HHS Public Access

Author manuscript

AIDS Behav. Author manuscript; available in PMC 2016 March 01.

Published in final edited form as:

AIDS Behav. 2015 March ; 19(3): 450–458. doi:10.1007/s10461-014-0909-6.

Behavioral Economic Decision Making and Alcohol-related Sexual Risk Behavior

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Abstract

The discipline of behavioral economics integrates principles from psychology and economics to systematically characterize decision-making preferences. Two forms of behavioral economic decision making are of relevance to HIV risk behavior: delay discounting, reflecting preferences for immediate small rewards relative to larger delayed rewards (i.e., immediate gratification), and probability discounting, reflecting preferences for larger probabilistic rewards relative to smaller guaranteed rewards (i.e., risk sensitivity). This study examined questionnaire-based indices of both types of discounting in relation to sexual risk taking in an emergency department sample of hazardous drinkers who engage in risky sexual behavior. More impulsive delay discounting was significantly associated with increased sexual risk-taking during a drinking episode, but not general sexual risk-taking. Probability discounting was not associated with either form of sexual risk-taking. These findings implicate impulsive delay discounting with sexual risk taking during alcohol intoxication and provide further support for applying this approach to HIV risk behavior.

Keywords

Sexual risk; alcohol; behavioral economics; delay discounting; probability discounting

INTRODUCTION

For the past three decades, the HIV and sexually transmitted infection (STI) epidemics have been among the highest of public health priorities. In an effort to improve preventive interventions aimed at reducing risky sexual behavior, clinical researchers have investigated a variety of individual and contextual factors that influence decision making regarding sexual risk-taking [see 1 for a review]. In particular, alcohol has become an established target of interest for understanding the factors contributing to sexual risk behavior [2–4]. This is based largely on experimental findings that acute intoxication reduces sexual inhibitions [5] and decreases perceived negative consequences of risky sex [6], as well as

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epidemiological studies showing associations between alcohol use and sexual risk taking in generalized epidemic contexts [7].

There has been growing interest in the extent to which the field of behavioral economics may be used to understand HIV risk [e.g, 8]. Behavioral economics integrates concepts and methods from psychology and microeconomics to systematically characterize individuals' decision making preferences. Two forms of behavioral economic decision making have particular relevance for understanding sexual risk behavior: delay discounting and probability discounting. Delay discounting refers to the process of devaluing a reward as a function of its delay to receipt [for a comprehensive review, see 9]. It is also referred to as capacity to delay gratification and is considered a behavioral economic index of impulsivity, with more impulsive individuals exhibiting strong preferences for smaller immediate rewards compared to larger rewards in the future. Probability discounting refers to the process of devaluing a reward as a function of its likelihood of receipt [for a review, see 10]. It is considered an index of risky decision making, with riskier individuals exhibiting stronger preferences for larger uncertain rewards compared to smaller guaranteed rewards.

Delay discounting has been examined in relation to a variety of behavioral health issues including nicotine dependence [e.g., 11], alcohol dependence [e.g., 12,13], opiate dependence [e.g., 14], stimulant dependence [e.g., 15], pathological gambling [e.g., 16,17], and obesity [e.g., 18]. Methodologically, delay discounting is either assessed using iterative tasks, systematically assessing diverse devaluations and delay durations, or briefer questionnaire measures with smaller numbers of selectively chosen choices. A recent meta-analysis that incorporated data from both approaches revealed that consistently higher levels of impulsivity have been observed in individuals engaging in drug use or gambling compared to controls [19]. While delay discounting is traditionally measured using monetary rewards, commodity-specific preferences can also be characterized using non-monetary rewards such as cigarettes [20], alcohol [21], cocaine [15] and food [22]. Probability discounting has also been applied to understanding health behavior, albeit not as extensively as delay discounting. In particular, more impulsive probability discounting has been linked to pathological gambling behavior [23,24] and smoking [25–27]. Like delay discounting, probability discounting can be assessed using extended tasks or briefer questionnaire measures.

