$20,000	35(43)	72(44)	12(25)	121(41)
\$20 - \$40,000	20(25)	28(17)	8(17)	56(19)
\$40 - \$60,000	13(16)	18(11)	8(17)	39(13)
\$60 - \$80,000	5(6)	18(11)	7(14)	31(11)
\$80 - \$100,000	5(6)	12(7)	8(17)	25(9)
> \$100,000	3(4)	15(9)	5(10)	23(7)
<i>Level of Education</i>				
Some H.S.	4(5)	4(3)	1(2)	9(3)
Completed H.S	9(11)	17(10)	6(13)	32(11)
Some college	51(63)	66(41)	19(40)	13(44)
Completed college	8(10)	48(30)	17(35)	74(25)
Some graduate	5(6)	6(4)	1(2)	12(4)
Graduate degree	4(5)	20(12)	3(6)	29(10)
<i>Dropout status</i>				
School Dropout	46(57)	47(28)	19(40)	112(38)
Non-dropout	34(42)	113(69)	27(56)	177(60)

Note. H.S. = high school

Table 2

Ratings of Smoking Behaviors Across All Participants

Rating	Smoking Behavior			
	Taking a smoke break	Social smoking	Second-hand smoke	Quitting smoking
Healthy	-3.76*** (0.85)	-3.57*** (1.25)	-3.73*** (0.87)	3.16*** (2.18)
Enjoyable	-3.69*** (0.95)	-1.15*** (3.25)	-1.31*** (3.16)	-1.48*** (3.00)
Well-lived	-3.74*** (0.88)	-2.90*** (1.93)	-2.95*** (1.94)	2.45*** (2.42)
Engage	-1.71*** (2.34)	-2.12*** (3.03)	-2.07*** (2.93)	-2.47*** (2.66)
Desire to Change	2.00*** (1.98)	0.92*** (1.82)	1.07*** (1.72)	-0.63*** (1.90)

Note. Positive “desire to change” ratings indicate a desire to reduce engagement in a behavior. Standard deviations are shown in parentheses below the means. * $p \leq .05$,

** $p \leq .01$, *** $p \leq .001$ for means that are statistically different from 0.

Table 3

Mean Ratings of Smoking Behaviors Between Smoking Groups

Rating	Behavior	Smoking Group			<i>F</i>
		Smokers	Non-smokers	Quitters	
Health	Second-hand smoke	-3.42 _a (1.37)	-3.93 _b (.31)	-3.77 _{ab} (.87)	10.04**
	Taking a smoke break	-3.28 _a (1.43)	-3.70 _b (1.18)	-3.58 _{ab} (1.11)	3.04*
	Social smoking	-3.44 _a (1.23)	-3.85 _b (.62)	-3.79 _{ab} (.77)	6.35**
	Quitting smoking	3.23 (1.93)	3.23 (2.13)	2.75 (2.76)	.98
Enjoyable	Second-hand smoke	-3.33 _a (1.33)	-3.80 _a (.76)	-3.88 _a (.53)	8.09***
	Taking a smoke break	2.17 _a (2.44)	-2.78 _b (2.12)	-1.15 _c (3.43)	108.99***
	Social smoking	2.11 _a (2.38)	-2.98 _b (1.97)	-1.27 _c (3.15)	129.51***
	Quitting smoking	-2.64 (2.45)	-1.10 _a (2.98)	-.92 _a (3.44)	8.67***
Well-lived	Second-hand smoke	-3.53 _a (1.16)	-3.85 _b (.64)	-3.70 _{ab} (1.02)	3.66*
	Taking a smoke break	-1.72 (2.20)	-3.42 _a (1.54)	-3.06 _a (1.82)	24.66***
	Social smoking	-1.57 (2.50)	-3.53 _a (1.32)	-3.27 _a (1.51)	35.02***
	Quitting smoking	2.11 (2.46)	2.57 (2.40)	2.65 (2.50)	1.09
Engage	Second-hand smoke	.21 _a (2.51)	-2.46 _b (1.84)	-2.38 _{ab} (1.79)	49.50***
	Taking a smoke break	2.33 _a	-3.91 _b	-3.52 _{ab}	706.14***

	break	(2.15)	(.47)	(1.01)	
	Social smoking	2.03 _a (2.30)	-3.65 _b (1.06)	-3.43 _{ab} (1.16)	397.39***
	Quitting smoking	-2.24 _a (2.34)	-3.18 _b (2.20)	-.28 _c (3.42)	25.68***
Desire to change	Second-hand smoke	2.48 _a (1.77)	1.94 _{ab} (2.03)	1.40 _b (2.00)	4.82**
	Taking a smoke break	2.42 (2.02)	.35 _a (1.38)	.35 _a (1.25)	50.92***
	Social smoking	2.57 (1.74)	.54 _a (1.33)	.35 _a (1.30)	59.85***
	Quitting smoking	-2.51 (2.40)	.12 _a (.90)	.00 _a (1.24)	85.45***

