5-15-2020

Our Temptation for Benjamins: Can framing spending habits allow us to overcome present bias?

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By

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A Thesis is submitted in partial fulfillment of the requirements for the course Senior

Seminar (EC375), during the Spring Semester of 2020

While writing this thesis, I have not witnessed any wrongdoing, nor have I personally

violated any conditions of the Skidmore College Honor Code.

Thesis Advisor: Rodrigo Schneider

April 28th, 2020

Abstract

This study will investigate whether people prefer spending their cash on hand for instantaneous benefits, or delay consumption for future returns, and the impact of their mood on their spending habits. Past studies find that one's state of happiness immensely contributes to his or her willingness to spend money; happier, satisfied individuals tend to spend a lot less than dissatisfied ones. However, few studies focus on the impact of loss aversion on people's time preferences towards money. The goal of this paper is to measure not only the impact of happiness as the same mood-congruent effect on time preferences but also that of loss aversion using lotteries that are announced in different time periods. Our statistical analysis goes in parallel with the literature on mood change and delaying consumption: those with higher degree of happiness appears to opt for the lottery that is higher compensated and announced in later time period, after accounting for demographic information.

Acknowledgement

1 Introduction

Many financial decisions we implement in our lives require a tradeoff. Examples of this include, but not limited to subscribing to a gym to get in better shape, going shopping, or investing our income on money markets. Since all of these require us to give up a certain portion of our financial means, these transactions can be labeled as tradeoffs between the cost of implementation and the benefits we extract in the aftermath. In the case of spending our money on a good or service, the extracted benefit appears more evident than, let's say, paying for a gym subscription. Since improving physical health is a more time-consuming commitment than going shopping for clothes, it also requires more long-term commitment in terms of financials, effort, and time. One notable example that mandates financial stability and long-term commitment is the savings we accumulate over time. Just like working out, the benefits offered by a healthy savings account comes in handy at later points in life. However, the cost associated with maintaining both habits is much more foreseeable in the short run. One difference is that gym memberships are becoming increasingly popular while accumulating savings, not even on the same radar. Studies have found that as of 2019, "1 in 5 Americans belong to at least one health club or studio," and visits to gym clubs has risen to 6.1 billion in 2018 from 4.3 billion in 2008 (IHRSA). The personal savings rate, on the other hand, has been on the decline: in 2012, the personal savings rate went up to 12.0%, which is 5% more than what it currently is (Federal Reserve Bank, 2019).

2 Background and Literature Review

Although working out and saving money may sound like two unrelated concepts, both activities require patience, effort, time, and without a doubt, money. Saving money, on the other hand, although a common-sense goal by many, does not seem to be as attainable. This holds true, especially when consumers are left alone to exert self-control in our spending behavior. This contrasts with the theory of the life-cycle hypothesis, which is an economic model developed by Modigliani and Brumberg (1954). The life-cycle hypothesis suggests that in times of low-income, families are most likely to resort to borrowing money, whereas they tend to save more in times of high income. The model that constitutes the life-cycle hypothesis has been widely recognized as a foundational study to

analyze saving patterns and consumption. However, the life-cycle model itself underlines a series of assumptions that may not approximate what happens in reality. One of these assumptions is that under this framework, each family stands as a rational entity with and allocates their income based on what benefits them the most in the present. A study by Thaler and Sefrin (1981) poses a contradiction to this framework by counterarguing that even when a given family has enough income to save, there exists the issue of lack of self-control: resources that require instantaneous transaction might tempt people to spend their income rather than saving it for future transactions. In addition, the authors argue that even if the family happens to be financially prosperous, they might be restricted by bounded rationality, which implies that people are limited by the resources they have to make the best decision for themselves. Under the life-cycle model, one assumption posits that families are not only financially prosperous but also adequately self-informed regarding how to save money in a way that maximizes their income. However, research on saving behavior has found that most people have not familiarized themselves with the time value of money and the effect of compounding, which is factored in having a savings account. Examples include lab-based studies on evaluating knowledge about compounding (Wageenar and Sagaria, 1975; Benzion et al., 1992) or field experiments with regard to saving for retirement (McKenzie and Liersch, 2011).