These forms of discounting decision making have only recently been examined in relation to sexual activity. For example, using tasks assessing monetary preferences, one recent study found that substance-dependent men who have sex with men (MSM) exhibit significantly more impulsive delay discounting compared to a control group [28]. Impulsive monetary discounting has also been shown to be associated with younger age of sexual initiation and recent sexual infidelity in healthy young adults [29], albeit with some methodological ambiguity. Using sex-specific tasks, several studies have demonstrated that the value of sexual activity is discounted, based on both delay and probability, in a similar fashion to other commodities [30–32]. Furthermore, two investigations using sex-specific delay discounting have revealed an association with self-reported sexual behavior and associated health consequences [33,34], with individuals who discount sexual behavior at a higher rate being more likely to have engaged in sexual behavior and experience negative

consequences. Of particular interest, another recent investigation revealed that alcohol dependent individuals exhibit significantly greater sex-specific delay discounting compared to controls [32], connecting alcohol-related risks and behavioral economic decision making. Taken together, these initial studies suggest links between delay discounting and HIV risk behavior, although there is considerable methodological heterogeneity and no studies have directly examined the relationship between probability discounting and risky sexual behavior to date.

To extend the empirical literature on behavioral economic decision making and sexual risk taking, the goal of the current study was to investigate the association between discounting rates and engagement in risky sexual behavior in a high-risk group of adults presenting for treatment in an emergency department. The ED provides a compelling context for examining this association, in light of the HIV risk factors observed among ED patients [35,36] and because the ED serves as the only source of medical care for many United States citizens, particularly among the uninsured and underinsured [37]. Using questionnaire-based assessments, monetary delay and probability discounting were examined in relation to risky sexual behavior (i.e., unprotected sex with a non-steady partner) both overall and, during drinking episodes, when alcohol may have significant effects on sexual decision-making [5]. We hypothesized that discounting rates would be associated with sexual risk taking, although given the limited literature we did not make specific predictions pertaining to differential findings between forms of discounting or alcohol involvement and sexual risk taking.

METHODS

Participants

Recruitment for the current study took place in the ED of two Rhode Island community hospitals from May 2011 to October 2013. The target population comprised English-speaking patients ages 18–65 who received medical care in the ED. Potential participants were screened to determine degree of heavy/problem alcohol use and engagement in risky sexual behaviors. Eligibility criteria included: (1) meeting the criterion for hazardous drinking (total score ≥ 8 for males; ≥ 6 for females) on the Alcohol Use Disorders Identification Test [AUDIT; 38] or engaging at least one episode of binge drinking (5 or more drinks for males; 4 or more drinks for females) in the past three months; and (2) reporting risky sexual activity during the past three months (i.e., engaging in at least one sex-risk behavior, including unprotected sex, consuming alcohol or other drugs prior to or during sex), and sexual activity with a non-steady partner in the past 90 days, or with a steady partner where infidelity is questioned or unknown. Patients in a mutually monogamous relationship for longer than six months were excluded. The behavioral economic measures employed in the current study were introduced into the larger protocol approximately nine months after the onset of recruitment. One-hundred forty-two patients enrolled in the study, however, fifteen patients (11%) had missing data[1], resulting in a final sample of 127 patients.

[1]Data was identified as missing if the participant elected not to answer a particular item.

Procedure

All procedures were approved by the appropriate university and hospital Institutional Review Boards. The current study focuses exclusively on baseline assessment data collected in the context of a larger ongoing randomized clinical trial of a brief intervention targeting combined alcohol and sex-risk behaviors among patients seeking medical treatment in the ED. Project staff worked on-site in the EDs to identify eligible patients and explain the study. Screening took place with the permission of medical staff and in-between medical care. A mini-mental status exam was conducted and a breathalyzer was administered to ensure that patients were able to provide informed consent (i.e., the patient was oriented, able to concentrate, and able to understand and remember the requirements of the study). Participants were required to have breath alcohol contents (BrACs) of <.02 to give informed consent. Overall, 96% of the participants provided BrACs of .00 and 4% (5) provided positive BrACs.

After the informed consent process, participants completed the baseline assessment battery using a computer. The majority of the baseline measures were self-report questionnaires. However, several key measures were administered in interview format by the project staff to ensure assessment accuracy. Completion of the assessment took approximately 45–60 minutes, and all measures were completed during, or within the two weeks following, the patient's ED visit. Participants were compensated $40 for their participation. Among patients who did not complete the baseline assessment on the day of their ED visit (n = 67), the average number of days to completion was 4.46 (SD = 3.58).

