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The Effect of Temporal Discounting and Loss Aversion on Mock Plea Bargain Decision-
Making

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A Thesis to be submitted to the Graduate Faculty of

JAMES MADISON UNIVERSITY

In

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Abstract

An overwhelming majority of criminal cases in the United States utilize plea bargaining (90-95%). A plea bargain is an agreement between a criminal defendant and a prosecuting attorney where the defendant agrees to plead guilty, or nolo contendere (no contest), to one or more charges to reduce or drop other charges. The decision to accept a plea bargain must be made by the defendant, so a defendant's ability to make or communicate competent choices regarding a plea bargain is important. However, defendant decision-making in plea bargaining is not sufficiently prevalent in plea bargaining or decision-making literature. While factors such as strength of evidence and attorney recommendation have been explored in defendant plea bargain decision-making, the same cannot be said of several cognitive biases that have been shown to affect decision-making in defendants. The current study is exploring the role of two such biases, temporal discounting and loss aversion, on defendant decision-making in plea bargaining. Participants in the study were presented with a vignette that details a plea-bargaining scenario and manipulates either temporal discounting or loss aversion, and were asked whether or not they would accept the plea bargain. It was found that more participants accepted a plea bargain when the consequence of doing so was distal rather than proximal, showing that temporal discounting had an effect, but that loss aversion had no effect on plea bargain decision-making. These findings can be used to inform various actors within the criminal justice system on how to frame plea offers in order to not be manipulative towards defendants.

Keywords: *decision making, plea bargaining, defendants, temporal discounting, loss aversion*

1. Overview of Literature Review

An overwhelming majority of criminal cases in the United States utilize plea bargaining (90-95%; United States Sentencing Commission, Devers, 2011). A plea bargain, sometimes referred to as a plea agreement or plea deal, is an agreement between a criminal defendant and a prosecuting attorney where the defendant agrees to plead guilty, or *nolo contendere* (no contest), to one or more charges to reduce or drop other charges. When a defendant is accused of a crime, the prosecuting attorney can make a plea offer to the defendant's attorney, who will then convey this information to the defendant. If the defendant agrees to accept the plea bargain, it commonly means that the defendant will plead guilty to a less serious charge or to the lesser of several charges in return for a reduced sentence. Another outcome may be that the defendant will agree to plead guilty to the original charges but for a reduced penalty. The Department of Justice defines a plea bargain as pleading guilty in exchange for a "concession by the prosecutor" (Department of Justice). Understanding the factors that go into a defendant's choice to plead guilty via plea bargaining is important, as the defendant must make the decision of their own volition. The goal of this study is to explore two such factors that may play a role in plea bargain decision-making in defendants (Bergman & Berman, 2020).

Plea bargaining can take place at any point in the criminal justice process. Plea deals can be offered right after an individual is arrested and before any formal charges are filed by the prosecutor. They can also come about in the middle of a trial, or if a trial results in a hung jury (where the jurors are split, and a unanimous decision cannot be made) in favor of going through another trial. In a typical plea bargain, the defense attorney and the prosecutor meet and one of them proposes a deal. While the decision

about whether or not to accept the plea bargain ultimately rests with the defendant, the defense counsel almost always offers a recommendation to the defendant (Bergman & Berman, 2020).

1.1 Background of Plea Bargaining

Plea bargaining allows both the defendant and the prosecution to avoid a potentially lengthy trial and may allow criminal defendants to avoid the risk of conviction at trial on a more serious charge. For example, in the U.S. legal system, a criminal defendant charged with a felony theft charge, the conviction of which would require imprisonment in state prison, may be offered the opportunity to plead guilty to a misdemeanor theft charge, which may not carry a custodial sentence. A plea bargain is a non-trial procedure, and a defendant waives their right to a trial by deciding to plead guilty and accept a plea bargain. Therefore, the defendant is also waiving their right to present their defense and have their guilt proven to a jury beyond a reasonable doubt (Langbein, 1979). There are three main types of plea bargains: change bargain, sentence bargain and count bargaining. Change bargaining consists of the defendant agreeing to plead guilty to reduced charges (e.g., pleading guilty to aggravated assault instead of attempted murder). Sentence bargaining consists of the defendant pleading guilty to a lighter or alternative sentence than the one they are being convicted of at the time (i.e., pleading guilty for a charge in exchange for a sentence of ‘time served’). Lastly, count bargaining consists of the defendant pleading guilty to fewer counts of the same charge.