With regard to consumption and saving behavior, studies in psychology and behavioral economics extends these arguments by highlighting two important cognitive biases. These biases are called present and exponential growth bias. Present bias occurs when an individual prioritizes the payoff generated in the present context, over the one obtained in the future. This theory justifies the satisfaction gained from spending the cash on hand, rather than locking it away. Examples of present bias come about in the studies that investigate overspending and under-saving (Laibson, 1997; Thaler and Benartzi, 2004), eating disorders (Ikeda, Kang, & Ohtake, 2010) and smoking (Harrison, Lau, & Rutström, 2010). Even though present bias stands as a catalyst for all these compulsive behaviors, what triggers it stems from our sense of happiness. Studies on time preferences have found that sadness or negative moods incentivize committing compulsive activities, overspending being one of them (Guven, 2012; Cryder et al., 2008; Stillman et al., 2012). Based on these findings, research on consumption behavior underpins that when individuals self-reflect on

their sadness, they tend to downplay their sense of worth. As a result, to rebuild their sense of worth, they resort to financial spending as a coping mechanism.

The second, exponential-growth bias, denotes that there is a tendency to neglect the compounding effect of a savings account. This type of bias does not take into account our preferences but rather how well we can reflect and comprehend the benefits of saving. The reason why exponential growth bias occurs in this context is that people lack a basic understanding of how banking and financial management work. The literature on the impact of exponential growth bias and under-saving is quite robust (Eisenstein and Hoch, 2007; McKenzie and Liersch, 2011; Almenberg and Gerdes, 2012). An experiment by Eisenstein and Hoch (2007) recruited undergraduate and MBA students and investigated their ability to estimate returns generated by a retirement account with a specific interest rate of return. The results they found were that most participants based their estimations on simple interest calculations, disregarding the process of compounding. The takeaway is that somebody with an exponential growth bias fails to envision the benefits gained from the compounding effect that a savings account offers and underestimates it. The reason why this is important in the context of our study is that previous studies find that students enrolled in institutions of higher educations are estimated to have lower levels of financial literacy and, by extension, more likely to spend money impulsively. One study by Bartholomae and Fox (2002) finds that financial literacy prior to one's college career significantly impacts his or her spending behavior during college. Another study by Danes and Boyce (1999) furthers this argument by offering an all-comprehensive training on financial literacy ascribed to a sample of high school students and find that training as such, grew confidence in managing money by 40%.

2.1 Why do savings matter and how to incentivize it?

The reason why saving money is vital in the long run is because our savings account plays an essential role in our financial security. Savings provide wealth and financial planning, not only for personal retirement but also for the country's investment level. A savings account yields interest and thus increases savings in the long run, without depositing more money. In addition, an increase in personal savings increases investment and thus stimulating the national economy (Misztal, 2011). However, the practice of maintaining a healthy savings account is not achieved quite easily. Studies have found that

when asked, people feel guilty and regretful about spending money. This is associated with the compulsive behavior displayed by those who regularly engage in gambling, eating disorders, and alcoholism. A behavior is classified as compulsive when it derives from a compelling instinct and is detrimental to mental health. In the context of spending money, the reported detrimental effect is guilt and anxiety. A study by Faber et al. (1987) asked a group of compulsive shoppers the first feeling they expressed after completing their purchase. The most common responses were guilt and anxiety as reactive mechanisms to their spending habits.

2.2 Save More Tomorrow, Automatic Savings and The Future Nudges

While the decision to save counteracts with our cognitive and reflective biases, there exists a series of solutions provided by research in behavioral economics that people can leverage to attain financial security. These solutions can arrive in the form of what are so-called *nudges*. The concept of nudging became popularized and prominent in the 2008 international bestseller *Nudge: Improving Decisions About Health, Wealth, and Happiness*, which was written by Richard Thaler and Cass Sunstein in 2008. The concept refers to the ways in which positive reinforcement can improve people's decision-making skills, compared to the outcome that may occur if they are left alone. The practice of nudging is quite prominent in studying and implementing savings programs. One example of this is *Save More Tomorrow*, a savings program that was devised by Richard Thaler and Shlomo Benartzi in 2004. The mission of the program is to commit people to allocate their future salary increases to a retirement savings account until they are eligible to withdraw their funds. The plan has three conditions. First, employees enrolled will be asked to put a fraction of their current salary to a fund periodically. Second, they will be asked to increase the amount put in the funds if their salary goes up or if they get a raise. Lastly, once the employees are enrolled, they have to remain in the program unless they decided to leave. The program resulted in huge success: currently, 15 million Americans are contributing to S*ave More Tomorrow*, and the conditions of the plan laid the foundations of the Pension Protection Act of 2006. Another possibility is to enroll in an automatic savings program that withdraws a fixed amount from your checking account periodically (Beshears et al. 2010). Other programs that come in the form of nudges include sending periodic updates to the owner of the savings account via digital communication tools and recent government

programs that offer tax subsidies for investing in a retirement savings account (Chetty et al. 2013). Other studies that explore time preferences and discounting bias in savings include, but not limited to, the effect of restricting access to savings accounts (Ashraf et al. 2006) and testing the saving behavior when participants receive bad news concerning their current income stream (Bowman et al. 1994). In the last-mentioned study, the authors provide a new perspective regarding consumption-saving models. In previous studies, the willingness to save emerged as a result of improving one's current state of mood. This study, however, concluded that the implications of presenting the bad news aroused loss aversion, which then incentivized taking precautionary measures by the willingness to spend less. The results obtained from this study conclude that the sense of loss version can increase propensity towards spending less, which means to save more as opposed to a sense of happiness.