Measures

Eligibility—The AUDIT was administered as the primary screening assessment of heavy/problematic alcohol use. This 10-item questionnaire was developed by the World Health Organization to identify patients whose alcohol consumption has become harmful to their health [38]. Each item is scored on a 4-point scale with a cumulative score range of 0–40; higher scores suggest more harmful alcohol use. A score of eight or higher reflects hazardous alcohol use [40], but more recent research suggests a more appropriate cut point of six or higher for females [41]. Inclusion criteria related to sexual risk-taking behaviors were assessed using a brief screening questionnaire comprising items that have been successfully used to identify individuals at risk for HIV/STI transmission in previous research [42]. The first item assessed the patient's total number of sexual partners (vaginal or anal sexual intercourse) over the past three months. If the patient indicated having only one sexual partner, the second question assessed the length of the relationship. Three items evaluated sex-risk behaviors over the past three months, including: 1) frequency of unprotected sexual intercourse (vaginal or anal); 2) frequency of consuming alcohol before or during sex; and 3) frequency of using any drug before or during sex.

Primary Assessment—Age, gender, race, ethnicity, years of education, and annual household income were obtained in a self-report questionnaire.

A 30-day TLFB interview was used to assess drinking. The TLFB is a structured, calendar-aided interview that was administered by the project staff. For the current study, we focused

on percent of drinking days over the past month, and average drinks per drinking day, reflecting frequency and quantity of alcohol use, respectively.

Risky sexual activity during the past 90 days was assessed via structured interview. Patients were asked to identify the number of steady and non-steady sexual partners over the last three months. Steady partners were explicitly defined as “a romantic, committed relationship for at least 3 months (meaning that you can only have 1 steady partner during the last 3 months).” Non-steady partners were defined as “A non-committed relationship, in which you have had sex one or more times, and you have the understanding that your partner may have sex with other people.” These categories were not mutually exclusive to the extent that a participant could specify having one steady partner and also have multiple non-steady partners. Follow-up questions for each partner type assessed the number of times they had 1) sex with the partner type, 2) how many times they had unprotected sex with the partner type, and 3) how many times they had unprotected sex under the influence of alcohol with the partner type. The interview is available upon request.

Delay discounting was assessed using the Monetary Choice Questionnaire [MCQ; 43], a widely-used 27-item measure of monetary delay discounting preferences. The MCQ was administered in interview format. Participants completed choices between smaller immediate rewards and larger delayed rewards at three levels of magnitude ($25–35; $50–60; $75–85) that were pre-configured at various levels of hyperbolic discounting. The overall pattern of responding can be used to infer temporal discounting functions (*k*), ranging from .00016–.25, with larger values reflecting steeper devaluation of delayed rewards (i.e., more impulsivity). The MCQ presents items in a randomized format and permits generation of the consistency of the inferred *k* value relative to the overall pattern of preferences (i.e., the proportion of choices with which the *k* value is consistent). This was used to characterize participant effort, with high consistency indicating systematic nonrandom preferences that suggest adequate attention and task consideration. Participants in this study made choices for hypothetical rewards, although previous studies have found close correspondence between hypothetical and actual choices in delay discounting paradigms [44–46].

Probability discounting was assessed using the Probabilistic Choice Questionnaire [PCQ; 23], which is a 30-item measure of decision-making under conditions of risk. The PCQ was also administered in interview format. Participants completed choices between smaller guaranteed rewards and larger uncertain rewards for three pairs of options ($20 vs. $100; $40 vs. $100; $40 vs. $60) that were pre-configured at various levels of hyperbolic discounting. Again, the patterns of responding were used to infer probabilistic discounting functions (*h*), which range from .33–16.77, with larger values reflecting less risky preferences (i.e., greater insensitivity to increasing risk). Note that this is the opposite direction to delay discounting, where larger values reflect more impulsive preferences. Like the MCQ, PCQ performance can be characterized in terms of consistency as a measure of participant task effort.

Statistical Analyses

Independent samples t-tests and chi square analyses were employed to determine whether patients from the two EDs differed in any meaningful ways. Descriptive statistics and graphics were used to examine each variable of interest and determine whether it was appropriate for parametric analyses, with transformations used if appropriate. Correlations among the indices of discounting from the MCQ and PCQ were examined and, if appropriate, principal components analysis (direct oblimin rotation) was planned to generate aggregated indices to reduce the overall number of independent variables [47]. The primary analyses comprised bivariate correlations to examine the direct associations among variables of interest, followed by hierarchical regression incorporating both covariates and behavioral economic variables to determine whether the discounting variables were uniquely associated with risky sex. Age, gender, education, annual household income, and recruitment site were explored as a priori covariates of interest. Given the emphasis on co-occurring alcohol use and risky sexual behavior, alcohol use frequency (i.e., percentage of drinking days during the past month) and quantity (i.e., number of drinks per drinking day in the past month) were also included as a priori covariates of interest. Statistically relevant covariates of interest were entered in the first level, and discounting indices that were statistically significant in zero-order correlations were entered in the second level of the model. Residual plots were examined to assess for model violations (e.g., nonlinearity and heteroscedasticity). Throughout all analyses, $p \leq .05$ was interpreted as statistically significant and $p \leq .10$ was considered a statistical trend. Effect sizes were reported as r and β. All analyses were conducted using SPSS v.20.0. (IBM, Armonk, NY).

