

Photocopy and Use Authorization

In presenting this thesis in partial fulfillment of the requirements for an advanced degree at Idaho State University, I agree that the Library shall make it freely available for inspection. I further state that permission for extensive copying of my thesis for scholarly purposes may be granted by the Dean of the Graduate School, Dean of my academic division, or by the University Librarian. It is understood that any copying or publication of this thesis for financial gain shall not be allowed without my written permission.

Signature _____

Date _____

Does Perceived Financial Insecurity Affect Delay Discounting and Probability Discounting?

by

Lillith Camp

A thesis

Submitted in partial fulfillment

of the requirements for the degree of

Master of Science in the Department of Psychology

Idaho State University

August 2022

To the Graduate Faculty:

The members of the committee appointed to examine the thesis of LILLITH CAMP
find it satisfactory and recommend that it be accepted.

Steven Lawyer Ph.D.
Major Advisor, Committee Chair

Erin Rasmussen Ph.D.
Committee Member

Darci Graves Ph.D.
Graduate Faculty Representative

Human Subjects Committee Approval

December 10, 2021

Lillith Camp
Psychology
MS 8112

RE: Study Number IRB-FY2022-30: Does Perceived Financial Insecurity Influence Delay and Probability Discounting?

Dear Ms. Camp:

Your request for approval of the new protocol listed above was reviewed at the Dec 10, 2021 8:30:00 AM MST meeting of the Idaho State University Human Subjects Committee. This is to confirm that your protocol was approved. Please note that Dr. Lawyer will need to complete his CITI refresher training.

You are free to proceed with your study as described in your protocol effective immediately. The study is subject to renewal on or before December 10, 2022, unless closed before that date.

Please note that any changes to the protocol as approved must be immediately reported and approved. Contact Tom Bailey(208-282-2179; email humsubj@isu.edu) if you have any questions or require further information.

Sincerely,

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

March 9, 2022

Lillith Camp
Psychology

RE: Study Number IRB-FY2022-30: Does Perceived Financial Insecurity Influence Delay and Probability Discounting?

Dear Ms. Camp:

I have reviewed your application for revision of the study listed above. The requested revision involves: Remove the master's qualification as a requirement for participation in the study. I am making this proposal as I was recently introduced to an article, Rouse (2019), in which they found no evidence of higher quality data for MTurk Masters relative to data sets that did not require Master status. In one of their two studies, they actually found reliability of data provided by Master Workers to be substantially lower than data provided by the general MTurk. The proposed changes would allow any worker on MTURK to participate in the study.

Add a validity check to each of the discounting measures that are in the project. These would look as follow:

MCQ- Which would you prefer?: \$1 now or \$100 now

PD MCQ- Which would you prefer?: \$40 for sure or a 10-in-10 chance (100%) of winning \$80

FCQ- Which would you prefer?: 2 bites now or 25 bites now

I am making this proposal after reading Craft and colleagues (2022) in which they used a similar question as post-hoc data exclusion criteria to check the validity of responses within a discounting measure. In these cases, we expect the respondent to choose the larger amount as there is no delay/probability in its delivery. If a participant chooses the smaller option, their data will not be used in the study. These questions would not be included in the calculation of discounting rates, they would strictly be used for validation.

Add a question asking participants to self-describe their socio-economic status. Due to the design of the manipulation of feelings of financial security, true economic status is not measured. In order to be able to compare across the two groups, this additional question must be included. The question would look as follows:

Which best describes your socioeconomic status?

- Upper class
- Upper-middle class
- Middle class
- Lower/working class
- Prefer not to disclose

There will be no changes to the consent document.

You are granted permission to conduct your study as revised effective immediately. The date for renewal remains unchanged at 12/10/22, unless closed before that date.

Please note that any further changes to the study must be promptly reported and approved. Contact Tom Bailey (208-828-2179; email humsbj@isu.edu) if you have any questions or require further information.

Sincerely,

Ralph Baergen, PhD, MPH, CIP
Human Subjects Chair

Table of Contents

List of Figures	vii
List of Tables	viii
Abstract	ix
Chapter 1: Manuscript Version of Thesis.....	1
Introduction	1
Methods	10
Results	18
Discussion	24
References.....	30
Chapter 2: Full Literature Review	62
Poverty.....	62
Behavioral Economics.....	71
Literature on Poverty and Behavioral Economics.....	84
Purpose of Present Study	90
Hypotheses	91
Appendix A: Demographics Questionnaire	92
Appendix B: Short Michigan Alcohol Screening Test	93
Appendix C: Drug Abuse Screening Test–10	95
Appendix D: Fagerström Test for Cigarette Dependence	96
Appendix E: Feelings of Financial Security Manipulation	97
Appendix F: Delay Discounting Monetary Choice Questionnaire	98
Appendix G: Probability Discounting Questionnaire	101

List of Figures

Figure 1. Mean financial satisfaction score group comparisons.....	57
Figure 2. Magnitude Effects by Group Assignment of Delay Discounting Log k values.....	58
Figure 3. Magnitude Effects by Group Assignment of Probability Discounting h values.....	59
Figure 4. Estimated Marginal Mean comparisons of LogK Values for the Financially Insecure and Financially Secure groups.....	60
Figure 5. Estimated Marginal Mean comparisons of h Values for the Financially Insecure and Financially Secure groups.....	61

List of Tables

Table 1: Descriptive data for demographic variables of excluded and included participants.....	46
Table 2: Descriptive data for demographic variables	48
Table 3: Descriptive Data for Substance Use Measures.....	51
Table 4: Spearman's rho correlations among all measures.....	52
Table 5: ANCOVA Results and Descriptive Statistics for Group Assignment by SMAST Scores and Delay Discounting Logk Values.....	53
Table 6: Omnibus test of model coefficients based on a logistic regression analyzing the relationship between group assignment and h scores.....	54
Table 7: Binary Logistic Regression Analysis between Group Assignment and <i>h</i> scores, and the FTCD (Covariate).....	55
Table 8: ANCOVA Results and Descriptive Statistics for Group Assignment by SMAST Scores and Probability Discounting h Values.....	56

Abstract

Past studies have pointed toward delay discounting as being a critical psychological factor that contributes to poverty, but most of those studies are correlational, preventing statements about causal relationships. Relatedly, recent research suggests that experimental manipulations that diminish the perception of financial well-being affects delay discounting, but less is known about whether this effect would generalize to probability discounting, which is also relevant to our understanding of poverty. In this study, we experimentally examined how a manipulation of perceived financial insecurity affects sensitivity to delayed and probabilistic monetary outcomes. Adults (N= 116) were recruited through Amazon's Mechanical Turk and assigned randomly to either a financially secure or financially insecure group in which their subjective sense of financial security was experimentally manipulated using feedback and a writing task consistent with group assignment. Participants then completed delay discounting and probability discounting tasks for hypothetical monetary outcomes. Results indicated no significant difference between the financially secure and insecure groups on the delay discounting task while controlling for alcohol use. A logistic regression analyzing the relationship between group assignment and probability discounting scores, while controlling for cigarette dependence, produced a nonsignificant overall model. These results fail to replicate previous research on perceived financial insecurity and delay discounting.

Keywords: decision making, delay discounting, probability discounting, financial security

Chapter 1: Manuscript Version of Thesis

Introduction

Poverty can be defined as receiving or earning insufficient income to pay for daily living necessities such as food, water, shelter, and clothing (Glasmeier, 2014). Individuals living in poverty do not have the financial means/resources to meet their fundamental human needs. Global poverty has been defined as one of the worst problems that the world faces in that the poorest individuals in the world are regularly hungry, have less access to a formal education, often have no light at night, and suffer from much poorer health (Jamaluddin & Hanafia, 2020). As a result of very limited (or even no access at all) access to basic living necessities, those living in poverty suffer not only consequences to their physical well-being, but also to mental health (Anakwenze & Zuberi, 2013; Lacey et al., 2020). Poverty is often characterized as cyclical, in that one born into poverty faces a more difficult time escaping poverty later in life.

One potential mechanism theorized to contribute to poverty is that being in poverty influences individual economic decision making in a way that increases the likelihood of continued future poverty. Farah et al. (2017) described this continuation in poverty due to poverty as the “poverty trap.” They listed present mindedness—the tendency to make decisions in light of shorter-term rather than longer-term outcomes—as having a reciprocal causal relationship with poverty. For example, if a person hasn’t had the money to eat, and they have the choice of receiving \$5 immediately or \$40 in a week, they may choose the immediate amount because waiting a week to receive the larger amount of money doesn’t solve the more immediate problem—hunger—now. In other words, poverty may increase the necessity of being more present-minded, ultimately leaving one at a disadvantage as compared to someone else who is able to delay that immediate gratification in order to obtain a larger amount. Mullainathan and

Shafir (2013) propose that the circumstance created from being poor increases the likelihood of behaving in ways that increase an individual's chances of remaining in poverty. They note that the mindset molded through resources scarcity affects decision making, for example over-borrowing and insufficient saving.

Haushofer and Fehr (2014) propose that poverty results in psychological outcomes that lead to economic behaviors that in turn make it more difficult to escape poverty. They examined the relationships between poverty, psychological outcomes, and various measures of behavior/decision making through various peer reviewed studies. Such studies reveal that people living in poverty are more likely to discount delayed rewards (Lawrance, 1991; Yesuf et al., 2008; Pender, 1996) and are more likely to be risk adverse than wealthier individuals (Dohmen, 2011; Guiso & Paiella, 2008). These data contribute to the idea that poverty is related to both risk-taking and temporal discounting. Haushofer and Fehr conclude that poverty causes psychological consequences, such as stress and negative affect, which lends itself to being more sensitive to delayed rewards (favoring sooner rewards) and being more risk averse. Given this relationship between poverty and sensitivity to delayed rewards, experimental research that can better establish causal relationship among these variables would contribute significantly to our understanding of these phenomena.

Delay and Probability Discounting

Delay discounting (DD) and probability discounting (PD) are behavioral measures of choice behaviors, which that indicate an individual's sensitivity to delayed and probabilistic rewards. Discounting was first studied in non-human animal laboratories utilizing basic operant conditioning principles (Logan, 1965). DD procedures with human participants often use a titrating procedure in which individuals make a series of choices between a smaller reward

available immediately and a larger reward available after a delay (e.g., \$3.50 now or \$10 in one week, with \$10 representing the highest possible reward). The size of the smaller reward is adjusted (e.g., \$20, \$30) to obtain an individual's subjective value of the reward at that delay. Participants typically select the larger-later reward when the immediate reward is very small, but as the immediate reward increases in value across the series of choices, participants will eventually switch and begin choosing the smaller-sooner reward. This point when individuals switch their choice from the larger-later reward to the smaller-sooner reward is called the indifference point, which establishes the subjective value of the larger-later reward at that delay. The preference for the smaller-sooner rewards is consistent with being more sensitive to delayed outcomes (Rachlin et al., 1991). Discounting procedures typically use hypothetical, rather than real, rewards or outcomes. One reason for this is that some outcomes may be infeasible or unethical to deliver (e.g., \$10,000) but another reason is that discounting procedures implementing hypothetical rewards produce data that is consistent with those using potentially real (Johnson & Bickel, 2002; Lawyer et al., 2011; Hinvest and Anderson, 2010) and real (Lagorio & Madden, 2005) rewards.

Probability Discounting (PD) is similar to DD except that it refers to the extent to which individuals discount the value of probabilistic outcomes. In a standard PD titration task, individuals make a series of choices between a smaller reward available for-sure (e.g., \$40 for sure) and a probabilistic larger reward (e.g., a 33% of winning \$100). Determining the subjective value of the larger outcome is done similar to DD, except that the subjective value of the large outcome is established across several probabilities (e.g., 10%, 20%). A tendency to choose the probabilistic reward indicates a pattern of risk-taking, while a tendency to choose the for-sure reward indicates risk-aversion (Green & Myerson, 2004).

DD is a critical behavioral process that underlies a range of human health outcomes, including drug dependency (Coffey et al., 2003), obesity (Rasmussen et al., 2010), alcohol use (Mackillop et al., 2011), cigarette smoking (Bickel et al., 1999), and sexual risk-taking (Johnson & Bruner, 2012; Lawyer & Schoepflin, 2013; Lawyer & Mahoney, 2017). In fact, the consistent relationship between DD and health problems has led to DD being described as a transdisease process, in that discounting may be fundamental behavioral mechanism the underlies a range of human health behaviors (Bickel & Mueller, 2009). The research literature on PD and human health problem behaviors is significantly smaller and more tentative than that on DD, but patterns of PD are associated with “risky” behaviors including gambling (Holt et al., 2003; Kyonka & Schutte, 2018), sexual risk-taking (Mahoney & Lawyer, 2018), cigarette use (Reynolds et al., 2004), and texting while driving (Hayashi et al., 2018) however this research remains sparse. Overall, preference for a smaller immediate reward (DD) or a larger more probabilistic reward (PD) represents important patterns of decision making that underlie a wide range of human health behaviors.

Within the behavioral economics literature, terms such as *impulsive* and *impulsivity* are often used to describe a broad range of behaviors, including delay and probability discounting. However, a review by Strickland and Johnson (2020) make it clear that the impulsivity construct lacks the basic empirical requirements of a useful psychological construct. In addition, the term ‘impulsivity’ has preexisting cultural meanings that unnecessarily stigmatizes otherwise adaptive behaviors. Similarly, “risky” is another term that should be used with caution. For this reason, quotes will remain around the word “risky” to acknowledge the subjective nature of risk taking and to avoid stigmatization of such activities commonly labeled as “risky”.

Research Examining the Relationship Between Poverty and Discounting

The small extant literature on risk aversion and poverty suggests that living in poverty is associated with risk aversion. In a study conducted by Dohmen et al. (2011), wealthier households in a large sample of Germans displayed lower levels of risk aversion than less wealthy individuals using both self-report and behavioral methods. Previous research has shown negative correlations between income and delay discounting (Lawrance, 1991; Haushofer and Fehr, 2014), in that those with lower incomes discounted delayed outcomes at higher rates; meaning they tended to choose smaller sooner over larger later reinforcers. This pattern of selecting a smaller-immediate over a larger-later reward can be thought of as individuals making choices that are more influenced by short-term outcomes than long-term outcomes.

Understanding the relationship between low-income and economic decision making is very important as economic decision-making can have effects on one's continuation in poverty.

In an effort to understand temporal factors that influence financial decisions, Carvalho et al. (2016) surveyed two groups of low-income participants, one of which was before payday and the other after payday. Each group completed a variant of Andreoni and Sprenger (2012)'s Convex Time Budget, in which participants make a series of questions allocating a hypothetical \$500 budget in which the interest rate varied (0%, 0.5%, 1%, 3%) as did the mailing date of the payment (today or four weeks from now). They found that before payday group made more present-biased decisions about monetary reinforcers than the after-payday group.

Adamkovič (2019) examined the relationship between poverty and sensitivity to delay. They measure sensitivity to delay using a corresponding subscale from the Poor Behavioural Regulation Scale (Wills et al., 2013) and found small but significant effects of poverty on the delay of gratification but their measure of sensitivity to delay. Finally, in a study directly related

to poverty, Rodriguez and colleagues (2021) examined the relationships between food insecurity, DD for food and money, and PD between food and money in women. They observed higher rates of obesity and higher rates of DD for food in women experiencing food insecurity. However, they found no significant differences between women experiencing food security and women experiencing food insecurity in DD for money and in PD for both food and money. This suggests that food insecurity is associated with sensitivity towards delayed food, but not towards money.

In a study conducted by Ostaszewski et al. (2007), they showed a negative correlation between income and PD, in that those with lower incomes typically discount probabilistic rewards at higher rates than individuals with higher incomes. In this study, individuals with lower incomes chose the smaller for-sure amount, possibly due to the uncertainty of receiving the larger amount. Not knowing whether you will be able to obtain something later on, even if a larger amount, explains why one would settle for a smaller amount more probable.

The potentially inescapable cycle of poverty solidifies the importance of research looking at the link between poverty and economic decision making. However, research in this field can be difficult as low-income individuals are considered ‘hard-to-reach.’ Hard-to-reach groups are defined as groups of people who have historically been difficult to find or contact for research (Hinojosa et al., 2014). Due to this dilemma of obtaining low-income participants researchers have had to find solutions around this, including manipulating perceptions of the adequacy or security of participant finances as an analogue to the experience of poverty.

Laboratory Study of Discounting and Poverty

The studies cited above examined the relationships between discounting and poverty, but several studies have used manipulations of perceived financial security to establish a clearer causal relationship between the perception of financial insecurity and discounting. It is worth

noting that such manipulations do not mirror the broad and chronic conditions that contribute to the complex experience of poverty, but represent an analog to one experience of poverty—the perception of financial insecurity—that allow for causal statements regarding an individual’s perceived financial well-being and decision-making processes like discounting.

A procedure commonly used to manipulate individual perception of financial security involves asking participants to indicate their relative financial well-being on different scales (i.e., one scale has a much wider range [e.g., \$0-\$50,000] and one has a much smaller range [e.g., \$0-\$2,000]) creating the perception that their financial well-being is relatively strong (their income is near the top of the scale) or weak (their income is near the bottom of the scale) relative to others. Research indicates that those whose income is near the top of a scale tend to be more satisfied than those whose income is closer to the bottom, even if the absolute amount of income is the same (Schwarz, 1999). This manipulation technique has been replicated several times (Nelson et al., 2005; Briers et al., 2013; Callan et al., 2011).

Nelson and colleagues (2005) used a financial perception manipulation in which subjects indicated the combined amount of money in their checking and savings accounts on one of two scales. On the ‘financially secure’ scale, income was indicated on an 11-point scale that ranged from \$0-\$50 to \$500+ with \$50 increments. On the ‘financially insecure’ scale, income was indicated on an 11-point scale that ranged from \$0-\$500 to \$400,000+. This means that most participants responding on the financially secure scale would respond on the higher end while most responding on the financially insecure scale would fall on the bottom of the scale.

They found that those who reported their finances on the \$500 scale were more financially satisfied than those who reported their savings on the \$400,000 scale, even though actual financial resources did not differ between the two groups. The findings that the

manipulation of perceived financial security was effective leads to the question of whether this financial manipulation would also affect DD in individuals, knowing that lower income individuals typically discount delayed rewards at higher rates.

Several researchers have used variations on this experimental manipulation to study how perceived financial insecurity affects DD. Callan et al. (2011) found that participants who were made to perceive their financial situation as less secure had an increased preference for smaller-sooner financial rewards. Their manipulation involved participants being randomly assigned into either a less or more discretionary income group. Participants reported both their average monthly income and their average monthly nondiscretionary spending. They were then told that they would receive feedback about their discretionary income that was determined by “statistical procedures,” though no such procedures took place. Then participants were told their calculated discretionary income (CDI) index score was either -\$523 (indicating less discretionary income) or +\$87(indicating more discretionary income). They then completed a computerized delay-discounting task in which participants made six choices between a relatively small monetary outcome (that started at \$500 and was adjusted depending on the previous decision made in order to find an indifference point at \$500 and was adjusted) and a larger outcome (\$1,000) at each of seven different delays (1, 7, 30, 90, 180, 365, and 730 days). They found that those in the financially less secure group indicated preference for the smaller sooner outcomes. This study showed that manipulating perceptions of personal finances had an impact on economic decision making using a standard titration-based delay-discounting task.