This study will test the effect of framing as a nudge for people to overcome their present bias. The participants aimed for this study will be undergraduate students in introductory-level economics courses offered at Skidmore College, who then will be randomly placed into three groups, one control and two treatment groups where the framing effect will take place. All participants will complete an online survey, which will have three-parts: demographic information, financial literacy, and follow-up questions, one of which will measure their time preference over money and the others their state of mood. The question would enable participants to choose one of the two lotteries offered as a reward upon the completion of the survey. One lottery will offer a prize of $50 within a week of completion, whereas the other will offer a prize of $100 at the end of the semester. Participants across all three groups will be asked to choose one of the two lotteries.

While the choice architecture is the same for all subjects, there is one caveat: both treatment groups will be asked to watch a 2 to 6-minute video clips on the nation's consumption behavior before moving on to the next section. The group assigned to receive a positive frame will watch the clip that has an optimistic narrative, whereas the other group will be asked to watch the clip with a more pessimistic tone. The video with a humorous tone is titled as *Why Are Americans so Bad at Saving Money?* The video with a pessimistic tone is called *America's Dopamine-Fueled Shopping Addiction*. Both clips are produced by *The Atlantic* magazine and released on YouTube in 2014 and 2019, respectively.

The theoretical framework that circumvents this study will replicate the methodology used in the study by Ifcher and Zarghamee in 2011, in which the authors deployed mood-enhancing clips to assess change in present bias. During the experiment, the authors asked 30 different time preference questions, which were posed in the following structure: form: "What amount of money, %p, if paid to you today would make you indifferent to $m paid to you?" In other words, the authors assessed how much the participants would be willing to wait, given the amount promised for the future. The objective here was to measure the overall willingness to improve time preferences for greater returns. In the literature review section of the study, the authors highlight a list of sources on the positive relationship between mild positive effect and improving time preferences, ranging from cognitive flexibility, productivity, creativity, and prosocial behavior (Diener et al. 2005; Isen 2007).

The methodology devised for this study will answer the same research question, which is whether or not mood plays a role in people's time preferences towards money. The only exception is that the questions on time preferences will offer real lotteries in which participants can potentially win either $50 or $100. Upon choosing their preferred lottery option, subjects will then be asked a list of questions that quantifies their current state of mood, which is referred to as Positive and Negative Affect Schedule (PANAS). Examples of these questions include asking participants to express their sadness level on a scale of 1 to 7, with 1 being the least happy and 7 the happiest. The implementation of PANAS is to quantify how effective the mood enhancement tools were across groups, and to what extent did the mood change impact present bias. While all groups will be given the same PANAS, the treatment groups will be additionally asked to express the extent to which the video clip changed their mood.

One major contribution of this study is that it will target a pool of participants that is largely missing from the literature: young college students. By the end of 2018, the market for student loans totaled as much as $1.46 trillion (Federal Reserve Bank of New York, 2019). In the last few years, studies have found major concerns about the expansion of student loans, such as delinquent payments and default on loans (Dynarski and Kreisman, 2013). By offering the participants a chance to win real awards, the study will investigate whether or not college students can exert self-control over their time preferences and, if so,

whether this is even more prevalent in the treatment group(s). If the results happen to be significant across cohorts, then this study will not only revalidate the previous literature on mood and time preferences but also hint on what type of tone financial training should exert to improve time preferences. Previous studies on and saving behavior mostly focus on time preferences with respect to positive effect. There are very few studies that assess the relationship between negative affect and time preferences, loss aversion being one of them. This study will overcome this literature gap by examining not only the impact of positive mood enhancement on the present bias (as done and replicated in the previous study) but also that of negative mood enhancement, such as loss aversion and detriments of consumption on the present bias. Finding the right frame for financial education is crucial not only to help college students acknowledge the importance of savings but also to allow them to budget their expenses.