Note. Positive “desire to change” ratings indicate a desire to reduce engagement in a behavior. Standard deviations appear in parentheses below the means. For ratings with significant *F* values, means with different subscripts within row are significantly different at the $p \leq .05$ based on Tukey HSD post hoc comparisons. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Table 4

Mean Ratings of Smoking Behaviors Between Education Groups

Rating	Behavior	Education Group						<i>F</i>
		Some high school	High school	Some college	College	Some graduate	Graduate degree	
Health	Second hand smoke	-2.44 (1.94)	-4.00 _a (0.00)	-3.69 _a (0.99)	-3.88 _a (0.55)	-3.92 _a (0.29)	-3.86 _a (0.58)	5.822***
	Taking a smoke break	-3.00 (1.58)	-3.56 (1.56)	-3.52 (1.28)	-3.62 (1.16)	-4.00 (0.00)	-3.62 (1.08)	0.722
	Social Smoking	-2.33 (2.00)	-3.91 _a (0.39)	-3.65 _a (0.99)	-3.85 _a (0.57)	-3.92 _a (0.29)	-3.90 _a (0.41)	6.236***
	Quitting Smoking	2.33 (2.83)	3.38 (2.01)	3.04 (2.28)	3.19 (2.23)	3.25 (2.30)	3.52 (1.60)	0.551
Enjoy	Second hand smoke	-2.56 _a (1.81)	-3.94 _b (0.35)	-3.64 _b (1.00)	-3.76 _b (0.82)	-3.67 _{ab} (1.16)	-3.79 _b (0.83)	3.32***
	Taking a smoke break	-1.33 (3.28)	-1.44 (3.08)	-.60 (3.36)	-1.86 (2.95)	-.58 (3.73)	-1.72 (3.21)	1.827
	Social Smoking	-2.13 _{ab} (2.64)	-1.59 _{ab} (3.20)	-.68 _a (3.30)	-2.16 _b (2.69)	.08 _{ab} (3.55)	-2.07 _{ab} (3.11)	3.213**

	Quitting Smoking	-1.56 (3.43)	-.59 (3.55)	-1.73 (2.85)	-1.24 (3.11)	-1.92 (3.09)	-1.86 (2.45)	0.985
Well lived	Second hand smoke	-3.13 (1.64)	-3.97 (0.18)	-3.63 (1.05)	-3.82 (0.68)	-3.92 (0.29)	-3.86 (0.76)	1.909
	Taking a smoke break	-2.89 (0.97)	-2.87 (1.77)	-2.54 (2.22)	-3.34 (1.57)	-3.08 (1.73)	-3.38 (1.21)	2.091
	Social Smoking	-2.33 (2.12)	-3.19 (1.82)	-2.63 (2.13)	-3.35 (1.60)	-2.92 (2.47)	-3.28 (1.49)	1.818
	Quitting Smoking	0.38 (3.93)	3.09 (2.15)	2.23 (2.44)	2.71 (2.38)	3.25 (1.55)	2.24 (2.31)	2.362*
Engage	Second hand smoke	-1.89 _{ab} (2.15)	-2.50 _a (2.08)	-1.34 _{ab} (2.43)	-2.04 _{ab} (2.26)	-.25 _b (2.96)	-2.31 _{ab} (1.82)	3.116**
	Taking a smoke break	-1.22 _{ab} (2.99)	-2.69 _{ab} (2.36)	-1.34 _a (3.43)	-3.20 _b (2.09)	-.75 _{ab} (3.89)	-3.11 _b (2.15)	5.505***
	Social Smoking	-1.22 _{abc} (3.38)	-2.34 _{abc} (2.60)	-1.40 _{ab} (3.25)	-3.12 _c (1.91)	-.09 _a (3.75)	-3.03 _{bc} (2.35)	5.478***
	Quitting Smoking	-3.67 (0.71)	-2.31 (3.01)	-2.29 (2.74)	-2.47 (2.72)	-2.67 (1.67)	-3.14 (2.23)	0.897
Desire to change	Second hand smoke	-0.11 _a (1.76)	2.28 _b (1.91)	2.13 _b (1.98)	1.92 _b (1.92)	2.33 _{ab} (2.06)	1.69 _{ab} (1.95)	2.605*