Plea bargaining is extremely prevalent in the United States criminal justice system, with a large majority of cases utilizing it, but it has a controversial history. While plea bargaining is relatively new in the course of the United States’ criminal justice

system, the use of plea bargains has increased over time. The practice began in the early 1900's and became common by the 1920's; by the late 1900's, about 90% of cases utilized plea bargaining (Brown & Bunnell, 2006). Plea bargaining was viewed as unconstitutional during the time of the American Civil War; this was due to the belief that plea bargaining allowed too many innocent defendants to plead guilty to crimes they did not commit; however, by the late twentieth century, plea bargaining became a standard feature of the criminal justice system in the United States. There are arguments for and against the use of plea bargaining; supporters of plea-bargaining claim that it speeds court proceedings and guarantees a conviction, whereas skeptics believe that it prevents justice from being served as defendants are "punished" for exercising their right to a trial with a more severe potential punishment. On the prosecution side, advantages include flexibility to the prosecutor and a guaranteed conviction. For the defense, plea bargaining can provide an immediate release for the defendant, a possibility of a more lenient sentence, and avoiding a conviction for an undesirably labeled crime (i.e., sex offense). Plea bargaining certainly has its advantages, such as defendants avoiding trial-related mental and financial costs.

There are pressures on attorneys to recommend plea bargain offers in order to forego a trial. Prosecuting attorneys can save extensive amounts of time, effort, and resources if a defendant decides to accept a proposed plea bargain. Similarly, public defenders are often overworked and have a large caseload, and having a defendant choose to accept a plea bargain can reduce their caseload (Wilson, 2016). Plea bargaining is efficient and succinct; if every criminal charge were given a full trial, the criminal justice system would need to greatly multiply the number of court resources in order to fulfil the

workload (Langbein, 1979). Critics of plea-bargaining claim that offering a defendant, an individual that is in a vulnerable state, may be coercive and manipulative (Caldwell, 2011). On the other hand, critics also insinuate that plea bargaining allows defendants to weaken the effectiveness of the legal system and allows them to minimize their punishment (Smith, 1986).

1.2 Decision-Making in Defendants

Decision-making is a key component of criminal cases. In the realm of courtroom related decision-making research, most of the literature points to the decision-making processes of other courtroom actors. Extensive research has been done on juror and jury decision-making (Mazzella & Feingold, 1994; Bornstein et. al., 2017). Even specifically to plea bargaining, a large portion of decision-making research has focused on attorney decision-making, and not defendant decision-making (McAllister & Bregman, 1986; Kramer, Wolbransky, Heilbrun, 2007). The final decision to accept a plea bargain and effectively plead guilty lies solely on the shoulders of the defendant (McCoy vs. Louisiana, 2018), and therefore it is important to explore what factors influence these decisions. Further, much of the existing literature on defendant plea bargain decision-making is focused on how innocent defendants choose to accept or deny plea offers (e.g., Gazal-Ayal 2006; Wright 2005; Scott & Stuntz 1992). Little has been explored in terms of what factors influence a guilty defendant to accept or deny a plea offer (Lee, Jaynes, & Ropp, 2020). Since critics of plea bargaining argue that the system is manipulative towards defendants, it is important to explore the situational and factors around how plea offers are presented to better understand whether or not that is true.

Defendants must make life-impacting decisions such as the decision to plead guilty or confess to a crime (Henderson & Shteynberg, 2019). The United States criminal justice system is reliant on pleas, with thousands of defendants pleading guilty every day; this includes defendants accepting plea bargains (Redlich & Simmons, 2012). Therefore, a defendant's ability to make or communicate competent choices regarding a plea bargain is important. Factors such as the nature of the offense, the probability of a conviction, expected penalties, and the strength of evidence must be factored into these decisions, and often there is added time pressure on the defendant when these decisions are being made (Redlich, Babas, Edkins, & Madon, 2017). Additional factors can influence a defendant's decision to accept a plea bargain, including the desire to expedite the process or forgo a trial or the possibility of potentially lessening any punishment or avoiding severe punishment at trial. (Cohen & Reaves, 2006). Looking into the factors that affect plea bargain decision-making is important because, while both the prosecuting and defending attorney play a part in the process, the decision ultimately falls to the defendant.