3 Data and Methodology

3.1 Participants

Participants enrolled in this study consist of sixty-nine undergraduate students of Skidmore College, who are currently enrolled in introductory-level economics students.[1] The reason why those students stand as an optimal participant pool is that higher-level courses in economics present more information on consumer theory and saving behavior, which can eventually cause disciplinary bias. In introductory-level economics courses, the disciplinary focus among students is more heterogeneous since the courses are required for other academic disciplines offered by the institution. All participants had to be 18 years or older for recruitment, and each was randomly assigned to three different groups. The control and the treatment group that is presented the negatively toned clip consist of twenty-four participants, whereas the one that receives the positively toned clip consist of twenty-one participants. While all participants were awarded for entering one of the

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[1] The sample size for this study is estimated through conducting a power analysis using the results obtained by Ifcher and Zarghamee (2011). In the paper, the authors state that for a waiting time of seven days, the discounting factor in obtaining $50 for the treatment groups is higher by 15% and for a waiting time of 56 days, the difference in discounting factor lowers to 12%. While the results of the power analysis suggested a sample of 26 subjects for each cohort (78 overall), due to time constraint, the total number could not exceed sixty-nine.

lotteries offered upon the completion of the survey, more than 95% of them claimed they completed the survey for extra credit of 1-2 exam points for their respective course.

3.2 Survey Instructions

Prior to the completion of the survey, all participants were asked to sign the informed consent form devised for this study. Those who refused to give automatically signed out of the survey session and thus withdrew from their rights to be enrolled in any of the lotteries and earn extra credit.

3.3 Demographic Information and Financial Literacy

The first part of the survey will include questions on demographic information, such as age, class year, gender identification, race, student status (domestic or international), major(s) and minor(s), race, religion, household income, and political affiliation. Upon the completion of the first part, participants will then be asked to respond to a list of multiple-choice questions that evaluate their aptitude in financial literacy and financial management. The questions about financial literacy will ask participants on whether they are receiving financial aid (or any other type of need-based aid), have student loans, employed by an organization (if so part-time or full time), and have opened a bank account and if so, what type of deposit account, checking or savings. Questions about financial management will ask participants to indicate the time they spent tracking their expenses, the money spent on a weekly basis, and what type of goods and services they purchase on a regular basis.

3.4 Lottery Choice and Follow-Up Questions

Upon the completion of financial literacy, participants will then be presented with the question of the lottery. They will either have to choose the lottery that yields $50 announced on March 16th, which is within ten days after the completion, or the one that yields $100 offered at the end of the classes, which takes place in the 28th of April. All groups will be offered the same question. The control group will receive no information on saving behavior prior to answering the hypothetical question. The treatment groups will be asked to watch two different minute video clips before choosing their lottery. One treatment group will be asked to watch the video clip on the detrimental effects of shopping, which bears a pessimistic tone. The other treatment group, on the other hand, will be asked to

watch the video clip on the reasons behind under-saving, which was explained in more humorous and entertaining content.

The purpose of presenting two distinctly different video clips is to determine whether or not the video clip resulted in significant mood-shift. The usage of video content for humor enhancement is not unique to experimental studies. Ifcher and Zarghamee (2011) highlight in their time preferences study that past experimental studies in psychology and economics find video clips as the most effective strategy for "mood-inducement procedure," compared to its alternatives (Westermen et al. 1996; Kirchsteiger et al. 2006; Rottenberg et al., 2007). In order to quantify the significance of the mood change participants are asked to complete what is called Positive and Negative Affect Schedule (PANAS). The PANAS designed for this study emulates the one designed by Ifcher and Zarghamee (2011). The enlisted questions will include exactly seven different positive affections and nine different negative ones and inquire participants to rate the degree to which they are feeling them, on a scale from 1 to 10. Positive emotions will include amusement, arousal, contentment, happiness, interest, relief, and surprise. The negative emotions, however, will be anger, confusion, contempt, disgust, embarrassment, fear, pain, sadness, and tension. While all three groups will be asked to complete one default PANAS, the treatment group will be asked another PANAS regarding how the video clip impacted them. Upon the completion of PANAS, participants will be directed to the follow-up questions, which will allow them to guess the purpose of this study and evaluate the level of difficulty they experienced while filling it out.