Using a similar method, Moeini-Jazani et al. (2019) directly manipulated feelings of financial deprivation (they were interested in how self-affirmation may offset this effect) by using the previously mentioned scale strategy. Participants were assigned randomly to one of two

groups—a financially deprived group or a financially non-deprived group. Similar to Nelson and colleagues (2005), the financially deprived group indicated their monthly income on a scale that ranged from \$0 to \$50,000 (and above) with \$5,000 increments while the financially non-deprived group indicated their monthly income on a scale that ranged from \$0 to \$2,000 (and above) with \$200 increments. Participants then received a bogus message (unrelated to their actual income) indicating either that they lacked financial resources (financially deprived group) or that they had an adequate amount of financial resources (financially non-deprived group). All participants then wrote about how it feels to live a financially constrained life. Participants in both conditions then completed a relatively unique DD task in which they indicated what amount of money they would require at 3, 9, and 18 months in the future to make them indifferent to receiving \$65 now. They reported that participants in the financially deprived group discounted delayed outcomes steeper than participants in the financially non-deprived group. In other words, participants that were in the financially deprived group preferred smaller sooner rewards to larger later rewards.

These findings suggest that in-the-moment perception of financial insecurity may affect the tendency to prefer small-sooner monetary outcomes over larger-delayed monetary outcomes. Such findings may contribute to a broader understanding of the factors that influence personal financial decisions and may contribute to challenges escaping poverty. However, the research on this topic to date is limited to only a few studies and only in the context of delay discounting and no research to date using perceptions of financial security on PD.

Purpose of Study

The proposed study aims to clarify if those who perceive their finances as less secure are more sensitive to delay when making monetary decisions than their counterparts who perceive

their finances as more secure. Another purpose of the proposed study is to fill the gap in the literature regarding how perceptions of financial security may affect an individual's risky decision making, specifically probability discounting, as these effects have not yet been measured.

Hypotheses

Hypothesis 1: Individuals who are randomly assigned to the Financially Insecure group will discount delayed monetary rewards at higher rates than those in the Financially Secure Group. In more simple terms, they will be more sensitive to the delayed outcomes than their financially secure counterparts.

Hypothesis 2: Individuals who are randomly assigned to the Financially Insecure group will discount probabilistic monetary rewards at higher rates than in the Financially Secure Group. In more simple terms, they will behave more risk averse than their financially secure counterparts.

Method

Participants

Power Analysis

An *a priori* power analysis for a t-test ($\alpha = 0.05$, power = 0.80) using the G*Power statistical software (Faul et al., 2007) indicated that approximately 74 (37 in each group) participants would be needed to have the power to test our hypotheses based on an effect size of 0.59. This effect size was documented in Moeini-Jazani et al.'s 2019 paper in which they observed group differences in DD scores between those who were led to perceive their finances as secure versus those who perceived their finances as insecure.

Recruitment and Demographics

Participants were recruited through Amazon's Mechanical Turk (MTurk). MTurk is an online crowdsourcing service in which researchers (i.e., requesters) are able to pay participants (i.e., workers) to complete tasks, otherwise known as Human Intelligence Tasks (HITS). MTurk not only has a large participant pool, decreasing the amount of time spent on data collection, but it is also more diverse than the more common method of using a sample of undergraduate college students (Buhrmester et al., 2011). Studies conducted through MTurk have replicated previous findings within delay and probability discounting literature indicating that MTurk is a viable service to collect discounting data (Jarmolowicz et al., 2012). Inclusion criteria required that interested individuals were at least 18-years-of-age, currently residing in the United States, and had not previously completed the study.

Self-Report Measures

Demographics

Demographic information gathered in this study included participant's monthly income, age, gender, race, level of education, relationship status, employment status, and household size. Monthly income was measured using two scales similar to those in Moeini-Jazani et al. (2019; Appendix A).

Short Michigan Alcohol Screening Test (SMAST; Selzer et al., 1975)

The SMAST (Appendix B) is a 13-item self-report inventory used to screen for alcohol abuse and dependence during the previous 12 months. It includes questions about individual's perceptions of their drinking, other's perceptions of their drinking, and consequences associated with drinking. The SMAST has been found to be reliable and valid for research (Shields, 2003). Given the connection between DD and alcohol dependence (MacKillop, et al., 2011), the

SMAST was administered to control for the potential confound of alcohol use on discounting outcomes.

Drug Abuse Screening Test (DAST-10; Skinner, 1982)

The DAST-10 (Appendix C) is a shortened version of the DAST (DAST-28; Skinner, 1982) that includes 10 self-reported items that assess an individual's degree of drug abuse related consequences during the previous 12 months. It includes questions about drug use and consequences associated with such use. The DAST-10 has proven to be both reliable and valid (Yudko et al., 2007). Similar to the SMAST, the DAST-10 was administered to ensure that any effect found on discounting seen is due to the manipulation and not due to drug use.

Fagerström Test for Cigarette Dependence (Fagerström, 2012)

The Fagerström Test for Cigarette Dependence (Appendix D) is a self-report instrument that assesses the intensity of one's physical dependence on cigarettes. The instrument includes six questions that indicate cigarette consumption, compulsion to use, and dependence. The FTCD was administered to ensure that any effect on discounting is due to the manipulation and not cigarette use (see MacKillop et al., 2011).

Financial Security Manipulations

The financial security manipulation used in this study was adapted from Moeini-Jazani et al.'s (2019) paper previously mentioned.

Financially Secure

Participants reported their average monthly income on the Financially Secure scale (Appendix E), meant to induce feelings of financial security. This scale ranged from "\$0" to "\$2,000 or more" with increments of \$200. Participants were then told that their information was being compared to others with similar demographics, considering their monthly income, age,

gender, ethnicity, level of education, employment status, and household size. A screen then appeared letting them know that, according to our calculations, they are financially secure. They were then asked to write about how it feels to live a life that is financially secure. This writing prompt was open ended with no requirements in terms of word count. This prompt included a time limit of 10 minutes and was presented as follows:

“Our online calculator compared your information and income with a large, representative database of individuals who have a similar profile as you do. Based on the information you provided, our calculator identified you as an individual who is financially adequate, relative to others; that is, someone who, relatively, has adequate and sufficient financial resources (i.e., money). We would like you to take a few minutes to reflect and write on how it feels to be in a relatively adequate financial position and to know that, on average, you have sufficient money to use at your will or when required in daily life, relative to those who are financially more constrained. Consider carefully and vividly how your life is with a relatively adequate amount of money and what the consequences of having sufficient money to live a stable life are.”

Financially Insecure

Those in the financially insecure group reported their average monthly income on the Financially Insecure scale (Appendix F), meant to induce feelings of financial insecurity. This scale ranged from “\$0” to “\$50,000 or more” with increments of \$5,000. Participants were then told that their information is being compared to others with similar demographics, considering the same demographic variables as previously mentioned. A screen then appeared letting them know that, according to our calculations, they are financially insecure. They were then asked to write about how it feels to live a life that is financially insecure. Similar to the Financially Secure

group, this writing prompt included a time limit of 10 minutes, had no word count requirements, and was presented as follows:

“Our online calculator compared your information and income with a large, representative database of individuals who have a similar profile as you do. Based on the information you provided, our calculator identified you as an individual who is financially constrained, relative to others; that is, someone who may experience financial difficulties and, relatively, lack adequate financial resources (i.e., money). We would like you to take a few minutes to reflect and write on how it feels to be in a relatively inadequate financial position and to know that, on average, you might not have sufficient money to use at your will or when required in daily life, relative to those who are financially less constrained. Consider carefully and vividly how your life is with a relatively inadequate amount of money and what the consequences of not having sufficient money to live a stable life are.”

Financial Insecurity Manipulation Check

To assess for the effectiveness of the manipulation in inducing feelings of financial insecurity/security, participants were asked to report their overall satisfaction with their own finances on a scale from 1-10. This manipulation check has been used with a similar manipulation previously (Briers & Laporte, 2013), and allowed researchers to demonstrate the effectiveness of the manipulation in inducing feelings of financial security or insecurity.

Attention Checks

To ensure that participants are being attentive to the task, three attention checks were implemented during the study. The first attention check was located within the demographics and read, “Please select yes for this item” and if the participant selected “no”, their data were

excluded from the study. Attention checks were also embedded within the discounting measures. Within the DD MCQ the attention check was as follows “Which would you prefer?: \$1 now or \$100 now”. Within the Probability Discounting Questionnaire, the attention check was “Which would you prefer?: \$40 for sure or a 10-in-10 chance (100%) of winning \$80”. These attention checks were included similar to Craft and colleagues (2022) in which researchers used a similar question as post-hoc data exclusion criteria to check the validity of responses within a discounting measure. In these cases, it was expected that the respondent would choose the larger amount as there is no delay/probability in its delivery. If a participant chooses the smaller option, their data was excluded from the study. These questions were not included in the calculation of discounting rates, they were strictly used for validation.

Behavioral Measures

Monetary Choice Questionnaire (MCQ)

The Monetary Choice Questionnaire (MCQ) task (Appendix F) is a brief questionnaire-based delay-discounting task that requires participants to make 27 choices between smaller sooner larger later hypothetical monetary reinforcers (Kirby et al., 1999; Kirby et al., 1996). The MCQ is divided into small (\$25-\$35), medium (\$50-\$60), and large (\$75-\$85) reward sizes (9 items each). The reward amounts vary between \$11-\$80 and delays varying from 7 to 186 days (one week to six months). This classification of reward sizes allowed the researchers to examine any magnitude effects on discounting rates. The 27 questions are arranged in a random order as they are not measuring indifference point like other delay-discounting tasks do.

The MCQ questions are designed to assess a wide range of k values (the rate of discounting) derived from the hyperbolic DD to characterize individual DD. Individuals with higher k discount at higher rates and would be considered to be more sensitive to delay. For this

study, estimates for k values were collected using the MCQ were determined using Kaplan et al.'s (2016) automated automatic scoring rubric for Microsoft Excel.

Individual discounting rates (k scores) are calculated as described in Kirby et al. (1999). Each of the 27 questions are ranked from 1-9 (within each of the three magnitudes) according to the severity of discounting if the smaller-sooner alternative is selected. Discounting rates are determined, according to the rank number, by figuring out the most plausible discounting rate given the pattern of responding. More specifically, each of the 27 questions has a k value assigned to it. For example, the k value assigned to item 27 is .25. If the individual selects the smaller-immediate reward, we can make inferences that their overall k score is equal to or larger than .25. Alternatively, if the larger later amount is selected, it can be inferred that the individual's k score is equal to or less than .25. This process is repeated for each question and a k value that is most representative of all their choices is determined. Often, the geometric mean (geomean) is used as to avoid underrepresenting the smaller of the two values (Kirby et al., 1999). For this scoring rubric, the same method is implemented when estimating k values at each of the small, medium, and large magnitude sizes, similar to the overall k value.

Calculating an individual's discounting rate becomes more complicated when responses are inconsistent, such as switching between the immediate and delayed outcomes multiple times. Inconsistent responding could mean a number of different things such as inattention or random responding, of which reduces the overall accuracy of k . In order to examine the level of inconsistent responding a participant displays, a consistency measure is calculated. This consistency measure represents the percentage of choices that were consistent with a participants assigned discounting rates (Kirby et al., 1999). Gray et al. (2016) recommend considering excluding data when the consistency is below 80%, and strongly recommend excluding data

when consistency is lower than 70%. Because of this recommendation, participants with consistency scores lower than 70% were excluded from subsequent analysis.

Probability Discounting Questionnaire (PDQ)

Participants also completed the Probability Discounting Questionnaire (PDQ; Appendix G) as described in Madden et al. (2009). This measure is a brief questionnaire-based probability-discounting task that requires participants to make 30 hypothetical choices between for-sure and probabilistic monetary outcomes. For example, the participant could choose between receiving \$40 for sure or having a 67% chance (2-in-3 chance) of receiving \$100. While the MCQ measures sensitivity to delay, this PDQ measures sensitivity to risk.

The PDQ is divided into three sets of 10 questions associated with small (\$60), medium (\$80), and large (\$100) probabilistic outcomes. The reward amounts vary between \$20-\$100 and probabilities varying from 10% to 90%. This classification of reward sizes allows the researchers to examine any magnitude effects on discounting rates. The 30 questions are arranged in a random order. Participant's discounting rate (h scores) were calculated according to the most plausible discounting rate given their pattern of responding. Similar to the MCQ, consistency of responding is also considered with this measure.

Estimates for h values were determined using a scoring rubric described by Madden et al. (2009) and similar to that used for the MCQ. Each of the 30 questions has an h value assigned to it and an h value is assigned based on whether the individual selects the smaller for-sure or larger-probabilistic reward. If the smaller for-sure option is picked, we can assume the individual's h to be equal to or more than the value assigned to that question. Alternatively, if the larger-probabilistic reward their h value can be assumed to be equal to or less than the value.

This process is done for each question and a h value that is most representative of all their choices is determined.

Procedure

After acknowledging and agreeing to the consent form, all participants reported demographic information. Participants were then randomly assigned to one of two financial groups: Financially Secure or Financially Insecure in which subjective sense of financial security was experimentally manipulated. Participants then indicated their monthly income on the scale dependent on their randomly assigned group. Both groups then received the feedback and writing task consistent with group assignment.

The SMAST, DAST-10, and FTCD were then administered to ensure extraneous variables are controlled for should there be a significant relationship between the substance use measures and discounting measures. Each participant then completed both the DD MCQ and the Probability Discounting Questionnaire to evaluate their discounting rates. The second and third discounting measure were embedded within the discounting measures. Participants then indicated their socioeconomic status. Lastly, participants received a debrief letting them know that the study did not truly calculate their financial status, and that such results are not indicative of their financial situation.

Results

Demographics

Chi-square analyses and independent t-tests were conducted to determine differences between the two groups. No significant differences were found between the Financially Secure and Financially Insecure groups on measures of age, gender, race, education level, relationship

status, employment, household size, or socioeconomic status (see Table 2), meaning that our randomization procedure was effective.

The average age of participant was 37.04 years ($SD = 11.68$ years), with an age range of 22 to 76 years. The majority of the sample (59.5%) identified as male and 40.5% identified as female. For race, 86.2% identified as white, 8.6% identified as Black, 2.6% Latino, .9% identified as Native American, .9% identified as Asian or Asian American, and .9% identified as multiracial. Most participants had their bachelor's degree (63.8%), while 26.7% had their masters, 6.9% had some college experience, and 2.6% had their high school diploma or GED. Most of the sample was married (80.2%). The remainder were single (13.8%), in some form of relationship, such as dating but not living with a partner (3.4%), dating and living with a partner (.9%), or divorced (1.7%). Most of the sample was employed full-time (92.2%), with the remainder being either employed part-time, self-employed, retired, or unemployed. The average household size was 3.45 ($SD = 1.37$), with range of 1 to 8. In regard to socioeconomic status, 3.4% were upper class, 10.3% were lower/working class, 28.4% were upper-middle class, and 57.8% were middle class.

Data Exclusion

Of the 313 participants who completed the study, data collected from 174 were excluded from final analyses due to providing inaccurate responses on one or more attention checks. Originally, only 74 participants were collected, however, after excluding data for consistency, the number of participants dropped below the number needed for a powered study. Because of this, we continued collecting data until both DD and PD tasks had enough participants for the analyses to be powered. Given the recommendation in the literature to not include participant's who's discounting consistency falls below 70%, data for 57 participants were eliminated from

either the DD ($N = 39$) or PD ($N = 64$) task due to low consistency scores. After this, average consistency on the DD MCQ was 92% and average consistency on the PDQ was 79%. Additionally, 13 participants were excluded due to consistency scores lower than 70% on both discounting measures, and 10 were excluded for not completing the writing task. This left 116 participants included in the final analyses. See Table 1 for descriptive data of excluded participants. Additionally, chi-square analyses and independent t-tests were conducted to determine differences between the two groups (i.e., the included and excluded participants) and no significant differences were found between the included and excluded groups on measures of age, gender, race, education level, relationship status, or employment. However, significant differences were found between the two groups on measures of household size ($t(239) = 3.064$, $p < .01$) and socioeconomic status ($X^2(3) = 14.509$, $p < .05$).

Self-Report Data

Most scores for self-report measures fell within ranges expected from a community sample, except for the substance abuse measures. Scores on the DAST-10 ($M = 3.97$; $SD = 2.677$) indicate moderate degree of problems related to drug use. Scores on the FTCD ($M = 3.07$; $SD = 2.852$) indicate low to moderate dependence on nicotine. Analysis of the distributions indicated normal distributions for the FTCD (skewness=.27, $SE=.225$; kurtosis= -1.408, $SE=.446$), DAST-10 (skewness=.48, $SE=.225$; kurtosis= -1.04, $SE=.446$), SMAST (skewness= .444, $SE=.225$; kurtosis= -1.010, $SE=.446$) (George & Mallery, 2010). There were no significant differences between the financially secure and insecure group in scores on the FTCD ($t[114] = -.445$, $p = .657$), DAST-10 ($t[114] = -.420$, $p = .675$), or the SMAST ($t[114] = -1.166$, $p = .246$). Independent samples t-tests comparing group mean differences in the substance use measures revealed no significant differences between the financially secure and insecure group in scores

on the FTCD ($t [114] = -.445, p = .657$), DAST-10 ($t [114] = -.420, p = .675$), or the SMAST ($t [114] = -1.166, p = .246$), see table 3. Lastly, scores on the SMAST ($M = 4.31; SD = 3.253$) indicate severe substance use disorder in this sample and are considerably higher than what is typically found throughout the literature (e.g., Minnich, 2019: $N = 3,792; M = 1.48; SD = 1.80$).

Manipulation Check

To determine if the manipulation of feelings of financial security was effective in provoking either feelings of financial security and financial insecurity an independent samples t-test was run examining group mean differences between the financially secure and insecure groups on financial satisfaction. There was no significant difference between the Financially Secure ($M = 6.73, SD = 2.328$) and the Financially Insecure group ($M = 6.32, SD = 2.405$) $t (114) = -.937, p = .175$ (See Figure 1), suggesting that the financial security manipulation was not effective.

Preliminary Analysis

Substance Use

As substance use may be positively correlated with higher discounting rates, initial bivariate correlations were conducted between the measures of substance use (DAST-10, SMAST, and FTCD) and discounting scores. Spearman's rho correlations were run to test the strength of correlation between the substance use measures (DAST-10, SMAST, and FTCD) with k scores and h scores. We opted for Spearman's rho over Pearson's r due to the nonnormality of the probability discounting data that did not change after several efforts to normalize with various transformations. Delay and probability scores did not significantly correlate with one another ($r_s = .118, p = .372$). Each of the substance use measures were correlated with each other (see table 4). There were significant correlations between the FTCD

and the PD MCQ ($r_s = .248, p = <.05$), and between the SMAST and the DD MCQ ($r_s = .219, p = <.05$) (See table 3). Because of this, an ANCOVA was used in order to control for the covariates.