Taking a smoke break	0.00 (2.83)	0.50 (1.88)	1.16 (1.87)	0.73 (1.58)	1.42 (1.93)	0.79 (1.57)	1.675
Social Smoking	0.67 (1.41)	0.91 (1.63)	1.28 (1.84)	0.84 (1.57)	1.83 (1.99)	0.69 (1.44)	1.605
Quitting Smoking	-0.56 (2.40)	-0.63 (2.06)	-0.84 (2.02)	-0.22 (1.58)	-1.58 (1.98)	-0.21 (1.52)	1.967

Note. Positive “desire to change” ratings indicate a desire to reduce engagement in a behavior. Standard deviations appear in parentheses below the means. For ratings with significant F values, means with different subscripts within row are significantly different at the $p \leq .05$ based on Tukey HSD post hoc comparisons. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Table 5

Mean Ratings of Smoking Behaviors Between School Dropouts and Non-Dropouts

Rating	Behavior	Education		<i>t</i>
		Dropouts	Non-dropouts	
Health	Second-hand smoke	-3.53 (0.45)	-3.90 (1.23)	3.71***
	Taking a smoke break	-3.50 (1.27)	-3.60 (1.25)	0.64
	Social smoking	-3.52 (0.50)	-3.85 (1.23)	3.23***
	Quitting smoking	2.86 (1.91)	3.37 (2.48)	1.97*
Enjoyable	Second-hand smoke	-3.54 (0.79)	-3.77 (1.16)	2.06*
	Taking a smoke break	-.40 (3.01)	-1.60 (3.49)	3.10**
	Social smoking	-.56 (2.98)	-1.76 (3.35)	3.18**
	Quitting smoking	-1.76 (3.00)	-1.34 (2.97)	1.17
Well-lived	Second-hand smoke	-3.63 (0.76)	-3.80 (1.05)	-1.53
	Taking a smoke break	-2.57 (1.72)	-3.09 (2.21)	2.25*
	Social smoking	-2.66 (1.81)	-3.10 (2.14)	1.88
	Quitting smoking	2.17 (2.25)	2.63 (2.63)	-1.59
Engage	Second-hand smoke	-1.28 (2.20)	-1.99 (2.55)	2.52*
	Taking a smoke break	-1.08 (2.50)	-2.78 (3.48)	4.80***
	Social smoking	-1.28 (2.56)	-2.53 (3.34)	3.58***
	Quitting smoking	-2.22 (2.60)	-2.67 (2.68)	1.43
Desire to change	Second-hand smoke	1.86 (1.95)	2.08 (2.03)	-0.95
	Taking a smoke break	1.15 (1.70)	0.77 (1.97)	1.77
	Social smoking	1.24 (1.64)	0.98 (1.77)	1.27
	Quitting smoking	-0.94 (1.76)	-0.41 (2.07)	-2.32*

Note. Positive “desire to change” ratings indicate a desire to reduce engagement in a behavior. Standard deviations appear in parentheses next to the means. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Table 6

*Socio-Economic and Educational Attainment Distributions and Frequencies Across All**Participants and by Smoking Group, n(%)*

	Smoker (n = 75)	Non-smoker (n = 90)	Ex-smoker (n = 77)	Total (N = 242)
<i>Gender</i>				
Male	38(51)	33(37)	45(58)	116(48)
Female	37(49)	57(63)	32(42)	126(52)
<i>Income</i>				
< \$20,000	28(11)	15(17)	17(22)	60(25)
\$20 - \$40,000	16(21)	20(22)	19(25)	55(23)
\$40 - \$60,000	11(15)	20(22)	7(9)	38(16)
\$60 - \$80,000	11(15)	16(18)	14(18)	41(17)
\$80 - \$100,000	3(4)	8(9)	7(9)	18(7)
> \$100,000	6(8)	8(9)	10(13)	14(6)
<i>Level of Education</i>				
Some H.S.	2(3)	1(1)	3(4)	6(3)
Completed H.S.	11(15)	6(7)	7(9)	24(10)
Some college	38(51)	26(29)	36(47)	100(41)
College	12(16)	31(34)	17(22)	60(25)
Some graduate	2(3)	8(9)	7(9)	17(7)
Graduate degree	10(13)	18(20)	7(9)	35(14)
<i>Dropout status</i>				
School Dropout	28(37)	22(24)	31(40)	81(34)
Non-dropout	33(44)	55(61)	31(40)	119(49)
Current student	14(19)	13(14)	15(20)	42(17)