Several factors have been shown to affect plea-bargaining decision-making in defendants. Severity of punishment, for one, has been extensively researched and has shown to have a significant effect on whether a defendant chooses to accept a plea bargain offer (McAllister & Bregman, 1986; Larry et al., 1978). Likewise, Gregory et al., (1978) found that more charges and more years in prison as a consequence increased the likelihood of both guilty and innocent defendants' rates of guilty pleas. Probability of a conviction has also been shown to affect mock defendant's decision making when accepting or denying a plea bargain (McAllister & Bregman, 1986). Strength, quantity,

and quality of evidence, including eyewitness testimony, has also been studied to determine whether there is any effect on decision-making in both mock defendants and real defendants (Rosenfeld & Penrod, 2011). In a study that examined the effect of likelihood of conviction, threatened punishment, and assumed role in a mock plea-bargaining decision scenario, it was found that all three factors significantly effect plea bargain decision-making (Bordens, 1984). A defendant's perception of the fairness of the plea offer can also play an important role in their willingness to accept a plea offer. Interestingly, Edkins and Dervan (2018) found that communicating collateral consequences, such as loss of voting rights or loss of professional licensure, did not affect mock defendants' decisions to plead guilty if accepting a plea offer resulted in no prison time.

A hypothetical defendant, with a completely rational mind and no biases at play, would theoretically accept a plea bargain offer when the value of that offer was equal or less than the value of the outcome that would be expected from going to trial. However, several biases can affect how defendants rationally evaluate the value of outcomes. Reinforcement modifies behavior in that more satisfying outcomes, not being incarcerated, are repeated and dissatisfying outcomes, being incarcerated, are avoided. Overconfidence or elevated optimism can cause defendants to choose to go to trial based off a skewed perception of the likelihood of winning a trial. Confirmatory bias explains how defendants that are in denial of their situation or under distorted impressions are likely to ignore the probability of a conviction if they go to trial, skewing their decision-making processes.

A commonly cited theory of defendant plea bargain decision-making is the shadow of a trial model initially introduced by Mnookin and Kornhauser (1979) and revised by Bushway and Redlich (2012). This model describes a defendant's decision to accept or reject a plea bargain a tactful choice to opt for a certain more lenient sentence rather than a possibly more severe one. The model suggests that defendants plead guilty if they are offered a plea bargain that is less than or equal to the probability of being convicted at trial multiplied by the outcome of trial – or “the expected value at trial.” (Lee et al., 2020). In other words, one would expect a defendant to plead guilty if an offered sentence is less than or equal to the expected value of going to trial. The prosecutor and defendant both predict the expected outcome of going to trial, and the defendant will accept the prosecutor's bargain if that sentence is lower than what they predicted the trial outcome to be. Several studies have supported the shadow of a trial model (Bushway & Redlich, 2012; Bushway et al., 2014; Kramer, Wolbransky, & Heilbrun, 2007; Smith, 1986; but see Abrams, 2011). However, some argue that the model does not fully explain the decision-making processes in defendants (Bibas, 2004). Bushway and Redlich (2012) replicated Smith's (1986) work with the same data set and advanced methodology, and found that at the individual level, the estimated probability of conviction at trial for those who pled guilty was either uncorrelated with evidentiary information or correlated in the opposite direction expected by the shadow model. This suggests that other factors may explain some variation in willingness to plea (Lee et al., 2012). Additionally, Kramer and colleagues (2007) reflected that in order for the shadow of a trial theory to be universally applicable, it must be assumed that the defendant is acting rationally, and that there are no outside factors influencing their decision-making.

Therefore, it is imperative to explore these factors and how they play into the decision-making processes in defendant decision-making.