4 Econometric Model and Behavioral Hypothesis

4.1 Econometric Model

In order to analyze the relationship between lottery choice and mood-inducement, the following logistic model is considered for analysis:

$$(1) \ log(lottery\_choice_i) = \beta_o + \beta_1 \, C_i + \sum_{j}^{1} \gamma_{ji} D_j + \varepsilon$$

$$(2) \ log(lottery\_choice_i) = \beta_o + \beta_2 \, TP_i + \sum_{j}^{1} \gamma_{ji} D_j + \varepsilon$$

$$(3) \ log(lottery\_choice_i) = \beta_o + \beta_2 \, TN_i + \sum_{j}^{1} \gamma_{ji} D_j + \varepsilon$$

where *lottery_choice* refers to the choice of lottery undertaken by each ith participant in the survey. C_i refers to whether or not the participant is assigned to the control group and equals one if the ith participant belongs to the control group and zero if not. TP_i equals to 1 if the ith participant belongs to the positive treatment group and 0 if the participant belongs to the other groups, and the same holds true for the dummy variable TN_i: a value of 1 meant the participant belonged to the negative treatment group and 0 meant the participant belonged to either the control group or the treatment positive group. The variable D_j is a combination of all the demographic factors and financial awareness, where j includes race, gender, religiousness, family income, weekly spending, and whether the participant has money in their savings account. All the collected from the demographic portion of the survey. Previous studies assessed time preferences through hypothetical questions (Ifcher and Zarghamee, 2011; Jamison et al. 2012; Harrison et al. 2018). The reason why lottery choices are used for analysis is that when it comes to lotteries, there is a tendency to avoid the risks of losing. An experimental study by van de Ven and Zeelenberg (2010) finds that when subjects were given a lottery ticket and asked to trade them for reward, there was reluctance in doing so. The reason why regret aversion prevailed was that participants tried to avoid the chances of losing the lottery even if the likelihood of holding the winning ticket was roughly the same for all. By taking part in real-time lotteries, this study eliminates the confounding possibility of hypothetical bias and measures the willingness to delay monetary gains during the emotional inducement procedure.

4.1 Behavioral Hypothesis

As previously mentioned, the literature on present bias finds that positive mood inducement is expected to improve cognitive flexibility, and thus reduce present bias with regard to monetary consumption. The behavioral hypothesis formed for this study is presented in the following:

H_o: *The lottery choice is the same across all cohorts, after controlling for financial literacy, and demographic information.*

H_a: *The lottery choice is different for the treatment groups compared to the control group, after accounting for financial literacy, and demographic information.*

The following section will provide summary statistics on demographic variables, financial literacy, and happiness in addition to analysis of lottery choice given the cohort. In order to account for independence across all three cohorts, a chi-squared analysis is conducted.

5 Results

In order to check whether or not difference on long-term happiness is significant across cohorts given the demographic, long term happiness is measured through the PANAS questionnaire. Ordinary Least Square (OLS) method is used to estimate the mean differences across cohorts. The following table (mention number, i.e., Table 1) displays the results of mean responses given the demographic variable on each assigned cohort:

Table 1: Demographic Controls on Happiness Level: Mean Response by Cohort

Demographic Controls	Control	Negative Treatment	Positive Treatment	Total
Race (White=0)	-0.140	0.0458	-0.102	-0.0167
	(0.0965)	(0.129)	(0.201)	(0.0719)
Gender(1=Female)	-0.0469	0.0505	-0.0365	0.0235
	(0.215)	(0.225)	(0.282)	(0.133)
Family Income Level	-0.0442	0.216*	0.206	0.136**
	(0.115)	(0.107)	(0.124)	(0.0579)
Religiousness	0.575***	0.402	-0.341	0.201
	(0.191)	(0.243)	(0.258)	(0.130)
Money Spent	0.0382	-0.0515	-0.193	-0.0584
	(0.0842)	(0.103)	(0.119)	(0.0534)
Money in Savings	0.109	-0.144	-0.326	-0.0658
	(0.214)	(0.234)	(0.272)	(0.131)
Constant	0.466	0.0391	1.155**	0.379*
	(0.373)	(0.336)	(0.497)	(0.223)
Observations	24	24	21	69
R-squared	0.388	0.245	0.302	0.107

Standard errors are parenthesized.
*** p<0.01, ** p<0.05, * p<0.1

Mean responses for the demographic variables race and gender are approximately the same across all cohorts. For the overall participant pool, the only significant predictor of long-term happiness happens to be the family income level at 0.05 level (t=2.35, p-value=0.02), and for the control group, religiousness appears as a significant predictor of long-term happiness. In addition to demographic controls, Levene's test is conducted to determine whether or not the variation in the responses regarding long-term happiness is significant, statistics of which are provided in the following Table 2:

Table 2: Testing for Homogeneity in long-term happiness across cohort:

Group	Mean	Standard Deviation	Frequency
Control	0.625	0.495	24
Negative Treatment	0.375	0.487	24
Positive Treatment	0.524	0.512	21
Total	0.507	0.504	69