Note. H.S. = high school

Table 8

Mean Ratings of Variables Influencing Smoking Between Smokers and Quitters

Smoking	Variables	Smoking Group		<i>t</i>
		Smokers	Quitters	
Starting	Friends	3.20 (0.97)	3.01 (1.06)	1.134
	Curiosity	2.73 (1.06)	2.96 (0.97)	-1.375
	Stress	2.13 (1.21)	2.40 (2.40)	-1.402
	Work	2.07 (1.11)	2.25 (1.10)	-1.005
	To be cool	2.11 (1.18)	2.19 (1.11)	-0.474
	Family	2.21 (1.18)	2.05 (1.11)	0.869
	Image	1.84 (1.04)	2.17 (1.1)	-1.899
Continuing	Enjoyment	3.25 (0.81)	2.82 (1.06)	2.842**
	Friends	2.89 (0.97)	2.86 (1.02)	0.224
	Stress	2.61 (1.20)	2.55 (1.09)	0.326
	Alcohol	2.53 (1.14)	2.54 (1.17)	-0.033
	Co-workers	2.15 (1.04)	2.25 (1.08)	-0.583
	Family	2.08 (1.15)	1.97 (1.11)	0.578
	Image	1.56 (0.93)	1.95 (1.12)	-2.314**
Quitting	Health	3.13 (0.99)	2.87 (1.16)	1.172
	Money	3.21 (1.02)	2.71 (1.11)	2.316*
	No enjoyment	2.03 (1.15)	2.83 (1.19)	-3.458***
	Children	2.45 (1.29)	2.23 (1.29)	0.837
	Image	2.08 (1.22)	2.39 (1.18)	-1.313
	Friends/family	2.24 (1.17)	2.03 (1.16)	0.915
	Doctor	1.97 (1.26)	1.68 (1.03)	1.353
Self-conscious	1.87 (1.10)	1.66 (1.02)	0.994	

Difficult rules	1.79 (1.07)	1.68 (1.02)	0.556
Co-workers	1.53 (0.92)	1.48 (0.88)	0.258

Note. Factors are listed in descending order of magnitude of influence. Standard deviations appear in parentheses next to the means * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Table 9

Mean Ratings of Variables Influencing Smoking Between Smokers Who Want to Quit and Smokers Who Do Not Want To Quit

Smoking	Variables	Smokers		<i>t</i>
		Desire to quit	No desire	
Start Smoking				
	Friends	3.45 (0.86)	2.95 (1.03)	.025*
	Curiosity	2.63 (1.13)	2.84 (0.97)	.402
	Stress	2.50 (1.23)	1.76 (1.09)	.007**
	Work	2.42 (1.18)	1.7 (0.91)	.004**
	To be cool	2.39 (1.22)	1.81 (1.08)	.031*
	Family	2.37 (1.20)	2.05 (1.15)	.250
	Image	2.05 (1.21)	1.15 (0.79)	.073
Continue Smoking				
	Enjoyment	3.24 (0.82)	3.27 (0.84)	.859
	Friends	3.08 (0.94)	2.70 (0.97)	.092
	Stress	3.08 (0.97)	2.14 (1.23)	.000***
	Alcohol	2.61 (1.10)	2.46 (1.19)	.584
	Co-workers	2.26 (1.06)	2.03 (1.01)	.327
	Family	2.26 (1.18)	1.89 (1.10)	.163

Note. Factors are listed in descending order of magnitude of influence. Standard

deviations appear in parentheses next to the means * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$