Several cognitive and social factors have been explored in the world of defendant decision-making, but less in plea-bargaining decision-making. Redlich and colleagues (2013) outlined several different social, cognitive, and developmental influences on defendant decision-making in plea bargaining situations. For example, reinforcement modifies behavior so that more satisfying outcomes are repeated, and dissatisfying outcomes are avoided; that is, defendants will lean more towards decisions that maximize good outcomes, like not going to prison, and minimize bad outcomes, like fines or incarceration. This follows the subjective utility theory model of decision-making; this theory states that the goal of decision-making is to seek pleasure or avoid pain (Fischhoff, Goitein, & Shapira, 1983). Individuals, including defendants, have a proclivity towards maximizing pleasure and minimizing pain. This proclivity influences all decision-making when it comes to a defendant's case. Heuristics and fallacies, however, can impact a defendant's ability to rationally weigh out options while maximizing well-being. Heuristics and biases, or mental shortcuts that make it easier for individuals to make decisions by limiting the cognitive workload required, can increase the chance of an error in judgement when deciding. Individuals have limited resources and time to make decisions, and heuristics and biases filter seemingly less relevant information out in order to more efficiently decide (Bibas, 2004). An example of a heuristic is overconfidence, or an elevated level of optimism, in one's ability to win a trial; this can cause defendants to go to trial, regardless of the actual probability of winning. Similarly, confirmatory bias can cause a defendant to ignore the probability of a conviction if they are in denial or

under a distorted impression that there is no way they will not win their trial.

Confirmatory bias differs from overconfidence in that overconfident defendants overestimate the probability of them winning a trial, whereas confirmatory bias causes a defendant to ignore probability altogether (Redlich et al., 2012). Social influence, specifically the influence of a defendant's attorney, can have a significant effect on decision-making in defendants as attorneys are a primary source of influence on defendants. For the criminal defendant, the attorney serves as an influential source of information, and their advice carries considerable weight. Regardless of whether the defendant has committed the crime for which they are being prosecuted, an attorney's recommendation is important when a defendant is deciding whether or not to accept a plea bargain offer. Attorneys typically hold a higher educational status and more legal knowledge and expertise than their clients. Bordens and Basset (1985) examined the factors influencing a defendant's decision to accept a plea bargain in a field study of real convicted defendants who had plea bargained their cases and found that influence from an attorney was among significant factors that contributed to a defendant's decision to accept a plea-bargain offer. Redlich et al., (2013) stated that there is a call for experiments examining cognitive, social, and developmental influences on plea negotiations.

Two particular biases of interest are loss aversion and temporal discounting. Temporal discounting explains the tendency to weigh more immediate consequences more heavily than future consequences. Loss aversion frames the decision-making situation in gains and losses, and those gains and losses determine decisions rather than final outcomes. While factors such as social influence of an attorney, probability of

conviction, severity of conviction, and strength of evidence have been extensively researched, these two biases have not been explored to that extent. Although there is abundant empirical research on plea bargaining and temporal discounting, as well as loss aversion, separately, research on the relationships between them is underdeveloped.

1.2.1 Temporal Discounting

Temporal discounting can be defined as the tendency for the value of future outcomes to be lower for closer outcomes than for further ones (Varghese et al., 2014). This draws from the concept of delay discounting, which describes individuals' tendency to prefer immediate rewards to rewards that are more distal (Ainslie, 1975). With both of these concepts, the weight of a particular outcome decreases as time increases. Temporal discounting takes subjective expected utility, or a personal deduction of whether an outcome will increase pleasure and decrease pain, and adds differences in time between an event and the outcome (Sternberg & Sternberg, 2012). Within the realm of forensic psychology, temporal discounting can be applied to several situations in which an individual must make decisions: engaging in risky behaviors; engaging in some criminal acts but not others; and making decisions when it comes to one's legal case (Varghese et al., 2014). This bias can certainly be applied to decision-making when it comes to the decision to accept or deny a plea bargain. Temporal discounting has been shown to have an impact on defendant decision-making; Madon and colleagues (2012) explored temporal discounting in a study that tested whether proximal or distal consequences resulted in increased guilty confessions; they found that participants were more likely to choose an outcome that limited proximal consequences rather than distal ones. In other words, people are more likely to weigh closer consequences more heavily than farther

consequences, regardless of the severity of that consequence (Madon et al., 2012).

Another study examined the effect of length of sentence on plea bargain acceptance decision making; it was found that plea acceptance was more likely when the potential trial sentence was shorter (5 years) rather than longer (25 years) in mock defendants (Schneider & Zottoli, 2019). Temporal discounting surely plays a role in plea-bargaining decisions, as plea bargaining often includes the choice between going to prison, a proximal consequence, or serving a sentence a different way such as paying a fine or completing community service, a distal consequence.