Primary Analyses

An initial review of the distributions of the discounting data revealed severely skewed distributions. Such distributions were determined to be nonnormal by examining kurtosis and skew values and by looking at histograms and P Plots. Log₁₀ transformed k -values for the MCQ (LGk; skewness = -1.092, SE = .24; kurtosis = .499, SE = .48) yielded a normal distribution of data. However, probability discounting scores were unable to be normalized by statistical transformations due to a bimodal distribution. Because of this, high and low probability discounting score groups were formed using the mean as a cut-off. A logistic regression was then run estimating the probability of a participant being in the low or high discounting group, based on their financial security group assignment, while controlling for FTCD scores. Regarding k and h scores, raw geomean scores that summarized the k and h values from all three magnitudes were used to calculate the means of each group for both measures.

Magnitude effects for delay and probability discounting are, notably, opposite in direction in that smaller delayed amounts are typically observed to be discounted more steeply than larger delayed amounts, however, probabilistic amounts are typically discounted less steeply than larger probabilistic amounts (Green & Myerson, 2004). Results on the MCQ (Figure 2) indicated that delay discounting rates were steeper for larger monetary rewards than smaller rewards, which is inconsistent with the magnitude effect found in other studies (e.g., Green, Myerson, & McFadden, 1997; Myerson & Green, 1995). Given this inconsistency with the literature, this calls into question the validity of the current data set. Results on the PDQ (Figure 3) indicated that probability discounting rates were steeper for larger rewards than

smaller rewards, which is consistent with the magnitude effect found in other studies (Green & Myerson, 2004).

First Hypothesis

To test hypothesis one examining if individuals who were randomly assigned to the Financially Insecure group discounted delayed monetary rewards at higher rates than those in the Financially Secure group, we ran an ANCOVA. Because the SMAST-10 was correlated significantly with DD scores, it was entered as a covariate. There was no significant difference between the financially secure and financially insecure groups on the MCQ [$F(1,97) = .151, p = .699$] while controlling for the SMAST (table 5; figure 2).

Second Hypothesis

Since the PDQ had a bimodal distribution, a logistic regression was run in which data from the PDQ was dichotomized based on the mean ($M = 4.94$), with scores lower than the mean being the low discounting group ($N = 23$), and those being above the mean being the high discounting group ($N = 54$). As stated above, the PDQ correlated significantly with the FTCD. In order to control for these effects, the FTCD was entered as a covariate in regression analyses. The logistic regression model was approaching statistical significance $X^2(2) = 5.79, p = .055$ (Table 6). The model explained 10.5% (Nagelkerke R^2) of the variance in discounting scores and the model correctly classified 62.7% of cases. Group assignment was a significant predictor (Table 7). Individuals in the financially secure group were 3.88 times more likely to be in the low discounting group and individuals in the financially insecure group were 1.21 times more likely to be in the low discounting group.

For the sake of being parallel with the analysis for DD, we conducted a supplemental one-way ANCOVA to test hypothesis two examining if individuals who were randomly assigned

to the Financially Insecure group discounted probabilistic monetary rewards at higher rates than those in the Financially Secure group. Because the FTCD was correlated significantly with PD scores, it was entered as a covariate. A significant difference between the financially secure and financially insecure groups on the PDQ [$F(1,72) = 5.93, p < .05$] while controlling for the SMAST (table 8; figure 3).

Discussion

The present study examined how perceptions of experimentally induced financial insecurity affect delay and probability discounting. We proposed two hypotheses. First, we predicted, based on previous research, that participants in the Financially Insecure group would be more sensitive to delayed outcomes and discount delayed monetary rewards at higher rates than those in the Financially Secure Group. Second, we predicted that participants in the Financially Insecure group would be more risk averse and discount probabilistic monetary rewards at higher rates than in the Financially Secure group.

Contrary to our first hypothesis, the present study failed to find differences in rates of delay discounting between individuals who perceived their finances as secure and those who perceived their finances as insecure. This represents a failure to replicate Moeini-Jazani et al.'s (2019) findings that feelings of financial security influence patterns of discounting delayed outcomes. There are several possible explanations for this outcome. It is possible that Moeini-Jazani et al.'s findings were spurious and that perceptions of financial insecurity simply do not impact DD choice patterns. However, several methodological factors also should be considered. It is important to note that our manipulation check suggests that the financial insecurity manipulation did not seem to change participant perceptions of their financial well-being. We also used a different measure of DD. As previously mentioned, Moeini-Jazani et al. used a

relatively brief measure of DD, a measure in which k scores (rates of discounting) were derived from three questions. In contrast, the measure of DD used in this study consisted of 27 smaller-sooner or larger-later questions. While no direct comparisons are available in the literature between these to DD measures, it is possible that the MCQ is a more comprehensive measure of discounting than the three-item open-ended question used by Moeini-Jazini and colleagues. Future studies examining the replicability of Moeini-Jazini et al.'s study should include the measure of discounting that they used, along with more comprehensive measures of discounting in order to compare the outcomes of the measures utilized.

Our second hypothesis that perceived financial insecurity would influence PD rates also was not supported. Although group assignment itself was a significant predictor of PD, our overall model did not find that participants assigned to the financial insecurity group were more likely to have lower PD rate when cigarette dependence was included as a covariate, though it approached significance. We did find that individuals in the financially *secure* group were 3.88 times more likely to be in the high discounting group than the low discounting group, indicating more preference for larger probabilistic outcomes. Overall, this suggests that the perception of financial security actually increases risk taking, however, it is also worth noting that we found no significant differences between the low and high discounting groups regarding the Financially Insecure group. The findings regarding financial security and risk taking are consistent with the literature on risk aversion and poverty, of which suggests that being financially secure makes an individual more risk taking. In a study conducted by Dohmen et al. (2011), wealthier households display lower levels of risk aversion according to self-report methods. Similarly, Yesuf and Bluffstone (2009) found that wealthier farming households were more willing to take risks in exchange for higher rewards, while poorer households were significantly more risk averse.

However, our findings are not consistent with the literature on financial insecurity and risk aversiveness. This could be due to our inductions of financial insecurity not being salient enough. Taken together, these results indicate that sensitivity towards probabilistic outcomes may be a critical psychological factor that contributes to risk-taking behaviors. However, it should be noted that when considering cigarette dependence as a covariate in this model, the overall model is nonsignificant.

Given the current trend within the discounting literature, future research should continue examining whether feelings of financial security affect delay and/or probability discounting, and effective interventions. Past studies have examined how to influence individual delay discounting rates (Dehart et al., 2016; Moeini-Jazani et al., 2019; Rung & Madden, 2018) but given the findings from the current study that perceptions of financial security make an individual more risk taking, researchers should work to better understand the relationship between financial security (and insecurity) and delay and probability discounting.

Limitations

There are several limitations to the current study. The first being concerns about the validity of the data. Though studies have determined MTurk to be a valid platform to collect discounting data (i.e., Jarmolowicz et al., 2012), several issues occurred while collecting data for the current study. Concerns were raised regarding validity of the data when examining the open-ended questions, quick completion time, and levels of substance use being significantly higher than community samples (see Minnich et al., 2019). Kennedy et al. (2020) note an increase in bots (semi- or fully automated code used to automatically respond to surveys) or scripts (codes that assist humans in responding quicker to certain types of questions). In order to verify the quality of the data, three attention checks were embedded within the survey. Over half of the

total participants collected for this study were excluded from final analyses due to failing at least one of the three attention checks. This points toward either automated responders (i.e., bots), or individuals being inattentive. Although our validity checks seem to have identified such automated responses, it is possible that some automated responses were not detected and ultimately used in the analyses.

Another tool used for data screening were consistency scores for the discounting measures. Several researchers recommend excluding participants with consistency scores below 70% (Gray et al., 2016). As such, we excluded 18% of data points from either discounting measures. Future studies should include more data validity checks if Mturk continues to be utilized for discounting studies. Something else to note when considering the findings from this study is the severe levels of alcohol, cigarette, and drug use found within the sample. These substance use measures are inconsistent when compared to community samples (Minnich et al., 2019). These scores raise concerns regarding the validity of the data. Another limitation that should be considered in terms of data validity is that the magnitude effect typically observed for the MCQ was not observed in the current study. This failure to replicate magnitude effects calls into question the validity of the data and should be considered when interpreting these results. Future research might also consider conducting this research in-person, which may avoid some of the data validity problems encountered here.

An important limitation is that we found no differences in financial satisfaction between the financially secure and financially insecure group on the measure of financial satisfaction. The reasons for this are not clear. Our manipulation and its measurement were the same as that used by Moeini-Jazani (2019). It is possible that, for some reason, this manipulation simply wasn't as convincing or meaningful to our participants as it was to Moeini-Jazani's participants. For

example, One of the participants in the financially insecure group wrote “While this description paints a pretty negative picture, I feel that my situation has become normal for me” and another wrote “It feels great to be poor... I just don't earn as much because I don't want to support this sick system”. This may mean that the manipulation we used simply did not create the psychological conditions it was designed to in this sample. While having a manipulation check is important when implementing a manipulation, further studies should consider a new manipulation check for similar studies.

Another limitation is that extraneous variables potentially could have affected the findings from this study. Future studies should investigate possible mediators that were not examined in the current study. Given the relationship between poverty, stress, and negative affect, and the relationship between stress, negative affect, and discounting rates (Haushofer & Fehr, 2014), it is important to consider the role stress and negative affect may play in this relationship. Despite the null findings regarding DD from this study, it is possible that stress and/or negative affect could better explain the effects of financial insecurity on discounting rates. Further research should examine the role that stress and negative affect play within the relationship between financial insecurity and discounting.

A last limitation that was encountered during this study was conducting statistical analyses, due to assumptions violations, that were not originally planned for. This made interpretation more difficult as our hypotheses were not fit for a logistic regression, rather comparing group mean scores. Given the historical trend that discounting data are nonnormal and frequently need to be transformed, future research should consider additional hypotheses for other possible analyses.

Conclusions

Overall, this study observed no notable differences in delay discounting rates between the financially secure and financially insecure groups, which failed to replicate Moeini-Jazini et al., (2019)'s findings. Additionally, logistic regression analyzing the relationship between group assignment and probability discounting scores, while controlling for cigarette dependence, produced a nonsignificant overall model. Research should continue examining the relationship between perceptions of financial insecurity and delay and probability discounting.

References

- Acri, M. C., Bornheimer, L. A., Jessell, L., Heckman Chomancuzuk, A., Adler, J. G., Gopalan, G., & McKay, M. M. (2017). The intersection of extreme poverty and familial mental health in the United States. *Social work in mental health*, 15(6), 677-689.
- Adamkovič, M. (2019). Objective poverty and willingness to delay gratification: do different poverty thresholds and cognitive load matter?. *Economic Psychology*, 32(2), 284-293.
- Amuedo-Dorantes, C., Arenas-Arroyo, E., & Sevilla, A. (2018). Immigration enforcement and economic resources of children with likely unauthorized parents. *Journal of Public Economics*, 158, 63-78
- Anakwenze, U., & Zuberi, D. (2013). Mental health and poverty in the inner city. *Health & social work*, 38(3), 147-157.
- Barnard, H., & Turner, C. (2011). Poverty and ethnicity: A review of evidence. *York: Jrf*.
- Beeghley, L. (1988). Individual and structural explanations of poverty. *Population Research and Policy Review*, 7(3), 201-222.
- Bickel, W. K., & Mueller, E. T. (2009). Toward the Study of Trans-Disease Processes: A Novel Approach With Special Reference to the Study of Co-morbidity. *Journal of dual diagnosis*, 5(2), 131–138. <https://doi.org/10.1080/15504260902869147>
- Bickel, W. K., Johnson, M. W., Koffarnus, M. N., MacKillop, J., & Murphy, J. G. (2014). The behavioral economics of substance use disorders: reinforcement pathologies and their repair. *Annual review of clinical psychology*, 10, 641-677.
- Bickel, W. K., Athamneh, L. N., Basso, J. C., Mellis, A. M., DeHart, W. B., Craft, W. H., & Pope, D. (2019). Excessive discounting of delayed reinforcers as a trans-disease process: Update on the state of the science. *Current Opinion in Psychology*, 30, 59-64.

- Brady, D., Finnigan, R. M., & Hübgen, S. (2017). Rethinking the risks of poverty: A framework for analyzing prevalences and penalties. *American journal of sociology*, 123(3), 740-786.
- Briers, B., & Laporte, S. (2013). Wallet full of calories: The effect of financial Dissatisfaction on the desire for food energy. *Journal of Marketing Research*, 50(6), 767–781. <https://doi-org.libpublic3.library.isu.edu/10.1509/jmr.10.0513>
- Brimeyer, T. M. (2008): Research note: religious affiliation and poverty explanations: individual, structural, and divine causes. *Sociological Focus*, 41, 226-237.
- Borjas, G. J. (2016). Does welfare reduce poverty? *Research in Economics*, 70(1), 143-157.
- Buhrmester, M.D., Kwang, T., & Gosling, S. (2011). Amazon's Mechanical Turk. *Perspecives on Psychological Science*, 6, 3 - 5.
- Callan, M. J., Shead, N. W., & Olson, J. M. (2011). Personal relative deprivation, delay discounting, and gambling. *Journal of Personality and Social Psychology*, 101(5), 955–973. <https://doi-org.libpublic3.library.isu.edu/10.1037/a0024778>
- Calnitsky, D. (2018). Structural and individualistic theories of poverty. *Sociology Compass*, 12(12), e12640
- Carvalho, L., Meier, S., & Wang, S. (2016). Poverty and Economic Decision-Making: Evidence from Changes in Financial Resources at Payday. *The American Economic Review*, 106(2), 260-284. Retrieved October 21, 2020, from <http://www.jstor.org/stable/43821452>
- Chen, C. Y., & Lin, K. M. (2009). Health consequences of illegal drug use. *Current opinion in psychiatry*, 22(3), 287-292.
- Coffey, S. F., Gudleski, G. D., Saladin, M. E., & Brady, K. T. (2003). Impulsivity and rapid discounting of delayed hypothetical rewards in cocaine-dependent individuals.

- Experimental and Clinical Psychopharmacology*, 11(1), 18–25. <https://doi-org.libpublic3.library.isu.edu/10.1037/1064-1297.11.1.18>
- Collins, P. H. (1990). Black Feminist Thought: Knowledge, Consciousness, and the Politics of Empowerment. Boston, MA: Un-win Hyman.. 1995.". In *Symposium on West and Fenstermaker's' Doing Difference'.* *Gender and Society* (Vol. 9, pp. 491-94).
- Conover, W.J. 1999. Practical Nonparametric Statistics, 3rd. John Wiley & Sons.
- Correll, S. J., Benard, S., & Paik, I. (2007). Getting a job: Is there a motherhood penalty?. *American journal of sociology*, 112(5), 1297-1338.
- Craft, W. H., Tegge, A. N., Freitas-Lemos, R., Tomlinson, D. C., & Bickel, W. K. (2022, February 17). Are Poor Quality Data Just Random Responses?: A Crowdsourced Study of Delay Discounting in Alcohol Use Disorder. *Experimental and Clinical Psychopharmacology*. Advance online publication. <http://dx.doi.org/10.1037/pha0000549>
- Crenshaw, K. (1990). Mapping the margins: Intersectionality, identity politics, and violence against women of color. *Stan. L. Rev.*, 43, 1241.
- Crenshaw, K., Gotanda, N., Peller, G., & Thomas, K. (1995). *Critical race theory: The key writings that formed the movement*. The New Press.
- Cunradi, C. B., Caetano, R., & Schafer, J. (2002). Socioeconomic predictors of intimate partner violence among White, Black, and Hispanic couples in the United States. *Journal of Family Violence*, 17, 377–389.
- Daruna, J. H., & Barnes, P. A. (1993). A neurodevelopmental view of impulsivity. In W. G. McCown, J. L. Johnson, & M. B. Shure (Eds.), *The impulsive client: Theory, research, and treatment* (pp. 23–37). Wash- ington, DC: American Psychological Association. <http://dx.doi.org/10.1037/10500-002>

- DeHart, W. B., Snider, S. E., Pope, D. A., & Bickel, W. K. (2020). A reinforcer pathology model of health behaviors in individuals with obesity. *Health Psychology, 39*(11), 966–974. <https://doi.org/10.1037/hea0000995>
- Dickman, S. J. (1990). Functional and dysfunctional impulsivity: Personality and cognitive correlates. *Journal of Personality and Social Psychology, 58*, 95–102.
<http://dx.doi.org/10.1037/0022-3514.58.1.95>
- Dohmen, T., Falk, A., Huffman, D., Sunde, U., Schupp, J., & Wagner, G. G. (2011). Individual risk attitudes: Measurement, determinants, and behavioral consequences. *Journal of the European Economic Association, 9*(3), 522–550.
- Estle, S. J., Green, L., Myerson, J., & Holt, D. D. (2007). Discounting of monetary and directly consumable rewards. *Psychological Science, 18*, 58–63.
- Evenden, J. L. (1999). Varieties of impulsivity. *Psychopharmacology, 146*, 348–361.
<http://dx.doi.org/10.1007/PL00005481>
- Fagerstrom K (2012) Determinants of tobacco use and renaming the FTND to the Fagerstrom Test for Cigarette Dependence. *Nicotine Tob Res 14*(1): 75–78.
- Farah, M., & Hook, C. (2017). Trust and the poverty trap. *Proceedings of the National Academy of Sciences of the United States of America, 114*(21), 5327–5329. doi:10.2307/26483279
- Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods, 39*, 175–191.
- Feagin, J. (1972). “When It Comes to Poverty, It’s Still, ‘God Helps Those Who Help Themselves.’” *Psychology Today, 6*(101) 29.

- Feagin, J (1975). *Subordinating the Poor: Welfare and American Beliefs*, Prentice-Hall, Englewood Cliffs, New Jersey, A Spectrum Book.
- George, D., & Mallery, M. (2010). *SPSS for Windows Step by Step: A Simple Guide and Reference*, 17.0 update (10a ed.) Boston: Pearson.
- Gigerenzer, G. (2008). Why heuristics work. *Perspectives on psychological science*, 3(1), 20-29
- Glasmeier, A. (2014). *An atlas of poverty in America: One nation, pulling apart 1960–2003*. Routledge.
- González, M. J. (2005). Access to mental health services: The struggle of poverty affected urban children of color. *Child and Adolescent Social Work Journal*, 22(3), 245-256.
- Gray, J. C., Amlung, M. T., Palmer, A. A., & MacKillop, J. (2016). Syntax for calculation of discounting indices from the monetary choice questionnaire and probability discounting questionnaire. *Journal of the experimental analysis of behavior*, 106(2), 156-163
- Green, L., Myerson, J., & Ostaszewski, P. (1999). Amount of reward has opposite effects on the discounting of delayed and probabilistic outcomes. *Journal of experimental psychology. Learning, memory, and cognition*, 25(2), 418–427. <https://doi.org/10.1037//0278-7393.25.2.418>
- Green, L., & Myerson, J. (2004). A discounting framework for choice with delayed and probabilistic rewards. *Psychological Bulletin*, 130, 769– 792.
<http://dx.doi.org/10.1037/0033-2909.130.5.769>
- Green, L., & Myerson, J. (2019). On the complexity of discounting, choice situations, and people. *Perspectives on Behavior Science*, 42, 433–443.
<http://dx.doi.org/10.1007/s40614-019-00209-y>

- Guiso, L., & Paiella, M. (2008). Risk aversion, wealth, and background risk. *Journal of the European Economic association*, 6(6), 1109-1150.
- Haque, Z. (2010) What works with integrating new migrants? Lessons from international best practice. London: Runnymede Trust.
- Haushofer, J., & Fehr, E. (2014). On the psychology of poverty. *Science*, 344(6186), 862–867.
<https://doi-org.libpublic3.library.isu.edu/10.1126/science.1232491>
- Hayashi, Y., Fessler, H. J., Friedel, J. E., Foreman, A. M., & Wirth, O. (2018). The roles of delay and probability discounting in texting while driving: Toward the development of a translational scientific program. *Journal of the experimental analysis of behavior*, 110(2), 229-242.
- Henricks, K., & Ortiz, R. (2021). Individuals in Default or the System? Race and Ethnicity, Stratification Views on Legal Debt, and Desire for Escalating Punishment. *Sociology of Race and Ethnicity*, 23326492211001083.
- Hills, J. (2010). An anatomy of economic inequality in the UK-report of the national equality panel. London: Government Equalities Office.
- Hinojosa, M. S., Kadivar, H., Fernandez-Baca, D., Chisholm, T., Thompson, L. A., Stanford, J., & Shenkman, E. (2014). Recruiting low income and racially/ethnically diverse adolescents for focus groups. *Maternal and child health journal*, 18(8), 1912–1918.
<https://doi.org/10.1007/s10995-014-1435-x>
- Hinvest, N. S., & Anderson, I. M. (2010). The effects of real versus hypothetical reward on delay and probability discounting. *Quarterly Journal of Experimental Psychology*, 63(6), 1072–1084.