Table 10

Ratings of Smoking Behaviors Across All Participants

Behaviors	Ratings				
	Healthy	Enjoyable	Well-lived	Engage	Change
Taking a smoke break	1.43*** (0.95)	3.54** (2.27)	1.91*** (1.45)	2.44*** (2.15)	3.77* (1.79)
Second hand smoke	1.32*** (0.82)	1.41*** (0.99)	1.32*** (0.88)	2.76*** (1.83)	4.35** (2.08)
Social smoking	1.44*** (1.01)	3.67* (2.30)	2.02*** (1.50)	2.58*** (2.17)	3.90 (1.79)
Quitting smoking	6.44*** (1.42)	3.08*** (2.13)	5.91*** (1.65)	2.93*** (2.31)	3.25*** (1.71)
Smoking	1.19*** (0.60)	3.24*** (2.25)	1.76*** (1.34)	2.65*** (2.26)	4.00 (1.86)
Smoking when alone	1.31*** (0.76)	2.98*** (2.06)	1.74*** (1.33)	2.48*** (2.22)	3.88 (1.84)
Smoking after a meal	1.27*** (0.64)	3.5*** (2.37)	1.86*** (1.45)	2.51*** (2.25)	3.83 (1.82)
Smoking after waking up in the morning	1.31*** (0.83)	2.99*** (2.14)	1.62*** (1.15)	2.29*** (2.12)	3.77 (1.81)
Smoking before bedtime	1.23*** (0.69)	2.75*** (2.02)	1.66*** (1.21)	2.31*** (2.13)	3.74** (1.84)
Smoking while drinking alcohol	1.26*** (0.78)	3.8 (2.44)	1.94*** (1.53)	2.37*** (2.05)	3.82 (1.75)
Smoking during times of stress	1.4*** (0.89)	3.46*** (2.21)	1.74*** (1.33)	2.6*** (2.18)	3.95 (1.82)
Smoking outside on a nice day	1.37*** (0.90)	3.61** (2.32)	1.97*** (1.55)	2.64*** (2.30)	3.85 (1.83)
Smoking inside	1.17*** (0.55)	2.46*** (1.91)	1.48*** (1.03)	1.83*** (1.69)	3.48*** (1.74)
Smoking in a designated area	1.71*** (1.31)	2.7*** (1.81)	1.92*** (1.44)	2.29*** (2.03)	3.72* (1.78)
Smoking outside in bad weather	1.33*** (0.92)	1.95*** (1.44)	1.56*** (1.12)	2.10*** (1.77)	3.68** (1.71)

Note. Positive “desire to change” ratings indicate a desire to reduce engagement in a behavior. Standard deviations are shown in parentheses below the means. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$ for means that are statistically different from neutral.

Table 11

Factor Loadings (top and bottom three items for each factor) for Factor Analysis With Varimax Rotation of Smoking Behavior Ratings

Enjoyable	Well-lived	Healthy	Second-hand smoke	Solitary	Quitting	Unenjoyable
Smoking with a meal (enjoyable) .89	Smoking (well-lived) .86	Taking a smoke break (healthy) .81	Second-hand smoke (enjoyable) .87	Smoking in bad weather (healthy) .70	Quitting smoking (well-lived) .92	Smoking in a designated area (well-lived) .56
Taking a smoke break (enjoyable) .88	Smoking with a meal (well-lived) .85	Smoking (healthy) .78	Second-hand smoke (healthy) .85	Smoking in the morning (healthy) .66	Quitting smoking (healthy) .91	Smoking in a designated area (healthy) .53
Smoking outside on a nice day (enjoyable) .88	Smoking before bedtime (well-lived) .84	Smoking outside on a nice day (healthy) .76	Second hand smoke (well lived) .82	Smoking alone (healthy) .61	Quitting smoking (enjoyable) .31	Quitting smoking (enjoyable) .51
Quitting smoking (well-lived) .04	Quitting smoking (healthy) .06	Smoking while drinking (enjoyable) -.01	Smoking in a designated area (healthy) -.05	Quitting smoking (enjoyable) -.05	Smoking with a meal (healthy) -.10	Smoking while drinking (enjoyable) -.09
Smoking in the morning (healthy) .03	Quitting smoking (enjoyable) -.17	Quitting smoking (well-lived) -.03	Quitting smoking (well lived) -.09	Social smoking (well-lived) -.05	Second hand smoke (enjoyable) -.13	Smoking while drinking (well-lived) -.10

Quitting smoking (enjoyable) -.21	Quitting smoking (well-lived) -.20	Quitting smoking (healthy) -.07	Quitting smoking (healthy) -.17	Smoking inside (enjoyable) -.06	Smoking in the morning (well-lived) -.13	Smoking inside (healthy) -.11
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Note. For each item the type of rating is shown in parentheses below the smoking behavior.