RESULTS

Preliminary Analyses

The sample was predominantly male (55%) and Caucasian (91%) with an average age of 27.30 years (SD = 8.14; range: 18 – 60). With regard to education, 18% of participants reported that they did not complete high school, 33% reported having a high school diploma or GED, 37% reported some college or technical school, and 12% reported completion of a two or four year degree. The majority (62%) of participants reported an annual household income of less than $30,000. Based on chart review, the majority of participants presented in the ED for illness (68%), followed by “injury” (25%), and “routine care” (7%). The average AUDIT total score was 11.82 (SD = 8.20; range: 1 – 36), indicating that, on average, participants in the current sample exceeded the cutoff score for hazardous drinking. Based on the Timeline Follow Back [TLFB; 39], participants reported drinking on approximately 33% of days during the past month, with an average of 7.49 drinks per drinking day (SD = 5.09; range: 1 – 34). The average rate of unprotected sex (i.e., the percentage of unprotected sex out of total sex) with non-steady partners was 63% over the past 90 days, and participants reported that 37% of their sexual activity with non-steady partners was both unprotected and involved alcohol. Summary statistics for risky sexual behavior and other variables of interest are presented in Table I.

Participants from the two recruitment sites were comparable in gender, ethnicity, and education, but were significantly different with regard to age, t (125) = 2.20, p = .03, and

income, t (127) = −2.84, p = .01. With regard to delay discounting, participants were highly consistent in terms of their preferences (M=98%–99%), suggesting good task effort. The inferred k values were substantially skewed, as is common, and were log10 transformed, which substantially improved the distributions. The three indices were substantially intercorrelated (rs = .68–.84, p <.001) and were thus aggregated using PCA, which accounted for 82.55% of the variance. The resulting index was significantly correlated with all three individual indices. A parallel pattern was present for probability discounting: choice consistency was high (97%–98%); the h values were skewed and improved by log10 transforms; individual hs were substantially intercorrelated (rs = .59–.68, ps <.001); and PCA generated an aggregated index that accounted for a substantial portion of the variance (77.05%) and was significantly correlated with the individual hs (rs = .86–.90, ps <.001). Of note, the aggregated delay and probability discounting indices were significantly positively correlated with each other (r = .24, p <.01), but at a modest magnitude effect size, suggesting some overlap but non-redundancy.

Correlational Analyses

Bivariate correlation analyses were employed to evaluate age, gender, education, annual household income, and recruitment site as covariates of interest (Table I). The results revealed that age, annual household income, and recruitment site were not associated with either discounting or risky sexual behavior in a meaningful way. In contrast, a significant negative association was observed between education and the MCQ component, such that individuals with more education were less impulsive. There was also a notable trend between education and risky sex, such that individuals with more education reported a lower rate of unprotected sex (i.e., a lower percentage of unprotected sex out of total sex). Similarly, there was a trend observed between gender and risky sex, such that women reported a higher percentage of unprotected sex. Percentage of unprotected sex with co-occurring alcohol use was significantly and positively associated with frequency and quantity of drinking. Interestingly, the same pattern of significant positive associations was observed between frequency and quantity of alcohol use and unprotected sex in general (i.e., not specific to incidents with co-occurring alcohol use).

The bivariate correlation analyses revealed that the MCQ component score (reflecting delay discounting) was significantly and positively associated with alcohol-associated unprotected sex, such that more impulsive individuals reported a higher percentage of unprotected sex with co-occurring alcohol use. Of note, the association between the MCQ component score and unprotected sex in general was positive (r = .12), but did not reach statistical significance. Probabilistic discounting (as indexed by the PCQ component) was not associated with risky sexual behavior, either in general or in the context of alcohol use.