- Hoerger, M., Quirk, S. W., & Weed, N. C. (2011). Development and validation of the Delaying Gratification Inventory. *Psychological Assessment*, 23, 725–738
- Hoffman, L., & Coffey, B. (2008). Dignity and indignation: How people experiencing homelessness view services and providers. *The Social Science Journal*, 45(2), 207-222.
- Holt, D. D., Green, L., & Myerson, J. (2003). Is discounting impulsive? Evidence from temporal and probability discounting in gambling and non-gambling college students. *Behavioural Processes*, 64, 355–367.
- Hudson, C. G. (2005). Socioeconomic status and mental illness: Tests of the social causation and selection hypotheses. *American Journal of Orthopsychiatry*, 75, 3–18.
- Hursh, S. R. (1984). Behavioral economics of drug self-administration and drug abuse policy. *Journal of the Experimental Analysis of Behavior*, 56(2), 377-393.
<https://dx.doi.org/10.1901/jeab.1984.42-435>
- IBM Corporation (2017). IBM SPSS Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.
- Ifcher, J., & Zarghamee, H. (2011). Happiness and Time Preference: The Effect of Positive Affect in a Random-Assignment Experiment. *The American Economic Review*, 101(7), 3109-3129. Retrieved October 19, 2020, from <http://www.jstor.org/stable/41408732>
- Impulsivity. (2019). In Oxford English dictionary online. Retrieved from <https://www.oed.com/view/Entry/92925?redirectedFrom=impulsivity#eid>
- Jamaluddin, Z., & Hanafiah, N. M. A. (2020). Poverty and productive welfare in Malaysia. *International Journal of Academic Research in Business and Social Sciences*, 10(8), 917-923.

- Jarmolowicz, D. P., Bickel, W. K., Carter, A. E., Franck, C. T., & Mueller, E. T. (2012). Using crowdsourcing to examine relations between delay and probability discounting. *Behavioural Processes*, 91(3), 308–312.
<https://doi.org.libpublic3.library.isu.edu/10.1016/j.beproc.2012.09.001>
- Johnson, M. W., & Bickel, W. K. (2002). Within-subject comparison of real and hypothetical money rewards in delay discounting. *Journal of the Experimental Analysis of Behavior*, 77(2), 129–146. <https://doi.org/10.1901/jeab.2002.77-129>
- Johnson, M. W., & Bruner, N. R. (2012). The sexual discounting task: HIV risk behavior and the discounting of delayed sexual rewards in cocaine dependence. *Drug and Alcohol Dependence*, 123, 15–21.
- Kaplan, B. A., Amlung, M., Reed, D. D., Jarmolowicz, D. P., McKerchar, T. L., & Lemley, S. M. (2016). Automating scoring of delay discounting for the 21- and 27-item Monetary Choice Questionnaires. *Behav. Analyst.* 1-12. doi: 10.1007/s40614-016-0070-9.
- Kyonka, E. G., & Schutte, N. S. (2018). Probability discounting and gambling: A meta-analysis. *Addiction*, 113(12), 2173-2181.
- Kirby, K. N., & Maraković, N. N. (1996). Delay-discounting probabilistic rewards: Rates decrease as amounts increase. *Psychonomic Bulletin & Review*, 3(1), 100–104.
<https://doi-org.libpublic3.library.isu.edu/10.3758/BF03210748>
- Kirby, K. N., Petry, N. M., & Bickel, W. K. (1999). Heroin addicts have higher discount rates for delayed rewards than non-drug-using controls. *Journal of Experimental Psychology: General*, 128(1), 78–87. <https://doi-org.libpublic3.library.isu.edu/10.1037/0096-3445.128.1.78>

- Lacey, M. H., & Minnis, H. (2020). Practitioner review: twenty years of adverse childhood experience (ACE) score research: strengths, limitations and application to practice. *J Child Psychol Psychiatry*, 61, 116-30.
- Lagorio CH, Madden GJ. Delay discounting of real and hypothetical rewards III: steady-state assessments, forced-choice trials, and all real rewards. *Behavioral Processes* 2005;69(2):173–187.
- Laird, J., Parolin, Z., Waldfogel, J., & Wimer, C. (2018). Poor state, rich state: Understanding the variability of poverty rates across US states. *Sociological Science*, 5, 628-652.
- Law, B. M. F., & Shek, T. L. (2014). Beliefs about poverty. In *Encyclopedia of quality of life and well-being research* (pp. 353-359). Springer. https://doi.org/10.1007/978-94-007-0753-5_166
- Lawrance, E. (1991). Poverty and the Rate of Time Preference: Evidence from Panel Data. *Journal of Political Economy*, 99(1), 54-77.
<http://www.jstor.org.libpublic3.library.isu.edu/stable/2937712>
- Lawyer, S. R., & Jenks, C. W. (2020). Emotion Suppression Decreases Delay Discounting for Monetary Outcomes. *The Psychological Record*, 70(1), 1-10.
- Lawyer, S. R., Schoepflin, F., Green, R., & Jenks, C. (2011). Discounting of hypothetical and potentially real outcomes in nicotine-dependent and nondependent samples. *Experimental & Clinical Psychopharmacology*, 19(4), 263.
- Lawyer, S. R., & Schoepflin, F. J. (2013). Predicting domain-specific outcomes using delay and probability discounting for sexual versus monetary outcomes. *Behavioural Processes*, 96, 71–78.

- Lawyer, S. R. and Mahoney, C. T. (2017). Delay discounting and probability discounting, but not response inhibition, are associated with sexual risk-taking in young adults. *Journal of Sex Research*, 55(7), 863–870. <https://doi.org/10.1080/00224499.2017.1350627>
- Lerner, J. S., Li, Y., & Weber, E. U. (2013). The financial costs of sadness. *Psychological Science*, 24(1), 72–79.
<https://doiorg.libpublic3.library.isu.edu/10.1177/0956797612450302>
- Logan, F. A. (1965). Decision making by rats: Uncertain outcome choices. *Journal of Comparative and Physiological Psychology*, 59, 246.
- MacKillop, J., Amlung, M.T., Few, L.R. (2011). Delayed reward discounting and addictive behavior: a meta-analysis. *Psychopharmacology* 216, 305–321.
<https://doi.org/10.1007/s00213-011-2229-0>
- MacKillop, J., Miranda Jr, R., Monti, P. M., Ray, L. A., Murphy, J. G., Rohsenow, D. J., & Gwaltney, C. J. (2010). Alcohol demand, delayed reward discounting, and craving in relation to drinking and alcohol use disorders. *Journal of abnormal psychology*, 119(1), 106.
- Madden, G. J., Begotka, A. M., Raiff, B. R., & Kastern, L. L. (2003). Delay discounting of real and hypothetical rewards. *Experimental and clinical psychopharmacology*, 11(2), 139.
- Madden, G. J., Petry, N. M., & Johnson, P. S. (2009). Pathological gamblers discount probabilistic rewards less steeply than matched controls. *Experimental and clinical psychopharmacology*, 17(5), 283.
- Madden, G. J., Raiff, B. R., Lagorio, C. H., Begotka, A. M., Mueller, A. M., Hehli, D. J., & Wegener, A. A. (2004). Delay discounting of potentially real and hypothetical rewards:

- II. Between- and within-subject comparisons. *Experimental and Clinical Psychopharmacology*, 12, 251–261. doi: 10.1037/ 1064 –1297.12.4.251
- Mahoney, C. T., & Lawyer, S. R. (2018). Domain-specific relationships in sexual measures of impulsive behavior. *Archives of Sexual Behavior*, 47(6), 1591-1599
- Mani, A., Mullainathan, S., Shafir, E., & Zhao, J. (2013). Poverty impedes cognitive function. *Science*, 341(6149), 976–980. <https://doi.org/10.1126/science.1238041>
- Mazur, J. E. (1987). An adjusting procedure for studying delayed reinforcement. In: M. L. Commons, J. E. Mazur, J. A. Nevin, & H. Rachlin (Eds.), *Quantitative Analyses of Behavior, Vol. 5. The effect of delay and of intervening events of reinforcement value* (pp. 55–73). Lawrence Erlbaum Associates, Inc. <https://doi.org/10.1177/1524838015584367>
- Mersky, J. P., Topitzes, J., & Reynolds, A. J. (2013). Impacts of adverse childhood experiences on health, mental health, and substance use in early adulthood: A cohort study of an urban, minority sample in the US. *Child abuse & neglect*, 37(11), 917-925.
- Mittal, C., & Griskevicius, V. (2014). Sense of control under uncertainty depends on people’s childhood environment: A life history theory approach. *Journal of Personality and Social Psychology*, 107(4), 621–637. <https://doiorg.libpublic3.library.isu.edu/10.1037/a0037398>
- Moeini-Jazani, M., Albalooshi, S., & Seljeseth, I. M. (2019). Self-affirmation reduces delay discounting of the financially deprived. *Frontiers in Psychology*, 10. <https://doi-org.libpublic3.library.isu.edu/10.3389/fpsyg.2019.01729>
- Moodley, J., & Graham, L. (2015). The importance of intersectionality in disability and gender studies. *Agenda*, 29(2), 24-33.

- Mortenson, T. G. (1998). Postsecondary Education Opportunity. The Mortenson Research Seminar on Public Policy Analysis of Opportunity for Postsecondary Education, 1998. *Postsecondary Education Opportunity*, 67, 78.
- Mullainathan, S., & Thaler, R. H. (2000). Behavioral economics.
- Mullainathan, S., & Shafir, E. (2013). Scarcity: Why having too little means so much. New York: Macmillan.
- Myerson, J., Green, L., & Warusawitharana, M. (2001). Area under the curve as a measure of discounting. *Journal of the Experimental Analysis of Behavior*, 76, 235–243.
- Nandi, A., & Platt, L. (2010). Ethnic minority women's poverty and economic well-being. *London: Government Equalities Office*.
- Nelson, L. D., & Morrison, E. L. (2005). The Symptoms of Resource Scarcity: Judgments of Food and Finances Influence Preferences for Potential Partners. *Psychological Science*, 16(2), 167–173. <https://doi-org.libpublic3.library.isu.edu/10.1111/j.0956-7976.2005.00798.x>
- Norcia, M., Rissotto, A. (2015): Causal attributions for poverty in Italy: What do people think about impoverishment. *International Journal of Sustainable Development*, 8, 59- 70
- Nwani, S. E., & Osuji, E. (2020). Poverty in Sub-Saharan Africa: The dynamics of population, energy consumption and misery index. *International Journal of Management, Economics and Social Sciences (IJMESS)*, 9(4), 247-270.
- Odum, A. L. (2011). Delay discounting: I'm ak, you're ak. *Journal of the experimental analysis of behavior*, 96(3), 427-439.
- Ostaszewski, P., & Karzel, K. (2007). Discounting of delayed and probabilistic gains and losses by poor and wealthy people. *Polish Psychological Bulletin*, 38(2), 79–87.

- Pender, J. L. (1996). Discount rates and credit markets: Theory and evidence from rural India. *Journal of development Economics*, 50(2), 257-296.
- Pew Charitable Trust. (2012). Pursuing the American dream: Economic mobility across generations. Washington, DC: Pew Charitable Trusts, Economic Mobility Project.
- Platt, L. (2011). Inequality within ethnic groups. *Joseph Rowntree Foundation*.
- Rachlin, H., Raineri, A., & Cross, D. (1991). Subjective probability and delay. *Journal of the Experimental Analysis of Behavior*, 55(2), 233–244. <https://doi.org/10.1901/jeab.1991.55-233>
- Rasmussen, E. B., Lawyer, S. R., & Reilly, W. (2010). Percent body fat is related to delay and probability discounting for food in humans. *Behavioural processes*, 83(1), 23-30.
- Reimers, S., Maylor, E., Stewart, N., & Chater, N. (2009). Associations between a one-shot delay discounting measure and age, income, education and real-world impulsive behavior. *Personality and Individual Differences*, 47, 973-978.
- Reynolds, B., Ortengren, A., Richards, J. B., & De Wit, H. (2006). Dimensions of impulsive behavior: Personality and behavioral measures. *Personality and individual differences*, 40(2), 305-315.
- Renwick, T., & Fox, L. (2016). The supplemental poverty measure: 2015. *Current Population Reports*, 1-23.
- Reynolds, B., & Schiffbauer, R. (2004). Measuring state changes in human delay discounting: An experiential discounting task. *Behavioural Processes*, 67(3), 343–356.
[https://doi.org/10.1016/S0376-6357\(04\)00140-8](https://doi.org/10.1016/S0376-6357(04)00140-8)

- Richards, J. B., Mitchell, S. H., De Wit, H., & Seiden, L. S. (1997). Determination of discount functions in rats with an adjusting-amount procedure. *Journal of the experimental analysis of behavior*, 67(3), 353-366.
- Rodriguez, L. R., Rasmussen, E. B., Kyne-Rucker, D., Wong, M., & Martin, K. S. (2021). Delay discounting and obesity in food insecure and food secure women. *Health Psychology*, 40(4), 242.
- Roser, M., & Ortiz-Ospina, E. (2019). Global extreme poverty.
<https://ourworldindata.org/extremepoverty>.
- Schwarz, N. (1999). Self-reports: How the questions shape the answers. *American Psychologist*, 54(2), 93–105. <https://doi-org.libpublic3.library.isu.edu/10.1037/0003-066X.54.2.93>
- Selzer, M. L., Vinokur, A., & van Rooijen, L. (1975). A self-administered Short Michigan Alcoholism Screening Test (SMAST). *Journal of Studies on Alcohol*, 36(1), 117–126.
<https://doi-org.libpublic3.library.isu.edu/10.15288/jsa.1975.36.117>
- Semega, J., Kollar, M., Shrider, E., & Creamer, J. (2020). *Income and Poverty in the United States: 2019*. Retrieved January 25, 2021, from
<https://www.census.gov/library/publications/2020/demo/p60-270.html#:~:text=The%20official%20poverty%20rate%20in,consecutive%20annual%20decline%20in%20poverty>.
- Shields, A. L. (2003). Reliability generalizations of three alcohol screening measures: The Alcohol Use Disorders Identification Test the CAGE Questionnaire and the Michigan Alcoholism Screening Test. Ph.D. thesis, Graduate Student Theses, Dissertations, and Professional Papers, Montana, MT, 9457.

- Skinner, H.A. (1982). The Drug Abuse Screening Test, *Addictive Behaviors*, 7(4): 363–71.
- Smith, A. (2010). *The Wealth of Nations: An inquiry into the nature and causes of the Wealth of Nations*. Harriman House Limited.
- Strickland, J. C., & Johnson, M. W. (2021). Rejecting impulsivity as a psychological construct: A theoretical, empirical, and sociocultural argument. *Psychological review*, 128(2), 336
- Thaler, R. H. (1981). Some empirical evidence on dynamic inconsistency. *Economics Letters*, 8(3), 201-207.
- Thaler, R. H. (1992). *The winner's curse: Paradoxes and anomalies of economic life*. Free Press.
- Tversky, A., & Kahneman, D. (1982). Judgment and uncertainty: Heuristics and biases. D. Kahneman, PS & A. Tversky (Eds.), *Judgment and uncertainty*, 3-20.
- Wagmiller, R. L., & Adelman, R. M. (2009). Childhood and intergenerational poverty: The long-term consequences of growing up poor.
- Wheaton, L., Minton, S., Giannarelli, L., & Dwyer, K. (2021). 2021 Poverty Projections: Assessing Four American Rescue Plan Policies. *Washington, DC: Urban Institute*, 500.
- Wills, T. A., Bantum, E. O. C., Pokhrel, P., Maddock, J. E., Ainette, M. G., Morehouse, E., & Fenster, B. (2013). A dual-process model of early substance use: tests in two diverse populations of adolescents. *Health Psychology*, 32(5), 533.
- Yearby, R. (2018). Racial disparities in health status and access to healthcare: the continuation of inequality in the United States due to structural racism. *American Journal of Economics and Sociology*, 77(3-4), 1113-1152.
- Yesuf, M., & Bluffstone, R. (2008). *Wealth and time preference in rural Ethiopia* (No. dp-08-16-efd).