Table 12

Pearson's correlations between personality trait scores and behavioral task performance

Measure	Laptop Task	IT(5-15)	IT(15-25)	IT(25-35)	RP- Small	RP - Large
SSS-Total	-.148*	0.028	.159*	.157*	.141*	.146*
SSS-Boredom	-0.113	0.03	0.048	0.058	0.049	.153*
SSS-Dis-inhibition	-.172**	0.054	0.117	.142*	0.093	.141*
SSS-Experience Seeking	-0.068	0.042	0.118	0.072	.148*	0.074
SSS-Thrill Seeking	-0.111	-0.035	.152*	.171**	0.055	0.068
BIS-Total	-.279**	-0.041	0.06	-0.017	0.04	-0.001
BIS-Attention	-.178**	0.022	0.095	0.009	0.08	0.062
BIS-Motor	-.229**	-0.086	0.038	0.022	0.076	0.043
BIS-NonPlanning	-.224**	0.022	0.04	-0.059	0.043	-0.023
ARS	-0.054	-0.013	-0.066	0.006	0.092	0.128

Note. IT denotes the Indifference Task followed by the time interval (years) in

parentheses. RP denotes the Risk Preference Task with a small or large gain. * $p \leq .05$, ** $p \leq .01$, *** $p \leq .001$.

Appendix A

In this task you will be shown a series of nine pairs, in which you will choose between a smaller dollar amount sooner and a larger dollar amount later.

Please mark the payout (dollar amount) you would take.

1. \$1,650 in 5 years – OR – \$4,740 in 15 years
2. \$1,440 in 5 years – OR – \$7,290 in 15 years
3. \$2,060 in 5 years – OR – \$3,430 in 15 years
4. \$3,400 in 15 years – OR – \$5,800 in 25 years
5. \$2,800 in 15 years – OR – \$7,900 in 25 years
6. \$2,200 in 15 years – OR – \$11,300 in 25 years
7. \$4,800 in 25 years – OR – \$24,200 in 35 years
8. \$7,700 in 25 years – OR – \$12,900 in 35 years
9. \$5,800 in 25 years – OR – \$16,700 in 35 years

Appendix B

Imagine that you have a laptop that you use for your work. The laptop is pretty old, and it works, but it's slow, heavy and lacking in some features you desire. You would really like to get new laptop, and after doing some research you are considering purchasing the brand new laptop described below.

The laptop has just been introduced and is currently on sale for \$1000. You have a credit card to which you could charge the full amount. However, in doing your research, you find out that the price is expected to drop over the next year. So, you can but it now at full price or get it for cheaper by waiting.

Which of the following options would you choose?

I would buy the laptop right now for \$1,000

I would wait three months and buy the laptop for \$875

I would wait six months and buy the laptop for \$750

I would wait nine months and buy the laptop for \$625

I would wait 12 months and buy the laptop for \$500

Appendix C

Suppose that you bought a lottery ticket a week ago. You are now informed that you have won and have been given two options of how to receive the money. Please choose one option within each of the following pairs of choices

Set 1:

1. Receive \$400 for sure – OR – Flip a coin; receive \$2000 if Heads or \$0 if Tails
2. Receive \$600 for sure – OR – Flip a coin; receive \$2000 if Heads or \$0 if Tails
3. Receive \$800 for sure – OR – Flip a coin; receive \$2000 if Heads or \$0 if Tails
4. Receive \$1000 for sure – OR – Flip a coin; receive \$2000 if Heads or \$0 if Tails
5. Receive \$1200 for sure – OR – Flip a coin; receive \$2000 if Heads or \$0 if Tails
6. Receive \$1400 for sure – OR – Flip a coin; receive \$2000 if Heads or \$0 if Tails
7. Receive \$1600 for sure – OR – Flip a coin; receive \$2000 if Heads or \$0 if Tails

Set 2:

1. Receive \$20 for sure – OR – Flip a coin; receive \$100 if Heads or \$0 if Tails
2. Receive \$30 for sure – OR – Flip a coin; receive \$100 if Heads or \$0 if Tails
3. Receive \$40 for sure – OR – Flip a coin; receive \$100 if Heads or \$0 if Tails
4. Receive \$50 for sure – OR – Flip a coin; receive \$100 if Heads or \$0 if Tails
5. Receive \$60 for sure – OR – Flip a coin; receive \$100 if Heads or \$0 if Tails
6. Receive \$70 for sure – OR – Flip a coin; receive \$100 if Heads or \$0 if Tails
7. Receive \$80 for sure – OR – Flip a coin; receive \$100 if Heads or \$0 if Tails