Hierarchical Regression

Based on the results of the bivariate correlation analysis, gender, education, and frequency and quantity of alcohol use were entered within the first level of the regression model as statistically supported covariates of interest. Delay discounting (i.e., MCQ component score) was entered in the second level of the regression model. These analyses were only conducted on variables that were significant in the zero-order correlations. With regard to

unprotected sex with co-occurring alcohol use, results of the regression analysis (presented in Table II) show that the same covariate model accounted for approximately one-third of the variance, R^2 = .291, $F(4, 122)$ =12.50, $p < .001$. However, percentage of unprotected sex was significantly associated only with frequency of alcohol use, whereas gender, education, and quantity of alcohol use were not. Beyond the covariates, delay discounting was significantly associated with unprotected sex in the context of co-occurring alcohol use.

DISCUSSION

The goal of the current study was to examine two forms of behavioral economic decision making, delay discounting and probability discounting, in relation to risky sexual behavior overall and in the context of a drinking episode. We found that impulsive delay discounting for money was significantly associated with frequency of unprotected sex with a non-steady partner when drinking, and that this relationship remained significant even after incorporating several relevant covariates including quantity and frequency of drinking. In addition, we found probability discounting was generally not associated with risky sexual behavior. These findings extend the small existing literature on behavioral economic decision making and HIV risk, providing further evidence that impulsive delay discounting is related to risky sexual behavior [29,33] and that this may be particularly relevant to heavy drinkers [32].

Given the specificity of the association between delay discounting and risky sexual behavior, it is worth considering the mechanisms that may underlie this relationship. As a cross-sectional study using self-reported behavior over a relatively long preceding period and trait-oriented discounting measures, it is hard to directly infer the dynamic processes involved. However, these findings clearly reveal a conditional relationship: impulsive discounting is not simply associated with risky sexual behavior in general, only when an individual is drinking. Thus, these findings suggest a person's relative level of discounting moderates aspects of intoxication that in turn affect risky sexual behavior. Future laboratory studies will be necessary to explore dynamic state-based relationships further.

Another notable aspect of these findings is that they contrast with one previous study that found associations between delay discounting and HIV risk behavior to be specific to sex-specific discounting tasks, not monetary discounting [34]. Given several significant methodological differences, it is hard to clearly know why the current study detected this relationship and the former study did not, although the effect sizes observed were of moderate magnitudes in the current study and the sample size was approximately twice as large, providing greater power. As such, it may be that the associations between monetary discounting and sexual risk taking are comparatively smaller than those of sex-specific discounting tasks and only detectable in larger samples.

The above point raises a limitation of the current study, no assessment of sex-specific discounting. Given that sex-specific discounting preferences directly tap into decision making parameters pertaining to sex, it may well be that complementary findings would have been revealed had sex-specific delay and probability discounting been assessed. For example, although probability discounting for monetary rewards exhibited no significant

associations with sexually risky behavior, it may be that the domain was too narrow and that versions using sexual parameters more closely related to HIV risk behavior would have been more sensitive. Clearly, a priority for future work will be using both domain general (money) and sex-specific measures to comprehensively characterize discounting preferences. Related to this is that the study used questionnaire-based assessments, which have the advantage of brevity but may have less resolution than extended tasks. Although few studies have directly addressed this, there is some evidence that there is substantial overlap between MCQ performance and task-based performance [52]. In addition, in a recent meta-analysis, task-based and MCQ-based effect sizes were generally similar [19]. Nonetheless, it is possible that higher resolution task-based assessments may bring these relationships in greater relief or reveal qualitatively different findings. A final assessment consideration is that, although the sex-risk indices reflected the behavioral variables of greatest interest, they were single-item self-report assessments for which reliability estimates and other psychometric properties could not be generated.

Other limitations are also worth noting. For example, the current data cannot address the blood alcohol levels (BALs) of participants that were associated with risky sexual encounters, further highlighting the importance of future laboratory studies that can parametrically identify potential difference across varying BALs. Similarly, an assumption in the distinction between alcohol-related and non-alcohol-related risky sexual behavior was that alcohol was a catalyst for the former, but that may not uniformly have been the case across participants. A final consideration is that, although a strength of the study was the use of a high-risk community sample in the ED, the current findings should only be cautiously generalized. Examining these relationships among general population groups and higher risk groups, such as individuals in STD clinics, and in specific populations of interest, such as HIV+ individuals is an important future direction.