$W0 = 0.61153087$ df(2, 66)   Pr > F = 0.5455648
$W50 = 0.29938785$ df(2, 66)   Pr > F = 0.74227318
$W10 = 0.61153087$ df(2, 66)   Pr > F = 0.5455648

Given the proportions above, we can confirm that the variance in long-term happiness isn't statistically significant across the cohort. Although testing the significance of long-term happiness on lottery choice is useful to determine whether or not emotional bias would curtail the accuracy of our results, it is also essential to assess whether or not there exist significant differences in demographic controls across the cohort. In order to control for this, a multivariate analysis of means test is used to determine whether if responses to demographic controls are on average equal across all groups. The following table 3 enlists all the computed summary statistics of the factorial multivariate analysis (MANOVA):

Table 3: Testing for equal proportions in demographic information across groups

Statistic		F (df1,	df2) =	F	Prob>F	
Wilks' lambda	0.749	14.000	120.000	1.340	0.196	e
Pillai's trace	0.265	14.000	122.000	1.330	0.201	a
Lawley-Hotelling trace	0.319	14.000	118.000	1.340	0.193	a
Roy's largest root	0.249	7.000	61.000	2.170	0.051	u

e = exact, a = approximate, u = upper bound on F

The first statistic, Wilk's Lambda, measures the proportion of variance in demographic responses across all the groups. However, this is used if the variables are continuous and thus not need to be considered for testing significance since none of the demographic questions have continuous answers in the survey. The same holds true Hotelling trace and Roy's root. The Pillai's trace, however, measures the proportion of responses for categorical variables, which is appropriate for this analysis. The results computed for Pillai's trace show that the differences in the proportion of the demographic r between control and treatment groups are small. The test statistic corresponding to Pillai's trace is not statistically significant, confirming that test and control groups are comparable.

In order to justify whether or not lottery choice is associated with exposure to mood-inducement, a chi-squared test of independence is carried out, the results of which are displayed in the following table 4:

Table 4: The Distribution of Lottery Choice across groups

Group	Lottery Choice:		
	$50	$100	Total:
Control	7	14	21
	16.28	60.87	31.82
Treatment-Negative	24	0	24
	55.81	0.00	36.36
Treatment-Positive	12	9	21
	27.91	39.13	31.82
Total	43	23	66[2]
	100	100	100

Pearson chi2(2) = 22.7945   *p-value* = 0.000

The results above highlight the lottery chose by each group. Compared to the other two groups, the control group has chosen the $100 lottery, which is announced at the end of the semester. This is congruent with the theory that associates positive effect and delaying consumption since the control group, on average, happens to have reported the highest level of current and long-term happiness compared to the other two. The second group that opted for the $100 lottery was the positive treatment group, which goes in parallel as well since the positive treatment group reported higher happiness levels than the treatment negative. As to the negative treatment group, no participant has chosen to enroll in $100 lottery, and happiness reported on average was the lowest. Overall, the analysis shows that the distribution of lottery choice across cohorts is significantly different.

The following tables 5, 6, and 7 reports the logistic regression on lottery choice and treatment effect, accounting for all the demographic information and financial literacy. The response variable, lottery choice, is formulated as one if the participant chooses the $100 dollar lottery and 0 if the participant opts for the $50 dollar lottery. Coefficients on the log(odds) are replaced with odds ratios for each assigned group and demographic controls for interpretability. In the context of this study, each odds ratio is computed as the ratio of the probability of choosing the $100 dollar lottery to the probability of choosing the $50 dollar lottery given the independent variable.

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[2] The reason why the total mounts to 66 and not 69 is because participants were given the option to choose neither of the lotteries, and three of them did.

Table 5: Analysis of Lottery Choice for Negative Treatment Group

Y= Lottery choice	Odds	Standard Error	z-value	p-value	[Confidence	Interval]
Group: Negative Treatment	1.000	.	.	.	.	.
Race (White:0)	1.903	0.920	1.33	0.184	0.737	4.911
Gender (Female:1)	1.331	1.013	0.38	0.708	0.299	5.920
Family Income	0.811	0.294	-0.58	0.563	0.399	1.649
Religiousness	0.524	0.387	-0.87	0.382	0.123	2.232
Money spent	1.478	0.486	1.19	0.235	0.776	2.815
Amount in Savings Account	4.856	4.151	1.85	0.064	0.909	25.937
Constant	0.249	0.364	-0.95	0.341	0.014	4.363