Yudko, E., Lozhkina, O., & Fouts, A. (2007). A comprehensive review of the psychometric properties of the Drug Abuse Screening Test. *Journal of Substance Abuse Treatment*, 32(2), 189–198. <https://doi-org.libpublic3.library.isu.edu/10.1016/j.jsat.2006.08.002>

Table 1*Descriptive Data for Demographic Variables for Excluded and Included Data*

	Excluded Data	Included Data
N	196	116
Age: <i>M (SD)</i>	34.78 (10.175)	37.18 (11.14)
Gender Identity: <i>N (%)</i>		
Men	126 (64.3%)	69 (59.5%)
Women	66 (33.7%)	47 (40.5%)
Trans Men	4 (2%)	0
Race: <i>N (%)</i>		
Black/AA	18 (9.2%)	10 (8.6%)
White	166 (84.7%)	100 (86.2%)
Latino/a/x	6 (3.1%)	3 (2.6%)
Asian/Asian American	1 (.5%)	1 (.9%)
Native American	3 (1.5%)	1 (.9%)
Multiracial	0	1 (.9%)
Level of Education: <i>N (%)</i>		
High School Diploma/GED	6 (3.1%)	3 (2.6%)
Some College	3 (1.5%)	8 (6.9%)
Bachelors	140 (71.4%)	80 (69%)
Masters	45 (23%)	25 (21.6%)
Doctorate	2 (1%)	0
Relationship Status: <i>N (%)</i>		

Single	19 (9.7%)	16 (13.8%)
Dating (NLWP)	4 (2%)	4 (3.4%)
Dating (LWP)	5 (2.6%)	1 (.9%)
Married	165 (84.2%)	93 (80.2%)
Divorced	3 (1.5%)	2 (1.7%)
Employment Status: N (%)		
Full Time	183 (93.4%)	107 (92.2%)
Part Time	6 (3.1%)	2 (1.7%)
Self Employed	6 (3.1%)	4 (3.4%)
Unemployed		1 (.9%)
Retired		2 (1.7%)
Household Size: M (SD)		
	4 (1.338)	3.45 (1.367)
Socioeconomic Status: N (%)		
Upper Class	25 (12.8%)	4 (3.4%)
Upper-Middle Class	69 (35.2%)	33 (28.4%)
Middle Class	95 (48.5%)	67 (57.8%)
Lower/Working Class	7 (3.6%)	12 (10.3%)

Note: NLWP= Not Living With Partner; LWP= Living With Partner

Table 2*Descriptive Data for Demographic Variables*

	Financially Insecure	Financially Secure	Total	χ^2	<i>t</i>	Sig.
N	56	60	116			
Age: <i>M (SD)</i>	38.61 (13.063)	35.58 (9.428)	37.04 (11.679)		1.599	.113
Gender Identity: <i>N (%)</i>				3.150		.076
Men	38 (67.9%)	31 (51.67%)	69 (59.5%)			
Women	18 (32.1%)	29 (48.33%)	47 (40.5%)			
Race: <i>N (%)</i>				3.640		.602
Black/AA	4 (7.14%)	6 (10%)	10 (8.6%)			
White	49 (87.5%)	51 (85%)	100 (86.2%)			
Latino/a/x	2 (3.57%)	1 (1.67%)	3 (2.6%)			
Asian/Asian American	0	1 (1.67%)	1 (.9%)			
Native American	0	1 (1.67%)	1 (.9%)			
Multiracial	1 (1.78%)	0	1 (.9%)			

Level of Education: N (%)				6.910	.075
High School Diploma/GED	0	3 (5%)	3 (2.6%)		
Some College	4 (7.14%)	4 (6.67%)	8 (6.9%)		
Bachelors	44 (78.57%)	30 (50%)	74 (63.8%)		
Masters	8 (14.28%)	23 (38.33%)	31 (26.7%)		
Relationship Status: N (%)				4.128	.389
Single	7 (12.5%)	9 (15%)	16 (13.8%)		
Dating (NLWP)	1 (1.78%)	3 (5%)	4 (3.4%)		
Dating (LWP)	0	1 (1.67%)	1 (.9%)		
Married	46 (82.14%)	47 (78.3%)	93 (80.2%)		
Divorced	2 (3.57%)	0	2 (1.7%)		
Employment Status: N (%)				5.953	.203
Full Time	52 (86.67%)	55 (91.67%)	107 (92.2%)		
Part Time	0	2 (3.33%)	2 (1.7%)		
Self Employed	1 (1.78%)	3 (5%)	4 (3.4%)		
Unemployed	1 (1.78%)	0	1 (.9%)		

Retired	2 (3.57%)	0	2 (1.7%)		
Household Size: <i>M (SD)</i>	3.47 (1.445)	3.44 (1.298)	3.45 (1.367)	.105	.916
Socioeconomic Status: <i>N (%)</i>				5.002	.172
Upper Class	2 (3.57%)	2 (3.33%)	4 (3.4%)		
Upper-Middle Class	11 (19.64%)	22 (36.67%)	33 (28.4%)		
Middle Class	35 (62.5%)	32 (53.33%)	67 (57.8%)		
Lower/Working Class	8 (14.28%)	4 (6.67%)	12 (10.3%)		

Note: NLWP= Not Living With Partner; LWP= Living With Partner

Table 3*Descriptive Data for Substance Use Measures*

	Financially Secure	Financially Insecure	Total	<i>t</i>	Sig.
DAST-10 <i>M (SD)</i>	4.07 (2.72)	3.86 (2.65)	3.97 (2.68)	-.420	.675
FTCD <i>M (SD)</i>	3.18 (2.83)	2.95 (2.89)	3.07 (2.85)	-.445	.657
SMAST <i>M (SD)</i>	4.65 (3.23)	3.95 (3.27)	4.31 (3.25)	-1.166	.246

Table 4*Spearman's Rho Correlations for All Measures Used*

	1.	2.	3.	4.	5.
1. SMAST	-				
2. DAST	.74**	-			
3. FTCD	.52**	.55**	-		
4. MCQ	.22*	.15	.15	-	
5. PDQ	-.17	.07	.25*	.12	-

Note: SMAST= Short Michigan Alcohol Screening Test; DAST-10 = Drug Abuse Screening Test; FTCD = Fagerstrom Test for Cigarette Dependence; MCQ= $\log_{10}$ transformed delay discounting k values; PDQ= probability discounting h values.

* $p < .05$; ** $p < .001$

Table 5

ANCOVA Results and Descriptive Statistics for Group Assignment by SMAST Scores and Delay Discounting Logk Values

Group	Observed Mean	Adjusted Mean	SD	n
Financially Secure	-1.475	-1.479	.88	48
Financially Insecure	-1.551	-1.547	.84	52

Source	SS	df	MS	F	Sig.
SMAST	.178	1	.178	.238	.627
Group Assignment	.113	1	.113	.151	.699
Error	72.571	97	.748		

* $p < .05$; ** $p < .001$

Table 6

Omnibus test of model coefficients based on a logistic regression analyzing the relationship between group assignment and probability discounting h scores.

	Chi-Square	df	Sig.
Step	5.792	2	.055
Block	5.792	2	.055
Model	5.792	2	.055

Table 7

Binary Logistic Regression Analysis between Group Assignment and probability discounting h scores, and the FTCD (Covariate)

Variable	B Value	p Value	OR (95% CI)
Group Assignment	-1.63	.026	.313 (1.12, .869)
FTCD	.068	.441	1.071 (.90, 1.27)
Model Nagelkerke R²	.105		

Table 8

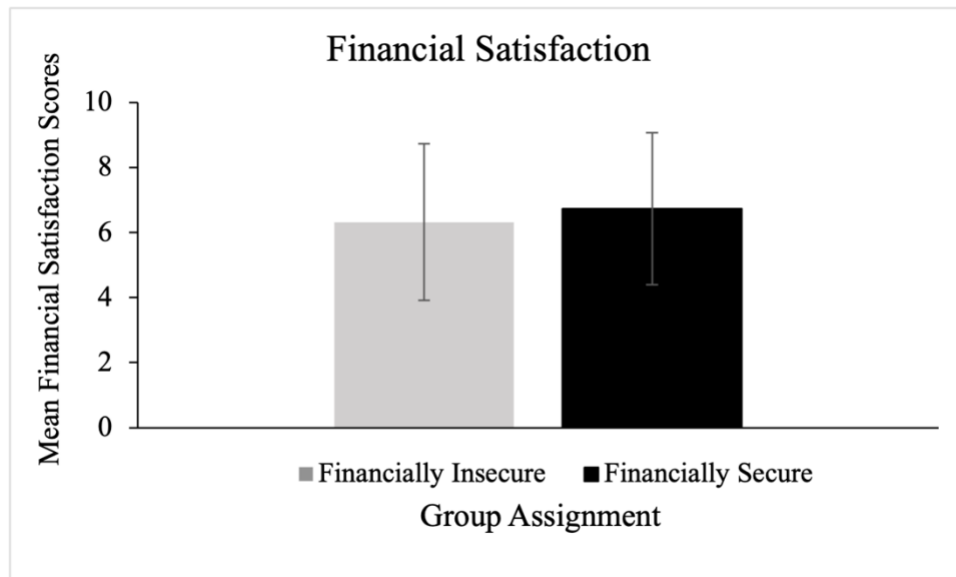
ANCOVA Results and Descriptive Statistics for Group Assignment by SMAST Scores and Probability Discounting h Values

Group	Observed Mean	Adjusted Mean	SD	n
Financially Secure	3.52	3.535	5.08	44
Financially Insecure	6.95	6.934	6.99	31

Source	SS	df	MS	F	Sig.
FTND	28.76	1	28.76	.812	.37
Group Assignment	209.92	1	209.92	5.93	.017*
Error	2548.9	72	35.4		

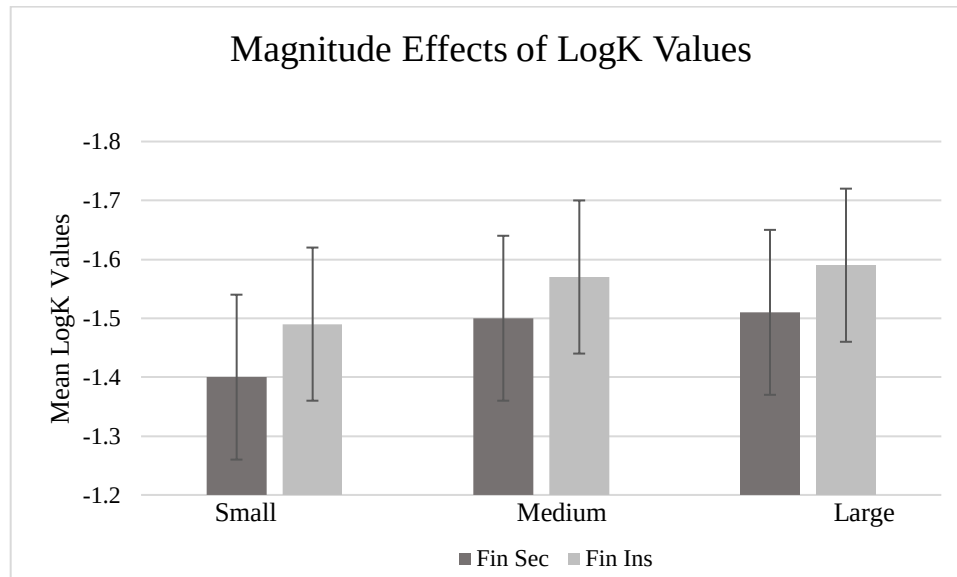
* $p < .05$; ** $p < .001$

Figure 1. Mean financial satisfaction score comparisons for the Financially Insecure and Financially Secure groups.



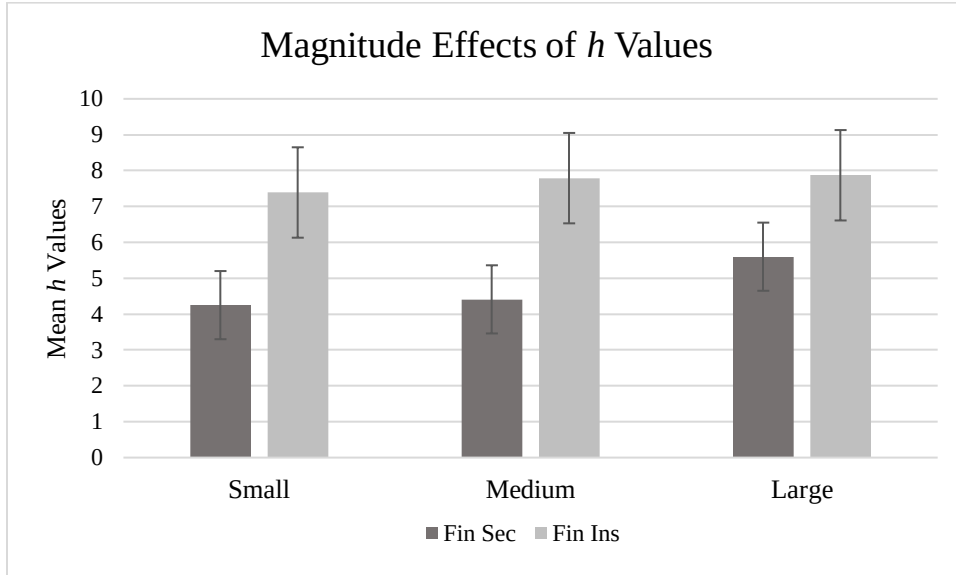
Note: Error bars indicate standard error of the mean.

Figure 2. Magnitude Effects by Group Assignment of Delay Discounting Logk values.



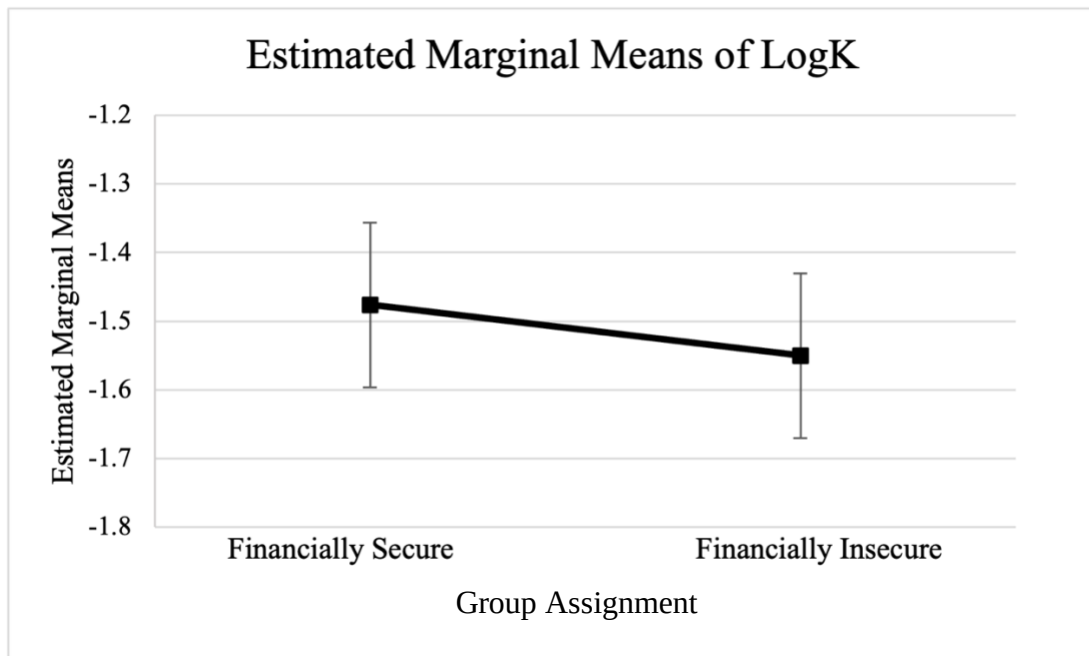
Note: Error bars indicate standard error of the mean. LogK= $\log_{10}$ transformed k values.

Figure 3. Magnitude Effects by Group Assignment of Probability Discounting h values.



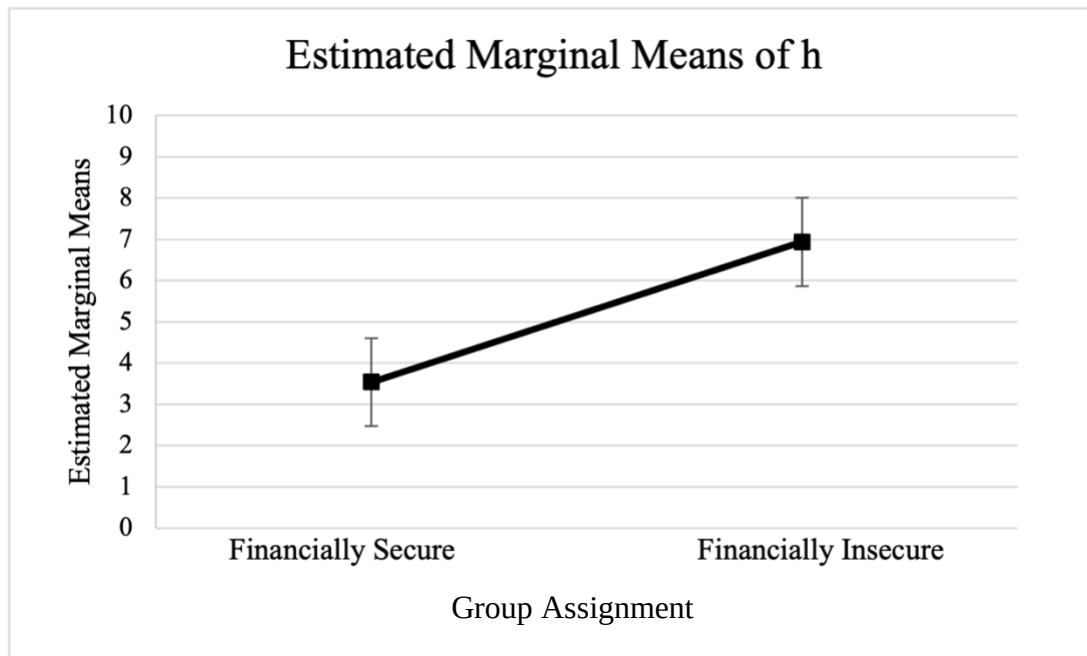
Note: Error bars indicate standard error of the mean.

Figure 4. Estimated Marginal Mean comparisons of LogK Values for the Financially Insecure and Financially Secure groups.



Note: Error bars indicate standard error of the mean. LogK = $\log_{10}$ transformed k values.

Figure 5. Estimated Marginal Mean comparisons of h Values for the Financially Insecure and Financially Secure groups.



Note: Error bars indicate standard error of the mean.

Chapter 2: Full Literature Review

Introduction

Poverty Overview

Definition and Prevalence

According to Glasmeier (2014), poverty can be defined as receiving or earning insufficient income to pay for daily living necessities such as food, water, shelter, and clothing. Therefore, individuals living in poverty do not have the financial means/resources to meet their fundamental human needs. Global poverty has been defined as one of the worst problems that the world faces in that the poorest individuals in the world are regularly hungry, have less access to a formal education, often have no light at night, and suffer from much poorer health (Jamaluddin & Hanafia, 2020). Roser and Ortiz-Ospina (2019) report that two-thirds of the world's population live on less than \$10 per day, and every tenth person lives on less than \$1.90 per day

In order to calculate such poverty rate, the US Census Bureau considers family size, composition, and monetary income to determine whether an individual or family is living below the predetermined poverty line. In 2020, the US Census Bureau defined poverty as an individual, under the age of 65, making \$13,465 or less for the year, or an individual over 65 making \$12,413 or less. This monetary amount in order to establish whether a person is in poverty is dependent on the number of individuals in the household, for example, a two-person household, in which both people are under 65, the combined income must be at or below \$17,331 for the year. In 2019, the United States (US) Census Bureau reported that the official poverty rate in the United States was 10.5% (Semega et al., 2020).

Poverty rates within the United States vary dramatically according to state. These state-level poverty rates range from less than 10% in Iowa to more than 20% in California (Renwick

and Fox 2016). Brady et al. (2017) proposed a theoretical framework of which emphasizes both the prevalence (share of the population with a risk) of poverty risk factors as well as poverty penalties (increased probability of poverty associated with a risk) associated with these risk factors. For example, poverty increases the risk of single motherhood, low education, unemployment, and young headship (head of household). In their 2017 study, Brady and colleagues discovered country-level poverty rate differences were more closely tied to penalties than prevalence. Broadly, this places the importance on specific risks that increase an individual's chance of poverty rather than just overall poverty rates. Given these findings, Laird et al. (2018) sought to explain these state-level poverty differences using Brady and colleagues' theory. They found that state poverty differences are more closely tied to the prevalence of high-risk populations, of which is the opposite of the Brady et al.'s findings regarding country-level poverty rate differences. Despite these findings, they emphasize that state-level antipoverty policy should not solely be focused on changing "risky" behavior at the level of the individual, but rather take into account cost-of-living penalties as well as the state-specific relationships between poverty, prevalence, and penalties.