CONCLUSIONS

Despite the considerations raised, the current study substantively contributes to the extant literature using behavioral economics to understand HIV risk behavior. These data suggest that, in a clinical sample of heavy drinkers who also engage in risky sexual behavior, more impulsive delay discounting is associated with sexual risk taking during drinking episodes. Although these findings will need to be replicated and additional descriptive and laboratory research remains to be done, a number of studies have implicated impulsive delay discounting as a predictor of treatment prognosis [e.g., 52,53] and there is increasing interest in directly addressing this form of impulsivity as a treatment target [e.g., 54]. As such, behavioral economics may ultimately contribute to novel clinical tools and intervention strategies for HIV and other STIs.

Acknowledgments

The authors gratefully acknowledge the following staff for their important contributions to data collection: Amanda Budziszek, Daryl Cioffi, Catherine Corno, Graham DiGuiseppi, Ayla Durst, Barbara Engler, Jeffrey Garofano, James Geckler, Jennifer Merrill, Vivian Partida, Carla Rich, Suzanne Sales, Tamara Sequeira, and Timothy Souza. This research was partially supported by NIH grants 2R01AA009892 (PMM), P01AA019072 (PMM), K23AA016936 (JM), and T32AA007459 (PMM). Dr. MacKillop is the holder of the Peter Boris Chair in Addictions Research, which partially supported his role.

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Table I

Bivariate Correlations between Covariates of Interest, Discounting Indices, and Risky Sexual Behavior

Variable	Summary Statistics[a]	1	2	3	4	5	6	7	8
1. Gender (% Male)[b]	55%	---							
2. Education[c]	4.28 (1.74)	.06	---						
3. Annual Income[d]	3.44 (2.57)	−.07	.17	---					
4. Alcohol Use – Frequency[e]	33.49 (27.78)	−.09	.10	−.09	---				
5. Alcohol Use – Quantity[f]	7.49 (5.09)	−.03	−.24**	−.03	26**	---			
6. MCQ Component[g]	0.00 (1.00)	−.05	−.21*	−.09	.11	.14	---		
7. PCQ Component[h]	0.00 (1.00)	.19*	.05	.02	−.08	.15	.24**	---	
8. Unprotected Sex[i]	62.90 (42.25)	.16	−.17	−.07	.23**	.19*	.12	.05	---
9. Unprotected Sex & Alcohol[j]	37.21 (38.15)	.06	−.05	−.09	.50**	.28*	.23**	.07	.68**

Note: Age, race, and recruitment site were also explored as a priori covariates of interest, but were excluded since no meaningful associations were observed.

[a] Mean (SD) presented.

[b] Gender is a dichotomous variable (0 = Male, 1 = female).

[c] Education is a categorical variable (4 = “high school degree”).

[d] Annual Income is a categorical variable (3 = “$20,000 to $29,999”).

[e] Frequency of alcohol use reflects the percentage of drinking days in the past month.

[f] Quantity of alcohol use reflects the average number of drinks per drinking day (past 30 days).

[g] MCQ Component is the latent component from the Monetary Choice Questionnaire (standardized).

[h] PCQ Component is the latent component from the Probabilistic Choice Questionnaire (standardized).

[i] Unprotected Sex = percentage of sex without a condom (past 90 days).

[j] Unprotected Sex & Alcohol = percentage of co-occurring alcohol use and sex without a condom (past 90 days).

* $p < .05$ level;

** $p < .01$

Table II

Hierarchical Regression Analysis Examining Predictors of Unprotected Sex Under the Influence of Alcohol with Non-Steady Partner

Variable	Level 1: Covariate Model					Level 2: Discounting Model				
	B	***SE***	***β***	***t***	***p***	***B***	***SE***	***β***	***t***	***p***
Gender[a]	8.73	5.86	.11	1.49	.14	8.98	5.79	.12	1.55	.12
Education[b]	−1.57	1.75	−.07	−0.90	.37	−0.87	1.76	−.04	−0.49	.63
Alcohol Use – Frequency[c]	0.66	.11	.48	6.00	<.001	0.64	0.11	.47	5.82	<.001
Alcohol Use – Quantity[d]	1.04	.62	.14	1.68	.10	0.97	0.61	.13	1.59	.11
MCQ Component[e]	---	---	---	---	---	6.30	3.16	.16	1.99	.05

Note: Level 1 R^2 = .29; Level 2 R^2 = .31.

[a] Gender is a dichotomous variable (0 = Male, 1 = female).

[b] Education is a categorical variable (4 = “high school degree”).

[c] Frequency of alcohol use reflects the percentage of drinking days in the past month.

[d] Quantity of alcohol use reflects the average number of drinks per drinking day (past 30 days).

[e] MCQ Component is the latent component for the Monetary Choice Questionnaire; higher scores denote increased impulsivity.