Level of significance: 0.05

Table 6: Analysis of Lottery Choice for the Control Group

Y=Lottery choice	Odds	Standard Error	z -value	p-value	[Confidence	Interval]
Group: Control						
	8.5916	5.6316	3.28	0.001	2.37	31.046
Race (White=0)	1.48	0.545	1.09	0.278	0.726	3.051
Gender (Female=0)	0.218	0.551	-0.28	0.779	0.225	2.459
Family Income	-0.004	0.296	-0.10	0.918	0.531	1.766
Religiousness	3.990	0.674	-0.02	0.983	-0.257	3.768
Money Spent	0.449	0.396	1.16	0.244	0.557	1.455
Amount in Savings	0.996	2.525	1.79	0.073	1.313	3.305
Constant	-5.731	0.0645	-2.30	0.021	-10.791	-0.672

Level of significance: 0.05

Table 7: Analysis of Lottery Choice for the Positive Treatment Group

Y= Lottery choice	Odds	Standard Error	z-value	p-value	[Confidence	Interval]
Group=Positive Treatment	1.99768	1.201	1.15	0.250	0.6146	6.492
Race (White=0)	0.4335	0.433	0.96	0.335	0.728	2.540
Gender	0.825	0.484	-0.33	0.743	0.261	2.607
Family Income	1.20	0.296	0.75	0.450	0.743	1.950
Religiousness	0.570	0.349	-0.92	0.359	0.171	1.895
Money Spent	0.223	0.246	0.91	0.365	-0.259	0.705
Amount in Savings Account	1.327	0.641	2.07	0.039	0.070	2.583
Constant	-2.066	1.022	-2.02	0.043	-4.070	-0.063

Level of significance: 0.05

On Table 6, the lottery choice given that the participant is assigned to the control group shows that the odds of choosing the $100 lottery increases by a factor of 8.6 after accounting for demographic controls and this is a significant at the 0.05 level given the Wald's test ($z = 3.28$, p-value= 0.001). Other demographic controls, with the exception of race, do not appear as significant predictors lottery choice. The positive treatment group variable in Table 7, on the other hand, does not appear to be a significant predictor of lottery choice after accounting for democratic controls ($z= 1.15$, $p = 0.250$), and all the demographic controls are not statistically significant. The same also holds true for the results provided by the negative treatment group, as seen in Table 5. However, for the logistic model, the dummy variable assigned for participants in the negative treatment group could not be used and thus omitted. The reason why is that all the participants assigned to the negative treatment group chose the $50 dollar lottery. Due to this limitation, the assigned odds of the dummy variable for the treatment effect is computed as 1, meaning the estimated probability of choosing the $100 dollar lottery given that the participant is assigned to the negative treatment group is 0. This goes in accordance with the nature of the relationship between mood and delaying consumption.

6   Limitations

Even though our results were in parallel with the literature on savings, one major limitation regarding their accuracy is low statistical power: the sample size collected from the survey results were no more than seventy-six, and some of the respondents failed to fully complete the survey and thus had to be eliminated. Limitations regarding the sample size can pose challenges to the magnitude of the treatment effect (since there was no respondent in the negative treatment group who selected the $100 dollar lottery). Ifcher and Zarghamee's study (2011) include a sample size of sixty-nine students (although time preference questions were asked repeatedly). Other experimental studies on emotional judgment and consumption include a sample size of ninety participants (Jamison et al. 2012; Karle et al. 2015; Tasneem, 2018). The other confounder that is tied to sample size is the issue of external validity. Overall, the sample size of our study consisted of undergraduates in a small liberal arts college, which bears a limited number of undergraduate students from similar backgrounds (undergraduate enrollments as of 2019

totals 2612 students[3]). Thus, the provided statistics may not parameterize the spending habits of an entire population of young adults. This limitation can be overcome by replicating the study design with a larger sample size and in a more diverse setting.

Another limitation regarding the statistics unexpectedly appears in the reported PANAS responses for each group. In essence, the survey data highlights the control group as the one to report the highest happiness level. The intended goal of the mood inducement procedure was to have the positive-treatment group be the one to report the highest degree of happiness. However, the group came in second after the control group, as shown in the following table:

Table 8: Descriptive Statistics on Reported Happiness across cohorts

Group:	Control	Negative Treatment	Positive Treatment
Not Happy (happiness<=5)	26.5%	44.1%	29.4%
Happy (happiness>5)	42.9%	25.7%	31.4%

The dummy variable happy is defined as one if participants report happiness levels above 5 (on a scale of 1-10) and 0 if they report happiness levels less than or equal to 5. Overall, participants in the control group report the happiness levels of approximately 43%, outnumbering the other two. Moreover, the participants in the control group also report the least number of reported un-happiness with a proportion of 26.5% compared to the two treatment groups. This contradicts with the behavioral hypothesis of this study, which anticipates the positive treatment group to report the highest level of happiness following the emotional inducement procedure. As displayed on table 4, lottery choice of $100 was by proportion, the highest in the control group (14 out of 21 participants), and this aligns the existing theory regarding the effect of happiness on consumption: higher rate of happiness (short-term and long-term) appears to affect present bias given the lottery choice.