It is also important to acknowledge that higher rates of poverty are seen within minority populations. The Urban Institute projects that 18.1% and 21.9% of individuals identifying as Black and Hispanic, respectively, will be living below the poverty level. These statistics for minority populations are in stark contrast to the projected poverty rates of white individuals (9.6%), highlighting a drastic and significant disparity in poverty rates on the basis of race. Given such well-established racial and ethnic disparities in U.S. economic outcomes, it is important to examine the causes and perpetuation of poverty related to an individual's racial and ethnic identities. Such disparities are to be further discussed later within this document

Cyclical and Generational Nature of Poverty

Poverty is often characterized as a cycle, in that one born into poverty faces a more difficult time escaping poverty later in life. Wagmiller et al. (2009) found that children who grow up in economically disadvantaged families are more likely to find themselves poor in early adulthood. They also found that the likelihood of being poor in early adulthood sharply increases as the amount of time spent living in poverty as a child increases. Specifically, they examined what proportion of their sample was poor from age 20-35 in five-year increments in relation to the number of years that they lived in poverty as a child. They found that, in individuals who lived in poverty for 50% or more of their childhood (at least 8 years), 46% were poor at age 20, 40% at age 25, 33.6% at age 30, and 45.3% at age 35. These statistics become even more glaring when comparing them to individuals who did not experience poverty as a child, in which 4.1% were poor at age 20, 5.3% at age 25, 4.3% at age 30, and 0.6% at age 35. These statistics emphasize the importance of examining mechanisms that potentially sustaining this cycle.

One of the most significant contributors to this cycle of poverty is barriers to education. Receiving a higher education is a primary way to escape poverty; however, people who are in poverty are the least likely to achieve a college education (Mortenson, 1998). This is paradoxical in that a potential route out of poverty is apparent to many but individuals living in poverty often cannot avail themselves of the opportunity, which perpetuates generational poverty. While this barrier to education is one of the most salient contributors to cyclical poverty, there are many other structural contributors including the class system, the electoral college process, institutionalized gender discrimination, institutionalized ethnic discrimination, and the cycle of poverty (Beeghley, 1988).

Theories of Poverty

Uncovering the causes and factors that maintain poverty has been a topic within the literature for many years. Feagin (1972) presented a theory of poverty that remained central to the conversation of poverty for the following decades. More recent theories of poverty have begun considering intersecting identities and how these might affect poverty. Feagin's seminal paper described three distinct beliefs about the causes of poverty: structuralist, fatalistic, and individualistic. These three theorized causes of poverty described are still used within the literature today and contribute to contemporary understandings of poverty (Henricks & Ortiz, 2021; Nwani & Osuji, 2020).

According to Feagin, a *structuralist* perspective on poverty emphasizes the role of environmental contributors to poverty, specifically larger socioeconomic systems (e.g., discrimination) which cause or perpetuate poverty, which is an environmental/external factor. From this perspective, many factors external to the individual are thought to cause and/or contribute to the perpetuation of an individual in poverty, each of which point to a structural failing within a social system. Structuralist beliefs point towards societal and economic systems such as discrimination, exploitation, and lack of opportunities as main causes of poverty (Feagin, 1975). An example of a structuralistic cause is that those who are lower income may experience discrimination when applying for jobs and ultimately face a decreased likelihood of obtaining said jobs. Another example is that the job market itself may not offer enough jobs for lower income individuals, and the jobs that are offered do not pay a livable wage. This view on the cause of poverty places main emphasis on the society in which one lives as the cause of poverty.

The next explanation of poverty, *fatalistic*, involves believing that a force beyond the individual or environment (e.g., luck or chance) causes or perpetuates poverty. These views on

poverty differ from structuralist and individualistic views in that it places the cause on fate, including concepts such as luck, sickness, and chance (Law and Shek, 2014). Brimeyer (2008) characterized another fatalistic view—divine intervention. This divine intervention could be that God is rewarding those who are loyal to him/follow him and punishing those who do not with poverty and economic hardships.

Contrary to structural explanations of poverty are *individualistic* beliefs. Individualistic beliefs view internal characteristics (e.g., lack of effort) of an individual as the cause or perpetuation of poverty, which is a psychological/internal factor. Basically, this belief looks at characteristics of an individual themselves as the cause of or perpetuation of one's financial position. This theory looks at personal traits such as lack of ability, effort, or morals. It also considers other micro-level characteristics such as skills, talents, habits, familial status, or behaviors, education, social networks, or parental resources. While some of these traits have structural implications, research commonly categorizes them as individualistic (Calnitsky, 2018). An example of this could be blaming someone's financial status on a lack of motivation or effort. There has been much controversy surrounding individualistic beliefs of poverty. More contemporary understandings of poverty take into account the interacting nature of each of these beliefs, and also considers other intersecting identities.

Structural and Institutional Factors

Our understanding of structural factors contributing to poverty have developed tremendously since Feagin's initial contribution. Hoffman and Coffey (2008) inquired about how people that are experiencing homelessness view their interactions with service providers (i.e., employees at emergency shelters, food stamp offices, and other similar agencies). Their results showed that descriptions of staff and providers were predominately negative, with many

highlighting experiences of infantilization and objectification. They argue that, rather than analyzing these responses as an individual psychological or cognitive response, it is due to power relations and social inequities apparent in provider-client relationships. This indicates that the perpetuation of homelessness is embedded within the service industry itself, rather than being internal to the individual.

Calnitsky (2018) argues that structural accounts of poverty tell us whether or not poverty exists in a given society and if so, how much. If it indeed does exist, individual accounts tell us who ultimately becomes poor. This conceptualization merges both structural and individualistic beliefs of poverty but attributes a much smaller role to individualistic characteristics. Calintsky cites single motherhood as an example of this. Brady et al. (2017) note that single motherhood is penalized in the United States, in that single mothers are more likely to experience poverty perhaps because mothers in the workplace suffer from decreased perceived competence and lower recommended starting salaries (Correll et al., 2007). While individual characteristics may explain some of this discrepancy, there are significant structural and institutional factors that likely contribute to poverty also. An example of such structural factor is the motherhood penalty, of which demonstrates that. Lastly, Calintsky states that a causal account of poverty cannot be based on individual attributes alone and that other considerations, such as structural factors, are necessary. Overall, this theory considers the interaction between these factors, as consistent with most things in life, multiple factors contribute to an individual's economic situation.

Structural racism has been conceptualized to affect economic inequality as well, more specifically racial disparities in health status and access to healthcare. For example, some US government policies supported racially separate and unequal distributions of resources including education, housing, employment, healthcare, and other vital resources during the Jim Crow era.

Despite the Supreme Court's ruling that separate and unequal violated the US Constitution, the Civil Rights Acts (1957, 1960, 1964, and 1968), and the Voting Rights Act of 1965, the federal government's unequal treatment of Black Americans did not cease. Yearby (2018) suggest that these inequalities exist still today because these rulings and laws failed to change structures of the United States. More specifically, structural racism prevents Black Americans from obtaining equal access to resources such as wealth, employment, income, and healthcare, resulting in racial disparities in health. While race and ethnicity are contributing factors to one's continuation in poverty, those with intersecting minority identities face even more structural setbacks.

Intersectionality and Poverty

The idea of intersectionality was first introduced by critical race theorist Kimberlé Crenshaw. She put forth a theory in which she recognized that all of the aspects of identity enrich women's lived experiences but also compound and complicate the various oppressions and marginalization's women face (Crenshaw 1990). She further described this as the ways race and gender intersect to affect black women. However, it is important to acknowledge that the idea of intersectionality had been developed over the twentieth century by various black feminists (Crenshaw et al., 1995). During the peak of rights activism, Black women found themselves outcasted by both the black men's and the white women's movements. Because of this, they developed their own ways of conceptualizing social identity. Rather than independent axes of demographics, they suggested interlocking matrices of privilege and oppression (Collins, 1990). Intersectionality includes various identities including race, ethnicity, disability, immigration status, and many other marginalized identities.

Considering intersectionality is vital in the discussion of the wealth disparity in the United States. Gender, age, religion, disability, health, location, and migration history can all be

important when considering the identities that affect an individual's financial status (Barnard & Turner, 2011). Children who are born into poverty are more likely to remain in poverty as adults, but additional marginalized identities further exaggerate this effect (Collins, 1998). Collins demonstrated that the intersection of multiple identities often creates unique forms of burden for those of whom possess multiple marginalized identities. Additionally, children of color are disproportionately likely to be born into poverty and to remain poor as adults (Pew Charitable Trust, 2012). This intersecting identity of being both economically disadvantaged and being a person of color affects an individual more so than just being of color or economically disadvantaged.

Citizenship status is another example of multiple identities interacting to affects one's financial status. Citizenship status has profound influence on the overall life chances of individuals (Amuedo-Dorantes, et al. 2018). Although many migrant workers have high skill levels and good qualifications, research suggests that they often have to take lower-paid jobs (Low Pay Commission, 2010) perhaps because employers fail to acknowledge foreign qualifications (Haque, 2010). While being an immigrant already affect's one's financial status, being undocumented has even more of an effect, since lack of citizenship hinders an individual's opportunities to making a livable income (Borjas, 2016). Additionally, poverty and disability have been found to have compounding effects due to marginalization being prominent in both identities (Moodley & Graham, 2015).

While considering intersectionality is vital when attempting to understand how ethnicity affects experiences and outcomes, Platt (2011) argues that inequality between groups is focused on so much that the field often ignores inequality within these marginalized groups. The National Equality Panel report (Hills, et al., 2010) showed substantial inequalities within varying minority

groups. These observed inequalities were often as large as, and even sometimes larger than, inequality within the entire population. Similar to the concept of intersectionality, this research was fueled by prior literature focusing on minority ethnic women's income and their economic status (Nandi and Platt, 2010). Taking all of this research into account, it is neglectful to not consider intersecting identities and how they each play a role in an individual's economic status.

Impacts of Poverty on Mental and Physical Well-Being

As a result of very limited (or even no access at all) access to basic living necessities, those living in poverty suffer not only consequences to their physical well-being, but also to their mental health. According to Lacey et al. (2020) children in poverty are more likely to experience Adverse Childhood Experiences (ACEs), such as parental separation/divorce, death of a close family member, parental convictions, parental drug use, parental alcohol misuse, parental mental health problems, interparental violence, physical abuse (parent–child), emotional abuse (parent–child), or sexual abuse (older child/adult child). Individuals who report frequent episodes of adversity in childhood, or increased ACEs, are at an increased risk for both physical and mental health problems (Mersky et al., 2013).

Hudson (2005) found that poverty precedes some mental health problems such as depression and anxiety and Cunradi et al. (2002) found that poverty is a risk factor for experiencing trauma or violence, which increases an individual's likelihood of experiencing post-traumatic stress disorder (PTSD), anxiety, and depression. Within poverty, higher rates of parental depression and child disruptive behaviors are observed when compared to individuals not in poverty (Acri et al., 2017). Although children of color who live in poverty are at a greater risk of developing mental health problems, they are less likely to receive effective mental health

services due to barriers such as language, cultural/religious beliefs, and racial discrimination (González, 2005).

Poverty proves to be an extreme influence on one's well-being as it not only impacts one's physical health (in terms of securing adequate housing, food, etc.), but it also may impact mental health. Anakwenze and Zuberi (2013) theorize that there exists a cyclical relationship between poverty and mental health, specifically that poverty cultivates mental illness, while the resulting mental illness reinforces poverty. This further points towards interventions to disrupt this cycle, whether it be at the poverty or mental health level.

Behavioral Economics and Poverty

Definition of Behavioral Economics

Behavioral economics combines economic theory with psychology and human choice behaviors (Thaler, 1981). The main goal of behavioral economics is to understand the behavioral processes that are inherent to human decision making. Traditional economics (Smith, 2010) is more aligned with highly organized human behavior and rarely accounts for individual differences. Pure economic theory also lacks rigorous empirical bases in controlled experiments with individuals, which is where psychology comes in to play (Hursh, 1984). Behavioral economics uses psychology to inform economics, while continuing to rely on mathematical structure derived from economics (Thaler, 1992).

Life is full of decisions, such that we frequently find ourselves preoccupied with daily decision making. Some choices may be relatively easy to resolve, such as what pair of socks to wear. Other choices are difficult and may come with consequences, such as whether to spend \$15 on a healthy salad for lunch or \$6 on a fast-food cheeseburger. While choosing the cheeseburger may save the individual money, of which they can spend on bills, there are

implications for their long-term health. Scenarios like this are more difficult as one must decide whether to make choices for the short-term or the long-term. Saving money might provide someone with a sense of relief now but choosing the unhealthy food option may lead to negative health outcomes in the future. Similarly, spending more money now might increase the likelihood of future better health (for example, on a preventative medical evaluation) when they are older, but they might find themselves struggling to pay bills more immediately. Situations like the ones described above often follow the same theme, would you rather receive something immediately that has delayed and/or long-term negative effects, or wait for something that is better (whether that be quantity or quality).

Traditional economic theory predicts that individuals always choose the more advantageous reward, that is, the larger amount of money after a delay or the salad that ultimately leads to more favorable health outcomes, however, this does not reflect typical human decision making. The decisions that individuals make in scenarios such as these is what interests behavioral economists. Humans sometimes make economic decisions that cannot be explained solely with pure rational economic theory. As such, this is why behavioral economists (Mullainathan & Thaler, 2000) combine both economic theory and psychological theory to explain human behavior. Tversky and Kahneman describe common biases in decision making in their 1974 paper, of which further emphasizes the importance of behavioral economics. These writers indicate that humans tend to rely on a limited number of heuristics that often lead to a less advantageous choice. Heuristics serve to simplify decision making by leading an individual to a quicker and/or easier solution at the sake of the best solution (Gigerenzer, 2008). These heuristics, which act to simplify the workload decision making causes, often cause decisions that are not the most optimal.

Behavioral Economics and Poverty

One potential mechanism that potentially contributes to one's continuation in poverty is that poverty influences individual economic decision making in a way that increases the likelihood of continued future poverty. Farah et al. (2017) described this continuation in poverty due to poverty as the poverty trap. They listed present mindedness as having a reciprocal causal relationship with poverty. Specifically, an individual in poverty may be more present-minded (discounting the future), which leads to the individual remaining in poverty. For example, an individual lacking financial resources may choose to accept a smaller amount of money as they receive it immediately as opposed to a larger amount after a delayed amount of time. Choosing the smaller-sooner reward might make more sense in the context of poverty as an individual could benefit more from receiving money immediately, despite the delayed amount being larger. If a participant hasn't had the money to eat, and they have the choice of receiving \$5 immediately or \$40 in a week, they may choose the immediate amount as they have more immediate problems to be solved. Though the delayed amount is considerably larger, waiting a week to receive it will not solve the more immediate hunger problem now. In other words, poverty may increase the necessity of being more present-minded, ultimately leaving one at a disadvantage as compared to someone else who is able to delay that immediate gratification in order to obtain a larger amount. Mullainathan and Shafir (2013) propose that the circumstances created from being poor increases the likelihood of behaving in ways that increase an individual's chances of remaining in poverty. They propose that the mindset molded through resources scarcity affects decision making, for example over-borrowing and insufficient saving.

Poverty has been a heavily researched topic within behavioral economics, with researchers studying the influence of both economic and psychological theories. Researchers

have been interested in the behavioral-economic factors associated with poverty. One theory as to why those in poverty behave differently on behavioral economic tasks is that living in poverty imposes a cognitive load that reduces effort and affects attention (Mani et al., 2013). In their study, Mani and colleagues induced thoughts of finances in individuals who were poor vs. well-off. They found reduced cognitive performance in those who were classified as poor, but not in those who were well-off. This indicates a relationship between cognitive performance and poverty, which in turn could also have implications on decision making. Looking at not only one's monetary income but also their behaviors with said income is important when explaining poverty. According to Mittal and Griskevicius (2014) those who were raised in households that faced economic uncertainty were more likely to choose smaller sooner rewards than those raised in wealthy households.

Haushofer and Fehr (2014) propose that poverty results in psychological outcomes that lead to economic behaviors that in turn make it more difficult to escape poverty. They examine the relationships between poverty, psychological outcomes, and various measures of behavior/decision making through various peer reviewed studies. Such studies reveal findings such as people living in poverty being more likely to discount delayed rewards (Lawrance, 1991; Yesuf et al., 2008; Pender, 1996) and being more risk adverse than wealthier individuals (Dohmen, 2011; Guiso & Paiella, 2008). These data contribute to the idea that poverty is related to both risk-taking and temporal-discounting. Haushofer and Fehr conclude that poverty causes psychological consequences, such as stress and negative affect, which lends itself to being more sensitive to delayed rewards (favoring sooner rewards) and being more risk averse. Given the research demonstrating. Given this relationship between poverty and sensitivity to delayed rewards, it is imperative to examine a causal relationship between the two.

Delay Discounting

Delay discounting (DD) is a common model used to examine decision making that involves examining patterns of choices that indicate sensitivity to delays to receiving rewards. Participants are presented choices between a smaller-sooner vs larger-later reinforcers or outcomes. DD was first studied in non-human animal laboratories utilizing basic operant conditioning principles (Logan, 1965). These subjects, commonly rats and pigeons, were trained using food or water that was available immediately or after a delay using adjusting delay and amount procedures (Mazur, 1997; Richards et al., 1997). These studies found that these non-human animals discounted delayed rewards in a hyperbolic function (Mazur, 1987), which was later found to be the same pattern of discounting in humans (Rachlin et al., 1991). Animal subjects are still utilized within the field, most notably within translational research. Though a rat and human seem very different, the same concepts and questions underlie discounting research in both.

In DD tasks designed for human subjects, individuals make a series of choices between a smaller reward available immediately and a larger reward available after a delay (e.g., \$3.50 now or \$10 in one week). The size of the smaller reward is adjusted to obtain an individual's subjective value of the reward at that delay. Participants typically select the larger-later reward when the immediate reward is very small, but as the immediate reward increases in value across the series of choices, participants will eventually switch and begin choosing the smaller-sooner reward. This point when individuals switch their choice from the larger-later reward to the smaller-sooner reward is called the indifference point, which establishes the subjective value of the larger-later reward at that delay. For example, if an individual chooses a \$10 reward that is available after one week instead of the immediate reward of \$5, \$6, or \$7, but finally selected the

\$8 available immediately instead of the \$10 available after a week delay, then the individual's indifference point would equal \$7.50, which means that the individual subjectively values \$10 in one week as the same as \$7.50 now.

This process is repeated across multiple delays, which typically yields indifference points that diminish as the delay to the larger reward increase. Plotting individual indifference points models individual's patterns of behavioral choices. These patterns can be described using a hyperbolic function, where the delay or time to the award, is plotted along the x-axis and along the y-axis is the subjective value of that reward. A hyperbolic function mathematically describes this pattern (Mazur, 1987; Eq. 1):

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

where V represents an individual's subjective value of A , which is the reward/amount, at the specified delay (D) while k acts as a free parameter. K is devised to capture the rate that an individual discounts rewards over multiple delays. In DD, higher k values indicate a preference for smaller-sooner (or more delay sensitive) outcomes. Therefore, the steeper the rate of discounting, the more sensitive to delay an individual is. Another way to quantify an individual's patterns of responding is with Area Under the Curve (AUC; Myerson et al., 2001). Area under the curve provides an atheoretical index of the extent of an individual's discounting. AUC estimates range from 0 to 1 and tend to be normally distributed. Lower AUC values indicate more sensitivity to delay.