1.2.2 Loss aversion

Loss aversion describes “defendants ... gambling on avoiding losses, such as loss of freedom.” (Redlich, Bibas, Edkin, & Madon, 2017 pp. 344). In other words, loss aversion describes an increased sense of sensitivity towards potential losses when faced with a decision (Kahneman & Tversky, 1979). The baseline state of a defendant is freedom, and any possible loss of freedom is a loss; therefore, a defendant may be less likely to take risks, like going to trial, to lessen or avoid a lengthy prison sentence. This is often shown in defendants who cannot make bail, or for whom bail was denied, since they were made to experience that loss of freedom and can fully understand the nature of that loss. A recent study reported that even when the bail amount is set at a relatively low level, the majority of defendants cannot afford to post bail (Dobbie, Goldin, & Yang, 2016). Those who are detained pending trial may view incarceration as the baseline and any possible freedom as a gain (Bibas, 2004). According to loss aversion, defendants will be more likely to accept a plea bargain to avoid being incarcerated if they have experienced some sort of loss prior to making the decision. This is evidenced by a study

conducted by Kellough and Wortley (2002), who tracked the outcomes of more than 1,800 criminal cases and found that defendants who had been remanded to custody and were detained up until the time of adjudication were 2.5 times more likely to plead guilty than those who had been released. Additionally, another study that utilized real defendants found that being detained before trial significantly increased the probability of a conviction primarily through guilty pleas (Dobbie, Goldin, & Yang, 2016). Tor and colleagues (2010) found that individuals who are faced with a potential loss will be more risk-seeking, while individuals who are faced with a potential gain will be more risk-averse. To frame this in another way, defendants who are incarcerated and faced with the potential gain of leaving jail or prison will be less likely to take any risks that will cause them to not receive that gain, while defendants who are not incarcerated and faced with a potential loss of freedom will be more likely to take the risk of going to trial and potentially getting a prison sentence (Tor et al., 2010).

It is important to consider that factually innocent and factually guilty defendants behave differently. In plea bargaining, innocent defendants have been shown to underestimate their likelihood of conviction at trial, and therefore be less willing to accept plea offers than guilty defendants (Bordens 1984; Gregory et al., 1978). “This comparative lack of innocents’ willingness to plead guilty has been construed as a systematic and overly optimistic bias toward the odds of acquittal as well as related to a perceived unfairness of being wrongly accused” (Tor et al., 2010 pp. 113). Even in experimental studies that used simulations of plea-bargaining scenarios, mock innocent defendants are less likely to plead guilty and accept a plea bargain than mock guilty defendants (Bibas, 2004; Tor et al., 2010).

1.2.3 Summary

While several variables have been examined in the limited amount of defendant plea bargain decision-making research, the two biases of temporal discounting and loss aversion have not been explored in depth. Exploring these biases will give a greater insight into what influences a defendant to accept or deny a plea offer. Since plea bargaining is often thought of to be coercive towards defendants, exploring these biases in the lens of plea bargaining will better inform how offers are presented to defendants. Determining the individual relationships between these two factors and decision-making will add to the limited existing literature on defendant decision-making in plea bargaining.

2. Methods

The aim of this study is to examine the effects of temporal discounting and loss aversion on plea bargaining decision-making. This was broken down into two studies: Study 1 examines the effect of temporal discounting, while Study 2 examines the effect of loss aversion on plea bargain decision-making. Based on previous literature, it was hypothesized that both biases will have a significant effect on plea bargain decision-making.

In order to determine this, both studies presented participants with a detailed vignette outlining a plea-bargaining scenario. The vignette controlled for factors such as prior history of the ‘defendant’, family status, job status, relevant biographical information, victim information, strength of evidence, etc. (explained further in the next paragraph). This was in order to limit the number of factors influencing the participants’

decision-making. Information about the case was included, such as the exact charges held against the ‘defendant’ and the proposed plea bargain from the prosecuting attorney.

Depending on the experimental condition, the vignette varied the type of punishment framed in terms of time (temporal discounting) and whether or not bail was denied (loss aversion), with an explanation of what bail means, since participants may not have that background knowledge. These manipulations of the variables are explained in more detail in the next paragraph. The vignette was presented in the second person point of view with the pronouns ‘you’, ‘your’, etc. to be engaging for the participant and to encourage them to adopt the perspective of the defendant. It has been found that second person pronouns have a significant impact on audience engagement in narratives. Readers mentally take on the perspective of the actor in a given narrative when the pronoun you is used and take on an external perspective when the pronouns he or she are used (Brunye et. al., 2009). After reading the vignette, participants answered whether they choose to accept the proposed plea bargain offer or not. They also answered a confidence scale item asking how confident they are in their decision. Then, based on their answer, they were asked follow-up questions about why they chose what they chose to give more information about what factors influenced their decision.