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[3] Figures were extracted from the college's admissions website and may not be up to date.

To understand why the mood inducement procedure failed to accomplish its intended goal for the positive treatment group, we looked at all the responses to the following question: "Please describe in 1-2 sentences, how did the video clip make you feel? Did it significantly change your current state of mood?" Almost half of the participants (11 out of 21) express no significant shifts mood shifts while only eight of the respondents expressed interest in willingness to save more to ensure financial stability, some of which were also included among the respondents who expressed no significant mood change. The reason why this might be the case is the content that video clip has presented with regards to the factors underlining a healthy savings account. The video breaks down a lack of savings for three different reasons. For timing purposes, which are the psychology and economics behind savings. The psychology part of the video elucidates that we, as humans, are not able to systematically plan our long-term budget due to our short-term temptations. Examples include, but not limited to, shopping for items not necessarily for ergonomics and necessity but for reasons such as aesthetics and fashionableness. The other reason that the video highlights is the ability has an income to save. The bottom 40% of Americans save little or none of their income, whereas the top Americans save about half of their incomes, implying that ability to save is a large driver of maintaining the healthy savings account. This information might have been a confounder in the participant's decision on the lottery: since our sample size consisted of undergraduate students, most of which coming from affluent families: around 40% of the participants reported a family income level of $175,000 or higher. Research on credit card usage among college students has found that student with affluent families tend to worry less about their spending habits (Hayhoe et al. 2000), which may be the case in the context of this study, meaning that lottery amounts weren't big enough to address participants' consumption patterns. The amounts of $50 and $100 dollars were determined based on the time preference questions devised by Ifcher and Zarghamee (2011). In the paper, the highest hypothetically proposed amount was $51.71, which served as a template to offer a $50 lottery in the survey. In addition, the authors also find that for participants in the positive treatment group, each additional increase in days waits for result in a consumption delay of about $2.20. This inspired us to offer the $100 lottery since the time gap between $50 lottery and the $100 lottery was about 45 days. However, this study does not account for

replicability since the time gap proposed does not stretch beyond 45 days. A replication analysis can be conducted to re-examine whether or not introducing different video clips and offering substantially different lotteries in larger time gaps impact economic behavior.

7 Concluding Remarks

The goal of this experiment is to reassess whether or not mood inducement procedures impact economic behavior by offering two different lotteries that are announced in different time periods. Participants enrolled in this study were randomly assigned to three different groups, one control and two treatment for the mood inducement procedure. All participants were assigned the same demographic and financial knowledge questionnaires for the first two parts of the survey and the lottery choices at the end. One lottery offered $50 within a week upon the completion of the survey, whereas the other offered $100 at the end of the semester, creating a 45-day time gap in between the announcements. While all participants were given the same lottery options, each treatment groups are assigned to different video clips whose content and the tone was distinctly different. One treatment group was asked to watch a video clip on negative externalities of consumption, meaning the environmental and social consequences of spending excessive amounts to fashion items, recounted with a pessimistic dark tone. The other treatment group, on the other hand, was asked to watch a video clip on why Americans overall incapable of are maintaining healthy savings over the years. The mood inducement procedure was assessed by allowing participants to rate their emotional presence before and after they have watched content. The results found were that the respondents who report a higher level of happiness in the survey are, on average, less willing to exhibit present bias and opt for the $100 lottery. In contrast, others who report a comparatively lower level of happiness opt for the $50 lottery.

One major implication of this study is to determine what kind of priming invokes consumption delays among college students and enable them to plan their budgeting consistently. Over the past few years, financial literacy training and budgeting workshops have become increasingly reliable sources for long-term financial behavior. A study by Lewis Mandell and Linda Schmid Klein (2009) find that high school students who had undergone financial literacy workshops have become significantly more savings-oriented than those who had not. The same research also underscores the importance of high schools

is incorporating financial literacy to their curricula, given the rise of the student loan market. However, it is equally essential to find the right narrative and tone to make financial literacy engaging and thought-provoking for young adults. Leveraging instructional and entertaining video clips as vehicles for learning can be one example of priming young students to care more about their financials, which is also backed by research on instructional training (Herron et al. 2006). Other popular trends, such as deploying interactive slides or videos or humorous visuals and social media content, can also be taken into account for replication and other experimental purposes, if not designing financial literacy and money management courses catered towards young adults.

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