Discounting is a fundamental process that underlies a range of human health problem behaviors such that relatively steep rates of DD are associated with drug dependency (Coffey et al., 2003), obesity (Rasmussen et al., 2010), alcohol in the context of substance use disorder (Mackillop et al., 2011), and sexual risk behavior (Mahoney & Lawyer, 2018). Often, problems

resulting from health behaviors stem from an individual's decision making. These decisions commonly include making a decision based on short-term reinforcers rather than long-term reinforcers, as the extended delay to their delivery is not favorable. The selection of the short-term reinforcers is often associated with long-term punishers. A common example of this is drug use, whereby individuals often choose the short-term reinforcer (drug use and the associated reinforcers) over the long-term reinforcer (better health). Often, using drugs also comes with long-term punishers such as many adverse health consequences (Chen & Lin, 2009).

This common thread lead Bickel and Mueller (2009) to describe DD as a trans-disease process common across numerous psychological disorders and ultimately an influence in comorbidity. DD has shown to be an endophenotype for psychiatric disorders such as ADHD, substance use disorders, and major depressive disorder, which may explain why comorbidity rates among these are high (Bickel et al., 2019).

The reinforcer pathology model (Bickel et al., 2014) refers to the joint effect of the high valuation of a reward and/or the excessive preference for the immediate delivery of a reward despite the long-term consequences. Bickel and colleagues further hypothesize that reinforcer pathology is attributable to both repetitive person-level variables and environmental-level factors. The reinforcer pathology model also takes into account demand for a reinforcer. Individuals who exhibit reinforcer pathology value their reinforcer/substance of dependence more than other reinforcers in that they may consume more, have an increased hedonic value, put more effort into and allocate more resources towards obtaining that reinforcer, and/or the extent to which consumption is sensitive to a change in price. This model has been used to explain substance use disorders (i.e., cigarettes, cocaine, heroin, alcohol) and obesity, aiming to identify underlying features involved (Bickel et al., 2014; Dehart et al., 2020). For example, MacKillop

and colleagues (2010) found greater DD of monetary rewards and greater alcohol demand in individuals with a greater severity of alcohol use disorder.

While there have been many different measures created to examine DD, the Monetary Choice Questionnaire is one of the most commonly used. The Monetary Choice Questionnaire (MCQ) is a shortened delay-discounting task that requires participants to make 27 choices between smaller sooner and larger later hypothetical monetary reinforcers (Kirby et al., 1999; Kirby et al., 1996). Kirby and colleagues (1999) had three reward sizes small (\$25-\$35), medium (\$50-\$60), and large (\$75-\$85), with reinforcer amounts varying between \$11-\$80, and delays varying from 7 to 186 days (one week to six months). This classification of reward sizes allowed the researchers to examine magnitude effects on discounting rates. The MCQ relies on the assumption of hyperbolic DD and utilizes k (the rate of discounting) to describe one's choice behavior. The MCQ does not determine indifference points, but rather assigns predetermined k values associated with each choice. The individual's series of choices determine their estimated k value, as well as the degree of fitness of that k value to the individual's choices.

On the Limits of 'Impulsivity'

Within the behavioral economics literature, terms such as *impulsive* and *impulsivity* are often used to describe the choice behaviors of participants. It is not uncommon and rather the norm within the field to describe an individual who exhibits a preference for smaller-sooner reinforcers as *impulsive* and to describe an individual who exhibits a preference for larger-later reinforcers as self-controlled. Presenting *impulsivity* as a psychological construct has recently been challenged within the field. Strickland and Johnson (2020) recently argued against the utility of using impulsivity as a broad construct, as they claim that it does not meet the requirements of a construct. Specifically, the aforementioned measures of *impulsivity* are often

not correlated (e.g., response inhibition and delay discounting). This is demonstrated by Reynolds and colleagues (2006), who suggested these measures represent distinct constructs that should be considered in their own right, as separate processes, rather than be considered as independent measures of a larger *impulsivity* construct.

Often, terms used within the behavioral and psychological sciences have preexisting meanings within a cultural context. While such common language has the ability to facilitate easier dissemination within the lay public, these similarities between scientific and public definitions generate confusion when the scientific meaning differs from the lay use. Impulsivity can be defined as “the character of being impulsive or acting on impulse, without reflection or forethought” (Evenden, 1999). This definition of impulsivity fits well with some concepts such as response inhibition (e.g., a reflexive response without forethought) but does not accurately represent other ideas such as DD. Intertemporal choice tasks (e.g., delay discounting and probability discounting) are not inherently done “without foresight,” as choices of smaller-sooner reinforcers over larger-later reinforcers are often given considerable thought across both experimental and natural settings. Also, selecting the smaller-sooner reward is not inherently maladaptive in all instances, as it is advantageous under some conditions to select the smaller yet sooner option under constraint or future uncertainty (Green & Myerson, 2019).

Behaviors that result in negative consequences are often defined as impulsive and therefore characterized by poor decision-making or “foolish” actions. However, these same behaviors can be placed within a context or environment in which they produce more beneficial outcomes, in which they are seen as indicators of “positive” traits such as boldness or courage (Daruna & Barnes, 1993; Dickman, 1990; Evenden, 1999). This calls attention to the context dependent nature of the usage of impulsivity and the idea that such impulsive behaviors likely

stem from an evolutionary environment that favored their selection. Individuals with marginalized identities are especially susceptible to this.

Similar to “impulsivity”, “risky” is another term that should be used with caution. For this reason, quotes will remain around the word “risky” to acknowledge the subjective nature of risk taking and to avoid stigmatization of such activities commonly labeled as “risky”.

Probability Discounting

Similar to DD, probability discounting (PD) refers to the tendency to devalue an outcome as a function of its likelihood (rather than delay). PD relies on the theory that the value of a reward decreases when its occurrence is probabilistic. An example of this would be giving participants the option of receiving \$25 “for sure” or having a 75% chance of receiving \$30. The “risky” choice would be selecting the higher magnitude probabilistic reinforcer over the smaller magnitude for sure reinforcer. Selecting the smaller for sure reinforcer would be considered risk averse behavior. As previously stated, sometimes choosing the less “risky” amount and receiving less money, makes more sense to an individual. Think about the phrase “A bird in the hand is better than two in the bush.” It makes sense to stick with the one bird in your hand because you do not know if they two birds in the bush are even there. However, the individual is missing out on potentially doubling their reinforcers.

PD tasks require individuals to make a series of choices between a smaller reward available for-sure and a probabilistic larger reward. Determining the subjective value of the larger outcome is done similar to DD, except that the subjective value of the large outcome is established across several probabilities. PD can be described with a similar hyperbolic decay model:

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

where V represents the current subjective value of A , which is the amount of the large outcome, O represents the odds against receiving A the large outcome ($[1/p] - 1$, where p is the probability), and h is a free parameter that describes the rate of decrease in value of the large outcome as a function of its probability. Lower h values indicate a preference for larger-probabilistic outcomes over smaller-certain outcomes.

Similar to DD, research has examined associations between PD and health-related consequences and outcomes, though relatively sparse. PD has been shown to be associated with behaviors such as gambling (Holt et al., 2003) and sexual risk-taking (Mahoney & Lawyer, 2018). PD has also been associated with substance use such as cigarettes (Reynolds et al., 2004), however, associations with other substances have been less consistent across studies. While human subject studies have not shown consistent results on the impact of alcohol use on PD, research conducted by Nasrallah and colleagues (2009) showed relationships between alcohol use and discounting in rats exposed to alcohol in which these subjects' displayed preferences for riskier choices. Overall, PD stands to underlie a range of health problem behaviors.

Madden et al. (2009) describes a Probability Discounting Choice Questionnaire (PD MCQ) for hypothetical monetary outcomes in which participants chose between receiving a small amount of hypothetical money for sure or a probabilistic larger amount of money. This Probability Discounting Choice Questionnaire requires participants to make 30 choices between smaller for-sure and larger probabilistic reinforcers. Reinforcer amounts vary between \$20-\$100, and probabilities range from 25%-90%. The hyperbolic discounting, h , is calculated in a similar method as the DD MCQ discounting value. This PD measure relies on the assumption of hyperbolic PD and utilizes h (the rate of discounting) to describe one's choice behavior. Individuals with lower h values are discounting at higher rates and would be considered "risky."

The literature regarding correlations between PD and DD is mixed, showing both positive and negative correlations. This means that just because someone appears to be sensitive to delay, they will not necessarily be sensitive to probability, or vice versa. The question once rose if DD and PD were different phenomenon, specifically wondering if they both reflect a single discounting process. This question is especially relevant given they both typically produce a hyperbolic function when graphed. However, Green and Myerson (2004) determined that the two discounting procedures are indeed different phenomenon. They attributed this to the findings that the amount of reward has opposite effects on the rate at which delayed and probabilistic rewards are discounted (Green et al., 1999).

Commodity-Specific Discounting

Discounting patterns can be influenced by the nature of the commodity (i.e., domain specificity). Depending on the domain used, some individuals may discount more steeply than others, especially depending on the efficacy of the reward. For example, cigarettes may not be as potent for individuals who have never smoked, while cigarettes may be discounted at steeper rates by an individual who smokes often. Discounting researchers have examined domain-specific discounting across various putative rewards, including drugs (Coffey et al., 2003), cigarettes (Bickel et al., 1999), alcohol (Petry, 2001), pornography (Lawyer, 2008), sex (e.g., Johnson & Bruner, 2012; Lawyer, et al., 2010), and food (Rasmussen et al., 2010).

Odom's (2011) review on delay discounting across commodities found that nonmonetary outcomes (i.e., alcohol, cigarettes, food) are discounted at higher rates than monetary outcomes. Estle and colleagues (2007) hypothesized that directly consumable rewards (food, substances, etc.) are more steeply discounted than monetary rewards because they differ in terms of their fungibility, or the ability to exchange a commodity for other goods. Basically, while you can use

money to buy other goods, non-monetary outcomes are not as readily exchangeable with each other.

Discounting rates of specific commodities may also be differentially related to health behaviors. Mahoney and Lawyer (2018) found delay and probability discounting for money were not related to a measure of delay gratification (Delaying Gratification Inventory [DGI]; Hoerger, Quirk, & Weed, 2011), but that DD for sexual activities was significantly related to the Physical Pleasures subscale of the DGI. Additionally, Lawyer and Schoepflin (2013) found discounting for sexual activities was significantly associated with sexual excitability, but not with non-sexual outcomes (i.e., money). This highlights the importance of commodity specificity when examining some health behaviors. When conducting a study involving discounting, researchers should be thoughtful of the domain chosen. This is evident in Rodriguez et al. (2021) in that they found higher rates of DD for food in food insecure women, but not for money. Thus, it is imperative to use the appropriate commodity when measuring discounting rates for the proposed outcome in order to more accurately reflect sensitivity to delay.

Real vs. Hypothetical Outcomes in Discounting

Discounting procedures typically use hypothetical, rather than real, rewards or outcomes. Real rewards have several limitations associated, including being costly, logistically difficult to deliver delayed rewards, and at times even being ethically questionable or illegal to deliver the rewards (i.e., cigarettes, alcohol, drugs). However, there are valid concerns with using hypothetical reinforcers. Past researchers who employed hypothetical rewards have questioned the validity of their results as choices made between these hypothetical outcomes may not reflect choices made between real outcomes (Madden et al., 2003).

Evidence supports the efficacy of using hypothetical reward, with literature showing that discounting procedures implementing hypothetical rewards produce data that is consistent with those using potentially real (Johnson & Bickel, 2002; Lawyer et al., 2011; Hinvest and Anderson, 2010) and real (Lagorio & Madden, 2005) rewards. Using a within subjects design, Madden and colleagues examined discounting rates of real and hypothetical rewards with delays ranging from 6 hours to 1 year with an adjusting-amounts procedure. In order to counterbalance, half of their participants completed the hypothetical-reward condition first and then the real-reward condition, while the other half experienced just the opposite (real-reward condition first and then the hypothetical-reward condition). No significant effects were found on hyperbolic discounting or area under the curve between real and hypothetical monetary rewards. This study examined the validity of using hypothetical rewards, finding no notable difference between using real or hypothetical rewards. Other within subjects designs (Johnson & Bickel, 2002; Madden et al., 2004) and between subjects research designs (Madden et al., 2004; Lawyer et al., 2011) have also shown no notable differences between real and hypothetical rewards.

Research Examining the Relationship Between Poverty and Discounting

The small extant literature on risk aversion and poverty suggests that living in poverty is associated with risk aversion. In a study conducted by Dohmen et al. (2011), wealthier households in a large sample of Germans displayed lower levels of risk aversion than less wealthy individuals using both self-report and behavioral methods. Their participants included 22,000 German individuals who completed the German Socio-Economic Panel (SOEP), of which was constructed to be representative of the adult German population. Their self-report method included a question assessing a general willingness to take risks, of which results were found to be comparable to their behavioral measure. Their behavioral measure included a paid

lottery experiment in which participants were asked a series of questions asking them to choose between receiving a “safe” option, or playing the lottery. The lottery option remained constant (they win either €300 or €0 with equal probabilities) while the “safe” option (increasing across each question). Risk-taking was then determined by examining individual switch points. In a study conducted by Ostaszewski et al. (2007), they showed a negative correlation between income and PD, in that those with lower incomes typically discount probabilistic rewards at higher rates than individuals with higher incomes. In this study, individuals with lower incomes chose the smaller for-sure amount, possibly due to the uncertainty of receiving the larger amount. Not knowing whether you will be able to obtain something later on, even if a larger amount, explains why one would settle for a smaller amount more probable.

Previous research has shown negative correlations between income and delay discounting (Lawrance, 1991; Haushofer and Fehr, 2014), in that those with lower incomes discounted delayed outcomes at higher rates; meaning they would choose smaller sooner over larger later reinforcers. This pattern of selecting a smaller-immediate over a larger-later reward can be thought of as individuals making choices that appeal to short-term needs while the long-term benefits of selecting the larger delayed reward are less considered. Understanding the relationship between low-income and economic decision making is very important as economic decision-making can have effects on one’s continuation in poverty. Carvalho et al. (2016) surveyed two groups of low-income participants, one of which was before payday and the other after payday. Each group completed a variant of Andreoni and Sprenger (2012)’s Convex Time Budget, in which participants make a series of questions allocating a hypothetical \$500 budget in which the interest rate varied (0%, 0.5%, 1%, 3%) as did the mailing date of the payment (today or four weeks from now). They found that before payday group made more present-biased

decisions about monetary reinforcers than the after-payday group. In a study directly related to poverty, Rodriguez and colleagues (2021) examined the relationships between food insecurity, DD for food and money, and PD between food and money in women. They observed higher rates of obesity and higher rates of DD for food in women experiencing food insecurity. However, they found no significant differences between women experiencing food security and women experiencing food insecurity in DD for money and in PD for both food and money. This suggests that food insecurity is associated with sensitivity towards delayed food, but not towards money. Adamkovič (2019) examined the relationship between poverty and sensitivity to delay. They measure sensitivity to delay using a corresponding subscale from the Poor Behavioural Regulation Scale (Wills et al., 2013). This subscale consists of 8 items, with items such as “I usually do what I want when I want to, I don’t think about what it will mean to me later”. Individuals respond on a 5-point response scale (1 = Not true at all; 5 = Very true). Adamkovič found very small effects of poverty on the delay of gratification but their measure of sensitivity to delay was self-report and therefore subject to social desirability in responding.

The studies cited above examined the relationships between discounting and poverty but causal statements about the experience of poverty are neither ethical nor feasible. One way that researchers attempt to establish clearer causal connections between poverty and decision-making is by manipulating perceptions of the adequacy or security of participant finances as an analogue to the experience of poverty. Several studies have used manipulations of perceived financial security to establish a clearer causal relationship between the perception of financial insecurity and discounting. It is worth noting that such manipulations do not mirror the broad and chronic conditions that contribute to the complex experience of poverty, but represent an analog to one experience of poverty—financial insecurity—that allow for causal statements regarding an

individual's financial perceived well-being and decision-making processes like discounting. Additionally, research in this field can be difficult as low-income individuals are considered 'hard-to-reach.' Hard-to-reach groups are defined as groups of people who have historically been difficult to find or contact for research (Hinojosa et al., 2014). Due to this dilemma of obtaining low-income participants researchers have had to find solutions around this, including manipulating perceptions of the adequacy or security of participant finances as an analogue to the experience of poverty.

Nelson et al. (2005) used an early manipulation of personal financial security, in which they simply asked participants whether they were carrying any money. The hypothesis was that individuals who were not carrying money would feel less financially secure than those who were carrying money. Their hypotheses were confirmed, but this observational method does not allow researchers to experimentally study financial insecurity.

A procedure commonly used to manipulate individual perception of financial security involves asking participants to indicate their relative financial well-being on different scales (i.e., one scale has a much wider range [e.g., \$0-\$50,000] and one has a much smaller range [e.g., \$0-\$2,000]) creating the perception that their financial well-being is relatively strong (their income is near the top of the scale) or weak (their income is near the bottom of the scale) relative to others. Research indicates that those whose income is near the top of a scale tend to be more satisfied than those whose income is closer to the bottom, even if the absolute amount of income is the same (Schwarz, 1999). This manipulation technique has been replicated several times (Nelson et al., 2005; Briers et al., 2013; Callan et al., 2011).

Nelson and colleagues (2005) used an additional financial perception manipulation in a second part to their study in which subjects indicated the combined amount of money in their

checking and savings accounts on one of two scales. On the ‘financially secure’ scale, income was indicated on an 11-point scale that ranged from \$0-\$50 to \$500+ with \$50 increments. On the ‘financially insecure’ scale, income was indicated on an 11-point scale that ranged from \$0-\$500 to \$400,000+. This means that most participants responding on the financially secure scale would respond on the higher end while most responding on the financially insecure scale would fall on the bottom of the scale.

They found that those who reported their finances on the \$500 scale were more financially satisfied than those who reported their savings on the \$400,000 scale, even though actual financial resources did not differ between the two groups. Nelson and colleagues (2005) had more control over this manipulation than the other manipulation (asking if participants are carrying money) as they randomly assigned participants to conditions, wherein the other study had no control on whether participants were carrying money. The findings that this manipulation of perceived financial security was effective leads to the question of whether this financial manipulation would also affect DD in individuals, knowing that lower income individuals typically discount delayed rewards at higher rates.

Several researchers have used variations on this experimental manipulation to study how perceived financial insecurity affects DD. Callan et al. (2011) found that participants who were made to perceive their financial situation as less secure had an increased preference for smaller-sooner reinforcers. Their manipulation involved participants being randomly assigned into either a less or more discretionary income group. Participants reported both their average monthly income and their average monthly nondiscretionary spending. They were then told that they would receive feedback about their discretionary income that was determined by “statistical procedures,” though no such procedures took place. Then participants were told their calculated

discretionary income (CDI) index score was either -\$523 (indicating less discretionary income) or +\$87(indicating more discretionary income). They then completed a computerized delay-discounting task in which participants made six choices between a relatively small monetary outcome (that started at \$500 and was adjusted depending on the previous decision made in order to find an indifference point at \$500 and was adjusted) and a larger outcome (\$1,000) at each of seven different delays (1, 7, 30, 90, 180, 365, and 730 days). They found that those in the financially less secure group had smaller AUCs, indicating preference for the smaller sooner reinforcers. This study showed that manipulating perceptions of personal finances had an impact on economic decision making with a more complex delay-discounting task.

Using a similar method, Moeini-Jazani et al. (2019) found that self-affirmation reduced DD in individuals who perceived themselves as financially deprived. In their study, they directly manipulated feelings of financial deprivation by using the previously mentioned scale strategy. Participants were assigned randomly to one of two groups—either the financially deprived group or the financially non-deprived group. The financially deprived group indicated their monthly income on a scale that ranged from \$0 to \$50,000 (and above) with \$5,000 increments. The financially non-deprived group indicated their monthly income on a scale that ranged from \$0 to \$2,000 (and above) with \$200 increments. After participants finished indicating their monthly income on their assigned scale, they were told that an algorithm would calculate their relative financial status, though no such calculation actually happened. Individuals in the financially deprived group received a message telling them that they lacked financial resources and were then asked to write about how it feels to live a financially constrained life. Those in the financially non-deprived group received a message that they had an adequate amount of financial resources and were then asked to write about how it feels to live a financially adequate life.

Participants in both conditions then completed the same DD task. For this task, participants were asked what amount of money they would require at 3, 9, and 18 months in the future to make them indifferent to receiving \$65 now. Their results indicated a main effect of perceived financial status on participants' AUC, showing that subjects who were in the financially deprived group had less AUC than participants who were in the financially non-deprived group. In other words, participants that were in the financially deprived group preferred smaller sooner rewards to larger later rewards. While the financial deprivation manipulation used in this study did have an effect on personal perception of one's finances, a relatively non-expansive measure of DD was used.

These findings suggest that in-the-moment perception of financial insecurity may affect the tendency to prefer small-sooner monetary outcomes over larger-delayed monetary outcomes. Such findings may contribute to a broader understanding of the factors that influence personal financial decisions and may contribute to challenges escaping poverty. However, the research on this topic to date is limited to only a few studies and only in the context of delay discounting. No research to date using perceptions of financial security on PD.

Purpose of Study

The proposed study aims to clarify if those who perceive their finances as less secure are more sensitive to delay when making monetary decisions than their counterparts who perceive their finances as more secure. Another purpose of this study is to expand the literature regarding perceptions of financial security and discounting using a DD procedure that has not been used in these previous studies. Past research looking at perceptions of financial security and DD have used either very perfunctory measure of DD (Moeini-Jazani et al., 2019) or lengthy measures (Callan et al., 2011). A shorter measure may not fully encompass one's discounting patterns, and

longer measures may impact the participant's responses as they may hit fatigue. Kirby's Delay Discounting Monetary Choice Questionnaire has not yet been used in similar studies and it is also a short, yet extensive, measure. Therefore, it will be used in the proposed study.

Another purpose of the proposed study is to fill the gap in the literature regarding how perceptions of financial security may affect an individual's sensitivity to probability, specifically PD. The effects of financial perceptions on an individual's PD have not been measured. While financial deprivation seems to affect one's sensitivity to probability, no methods of measuring PD specifically have been used with this manipulation of perceived financial stability by using manipulated income scales.

Hypotheses

Hypothesis 1: Individuals who are randomly assigned to the Financially Insecure group will discount delayed monetary rewards at higher rates than those in the Financially Secure Group. In more simple terms, they will be more sensitive to the delayed outcomes than their financially secure counterparts.

Hypothesis 2: Individuals who are randomly assigned to the Financially Insecure group will discount probabilistic monetary rewards at higher rates than in the Financially Secure Group. In more simple terms, they will behave more risk averse than their financially secure counterparts

Appendix A: Demographics Questionnaire

1. How old are you in years? _____
2. What is your gender identity? Select the answer that fits best.
 - a. Man
 - b. Woman
 - c. Transgender
 - d. Gender Queer
 - e. If not listed, please describe: _____
3. What best describes your race? Select all that apply.
 - a. Black/African American
 - b. Latino/a/x/Hispanic
 - c. White/European American
 - d. American Indian
 - e. Asian/Asian American/Pacific Islander
 - f. Multiracial
 - g. Other: _____
4. What is your highest level of education?
 - a. High School Diploma/GED
 - b. Some college
 - c. Bachelor's degree
 - d. Master's degree
 - e. Doctorate/Professional degree
5. Which best describes your relationship status?
 - a. Single
 - b. Dating but not living with partner
 - c. Dating and living with partner
 - d. Married
 - e. Divorced
 - f. Widower
 - g. Other: _____
6. What is your current employment status?
 - a. Full-time
 - b. Part-time
 - c. Self-employed
 - d. Unemployed but looking for a job
 - e. Retired
 - f. Unable to work/other
7. What is your household size? _____

Appendix B: Short Michigan Alcohol Screening Test

The following questions concern information about your involvement with alcohol during the past 12 months. Carefully read each question and decide if your answer is “YES” or “NO”. Then, check the appropriate box beside the question.

Please answer every question. If you have difficulty with a, then choose the response that is mostly right.

These questions refer to the past 12 months only.

1. Do you feel that you are a normal drinker? (by normal we mean do you drink less than or as much as most other people).

YES NO

2. Does your wife, husband, a parent, or other near relative ever worry or complain about your drinking?

YES NO

3. Do you ever feel guilty about your drinking?

YES NO

4. Do friends or relatives think you are a normal drinker?

YES NO

5. Are you able to stop drinking when you want to?

YES NO

6. Have you ever attended a meeting of Alcoholics Anonymous (AA)?

YES NO

7. Has your drinking ever created problems between you and your wife, husband, a parent or other near relative?

YES NO

8. Have you ever gotten into trouble at work because of your drinking?

YES NO

9. Have you ever neglected your obligations, your family, or your work for two or more days in a row because you were drinking?

YES NO

10. Have you ever gone to anyone for help about your drinking?

YES NO

11. Have you ever been in a hospital because of drinking?

YES NO

12. Have you ever been arrested for drunken driving, driving while intoxicated, or driving under the influence of alcoholic beverages?

YES NO

13. Have you ever been arrested, even for a few hours, because of other drunken behaviors?

YES NO

Appendix C: Drug Abuse Screening Test–10

The following questions concern information about your possible involvement with drugs not including alcoholic beverages during the past 12 months.

"Drug abuse" refers to (1) the use of prescribed or over-the-counter drugs in excess of the directions, and (2) any nonmedical use of drugs.

The various classes of drugs may include cannabis (marijuana, hashish), solvents (e.g., paint thinner), tranquilizers (e.g., Valium), barbiturates, cocaine, stimulants (e.g., speed), hallucinogens (e.g., LSD) or narcotics (e.g., heroin). Remember that the questions do not include alcoholic beverages.

Please answer every question. If you have difficulty with a statement, then choose the response that is mostly right. In the past 12 months...

1. Have you used drugs other than those required for medical reasons?

YES NO

2. Do you abuse more than one drug at a time?

YES NO

3. Are you unable to stop abusing drugs when you want to?

YES NO

4. Have you ever had blackouts or flashbacks as a result of drug use?

YES NO

5. Do you ever feel bad or guilty about your drug use?

YES NO

6. Does your spouse (or parents) ever complain about your involvement with drugs?

YES NO

7. Have you neglected your family because of your use of drugs?

YES NO

8. Have you engaged in illegal activities in order to obtain drugs?

YES NO

9. Have you ever experienced withdrawal symptoms (felt sick) when you stopped taking drugs?

YES NO

10. Have you had medical problems as a result of your drug use (e.g., memory loss, hepatitis, convulsions, bleeding)?

YES NO

Appendix D: Fagerström Test for Cigarette Dependence

1. How soon after waking do you smoke your first cigarette?
 - a. Within 5 minutes
 - b. 5-30 minutes
 - c. 31-60 minute

2. Do you find it difficult to refrain from smoking in places where it is forbidden? E.g., Church, Library, etc.
YES NO

3. Which cigarette would you hate to give up
 - a. The first in the morning
 - b. Any other

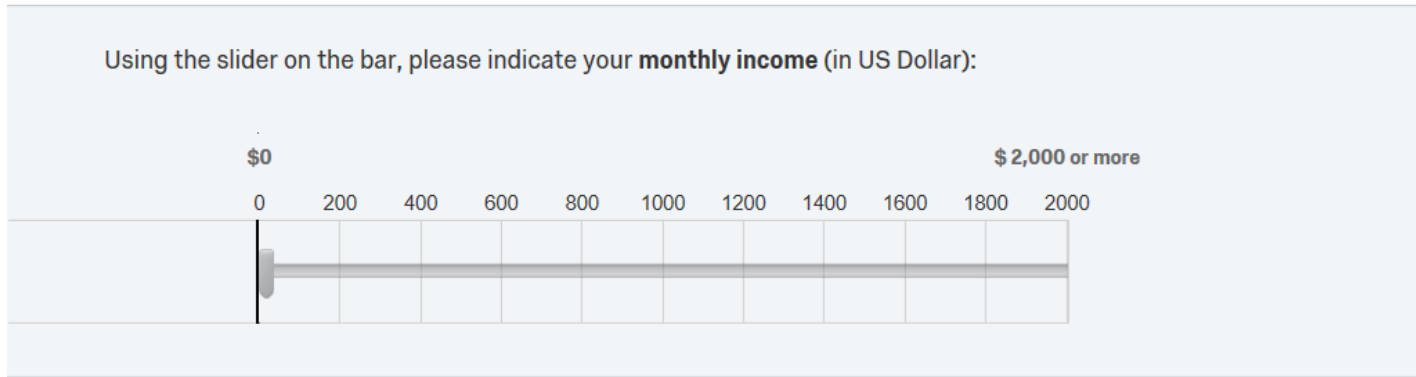
4. How many cigarettes a day do you smoke?
 - a. 10 or less
 - b. 11-20
 - c. 21-30
 - d. 31 or more

5. Do you smoke more frequently in the morning?
YES NO

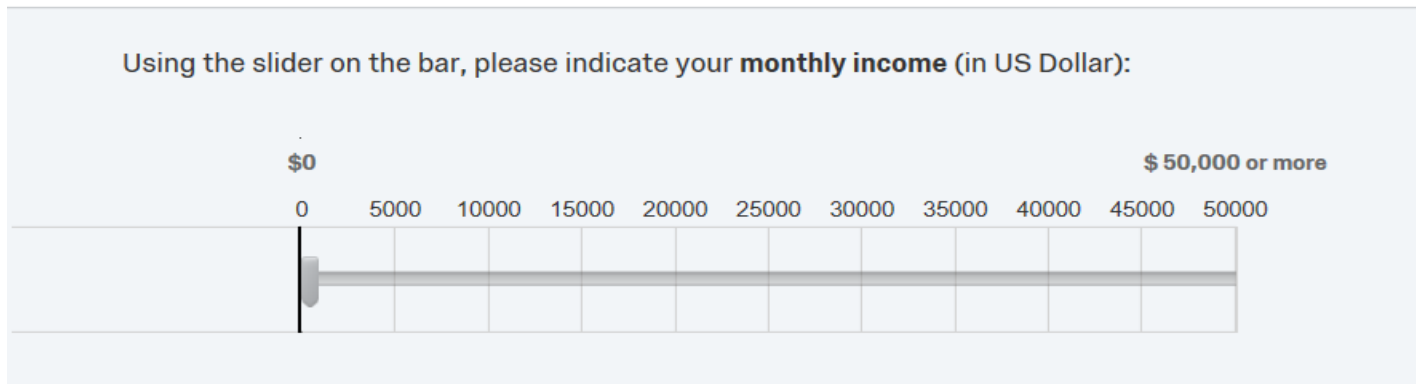
6. Do you smoke even if you are sick in bed most of the day?
YES NO

Appendix E: Feelings of Financial Security Manipulation

Financially Secure group:



Financially Insecure group:



Appendix F: Delay Discounting Monetary Choice Questionnaire

Now we are going to ask you to make some decisions about which of two rewards you would prefer. You will not receive the rewards that you choose, but we want you to make your decisions as though you were really going to get them. **Please take the choices seriously.** The reward choices will be shown to you. Choose your reward choice for each question and answer every question as though you will actually receive that choice. The choices you make are up to you.

1. Would you prefer:
 \$54 now, or ☐
 \$55 in 117 days? ☐
2. Would you prefer:
 \$55 now, or ☐
 \$75 in 61 days? ☐
3. Would you prefer:
 \$19 now, or ☐
 \$25 in 53 days? ☐
4. Would you prefer:
 \$31 now, or ☐
 \$85 in 7 days? ☐
5. Would you prefer:
 \$ now, or ☐
 \$25 in 19 days? ☐
6. Would you prefer:
 \$47 now, or ☐
 \$50 in 160 days? ☐
7. Would you prefer:
 \$15 now, or ☐
 \$35 in 13 days? ☐
8. Would you prefer:
 \$25 now, or ☐
 \$60 in 14 days? ☐
9. Would you prefer:
 \$78 now, or ☐
 \$80 in 162 days? ☐

10. Would you prefer:
\$ 40 now, or ☐
\$55 in 62 days? ☐
11. Would you prefer:
\$11 now, or ☐
\$30 in 7 days? ☐
12. Would you prefer:
\$67 now, or ☐
\$75 in 119 days? ☐
13. Would you prefer:
\$34 now, or ☐
\$35 in 186 days? ☐
14. Would you prefer:
\$27 now, or ☐
\$50 in 21 days? ☐
15. Would you prefer:
\$69 now, or ☐
\$85 in 91 days? ☐
16. Would you prefer:
\$1 now, or ☐
\$100 now ? ☐
17. Would you prefer:
\$49 now, or ☐
\$60 in 89 days? ☐
18. Would you prefer:
\$80 now, or ☐
\$85 in 157 days? ☐
19. Would you prefer:
\$24 now, or ☐
\$35 in 29 days? ☐
20. Would you prefer:
\$33 now, or ☐
\$80 in 14 days? ☐
21. Would you prefer:
\$28 now, or ☐
\$30 in 179 days? ☐

[]

[]

22. Would you prefer:
\$34 now, or
[]

\$50 in 30 days?
[]

23. Would you prefer:
\$25 now, or
[]

\$30 in 80 days?
[]

24. Would you prefer:
\$41 now, or
[]

\$75 in 20 days?
[]

25. Would you prefer:
\$54 now, or
[]

\$60 in 111 days?
[]

26. Would you prefer:
\$54 now, or
[]

\$80 in 30 days?
[]

27. Would you prefer:
\$22 now, or
[]

\$25 in 136 days?
[]

28. Would you prefer:
\$20 now, or
[]

\$55 in 7 days?
[]

Appendix G: Probability Discounting Questionnaire

In the task that follows, you will have the opportunity to choose between reward amounts after different probabilities. You will not receive the rewards that you choose, but we want you to make your decisions as though you were really going to get them. **Please take the choices seriously.** The reward choices will be shown to you. Choose your reward choice for each question and answer every question as though you will actually receive that choice. The choices you make are up to you.

1. Would you prefer:
 \$20 for sure, or ☐
 A 1-in-10 chance (10%) of winning \$80? ☐
2. Would you prefer:
 \$20 for sure, or ☐
 A 1-in-8 chance (13%) of winning \$80? ☐
3. Would you prefer:
 \$20 for sure, or ☐
 A 1-in-6 chance (17%) of winning \$80? ☐
4. Would you prefer:
 \$20 for sure, or ☐
 A 1-in-5 chance (20%) of winning \$80? ☐
5. Would you prefer:
 \$20 for sure, or ☐
 A 1-in-4 chance (25%) of winning \$80? ☐
6. Would you prefer:
 \$20 for sure, or ☐
 A 1-in-3 chance (33%) of winning \$80? ☐
7. Would you prefer:
 \$20 for sure, or ☐
 A 1-in-2 chance (50%) of winning \$80? ☐
8. Would you prefer:
 \$20 for sure, or ☐
 A 2-in-3 chance (67%) of winning \$80? ☐
9. Would you prefer:
 \$20 for sure, or ☐
 A 3-in-4 chance (75%) of winning \$80? ☐

10. Would you prefer:
\$20 for sure, or
☐ ☐
- A 5-in-6 chance (83%) of winning \$80?
☐
11. Would you prefer:
\$40 for sure, or
☐ ☐
- A 2-in-11 chance (18%) of winning \$100?
☐
12. Would you prefer:
\$40 for sure, or
☐ ☐
- A 2-in-9 chance (22%) of winning \$100?
☐
13. Would you prefer:
\$40 for sure, or
☐ ☐
- A 2-in-7 chance (29%) of winning \$100?
☐
14. Would you prefer:
\$40 for sure, or
☐ ☐
- A 1-in-3 chance (33%) of winning \$100?
☐
15. Would you prefer:
\$40 for sure, or
☐ ☐
- A 2-in-5 chance (40%) of winning \$100?
☐
16. Would you prefer:
\$40 for sure, or
☐ ☐
- A 1-in-2 chance (50%) of winning \$100?
☐
17. Would you prefer:
\$40 for sure, or
☐ ☐
- A 2-in-3 chance (67%) of winning \$100?
☐
18. Would you prefer:
\$40 for sure, or
☐ ☐
- A 10-in-10 chance (100%) of winning \$80?
☐
19. Would you prefer:
\$40 for sure, or
☐ ☐
- A 4-in-5 chance (80%) of winning \$100?
☐
20. Would you prefer:
\$40 for sure, or
☐ ☐
- A 6-in-7 chance (86%) of winning \$100?
☐

21. Would you prefer:
\$40 for sure, or
☐ ☐
- A 10-in-11 chance (91%) of winning \$100?
☐
22. Would you prefer:
\$40 for sure, or
☐ ☐
- A 2-in-5 chance (40%) of winning \$100?
☐
23. Would you prefer:
\$40 for sure, or
☐ ☐
- A 6-in-13 chance (46%) of winning \$60?
☐
24. Would you prefer:
\$40 for sure, or
☐ ☐
- A 6-in-11 chance (55%) of winning \$60?
☐
25. Would you prefer:
\$40 for sure, or
☐ ☐
- A 3-in-5 chance (60%) of winning \$60?
☐
26. Would you prefer:
\$40 for sure, or
☐ ☐
- A 2-in-3 chance (67%) of winning \$60?
☐
27. Would you prefer:
\$40 for sure, or
☐ ☐
- A 3-in-4 chance (75%) of winning \$60?
☐
28. Would you prefer:
\$40 for sure, or
☐ ☐
- A 6-in-7 chance (86%) of winning \$60?
☐
29. Would you prefer:
\$40 for sure, or
☐ ☐
- A 12-in-13 chance (92%) of winning \$60?
☐
30. Would you prefer:
\$40 for sure, or
☐ ☐
- A 18-in-19 chance (95%) of winning \$60?
☐
31. Would you prefer:
\$40 for sure, or
☐ ☐
- A 30-in-31 chance (97%) of winning \$60?
☐