An analysis of the differences in confidence levels between participants who said yes to the plea bargain and participants who said no was conducted to examine whether there were differences between the groups. Confidence is a belief about the validity of our own thoughts, knowledge, or performance (Luttrell, 2013). Looking at group differences in confidence can tell us several things. It can tell us whether there was a major difference in critical thinking between the groups, as critical thinking has been

shown to be significantly positively associated with confidence (Luttrell, 2013). To contrast, low levels in confidence in decision making has been found to be associated significantly with ambiguity of decisions; in other words, when confidence in decision making is low, there is more confusion and uncertainty involved in the decision (Cagno & Grieco, 2018). This ambiguity can result from any difficulty that an individual experiences when evaluating their capabilities or knowledge and is therefore strongly connected with their degree of confidence. Lastly, one study examined decision making processes in attorneys asked participants to play the role of a prosecuting attorney deciding whether to recommend a plea offer to a defendant or follow through with a trial. Those who chose to offer the plea deal felt more confident in their decision (Vortuba & Tisdale, 2020). The authors go on to state that “it is possible the public—like the courts—recognizes plea bargaining as the “necessary evil” needed to promote the efficient resolution of this case” (pp. 20). Therefore, it would be interesting to look at the defendant’s point of view in this situation to see if their confidence in their decision-making shows similar patterns to what has been found of attorneys in similar studies. However, it is important to note that there is no evidence to support any relationship between confidence in one’s decision and accuracy of decision making. In fact, several heuristics and biases can influence how an individual rates their confidence in their decision making (Tversky & Kahneman, 1974), so the results from these analyses should be interpreted with reservations. For the purposes of this study, confidence was only used to exploratorily observe the differences between participants who accepted the plea bargain and participants who rejected it, not to determine accuracy of the decision.

According to the recommendations from the National Institutes of Health, the average American reads at about a 6th grade to 8th grade reading level (Eltorai et al., 2014). Because of this, the vignette has been carefully written to ensure that the reading comprehension level is not too high for participants to read. This was done using one of the Flesh-Kincaid readability tests (specifically, the Flesch Reading Ease test). This test was originally developed under contract to the US Navy as a way to determine reading level of passages, to ensure that the technical manuals they used were able to be comprehended (Flesch et al., 1975). Now, the test is used universally, from fields like higher education to automobile insurance policy making. This test is scored on a scale of 0 to 100, where 0 indicates a passage that is extremely difficult to read and 100 indicates a passage is very easy to read. The vignette used in the current study scored at a 71.5, which indicates that the passage is generally easily understood by the average 7th grader, and therefore the average American.

Participants were recruited through Amazon Mechanical Turk. Amazon Mechanical Turk is an open, online marketplace for task creation, worker recruitment, compensation, and data collection. Individuals register as either requesters or workers. Requesters can create and post their task that can be done at a computer by registered workers. Workers can browse available tasks and are paid after the successful completion of a task. This source was chosen for data collection in order to gather information from a sample that resembles that of the public, as opposed to a university sample. Participant samples recruited through Amazon Mechanical Turk are significantly more diverse and higher in quality than a college student sample, and data obtained from the site are similar to data obtained from traditional methods in reliability (Buhrmester, Kwang, & Gosling,

2011; Behrend et al., 2011). Participants were filtered to ensure that they were United States residents and that no participants could participate more than once, or in both studies. Additional exclusionary criteria are explained in further paragraphs.

The vignettes, questions, and accompanying information were presented to participants via online survey (Qualtrics). Participants were asked several questions regarding demographics: gender, race, age, education level, employment status, prior convictions, and previous plea bargain experience (Appendix A). Participants were selected if they are United States citizens or residents, 18 or older, and have at least a high school diploma/GED to ensure English language comprehension.

If participants took less than three minutes to take the survey, their response was not included in the analysis. This ensured that participants were giving the appropriate amount of attention to the survey and not choosing an arbitrary answer to finish quickly. Survey response research suggests that using a cutoff of two seconds for each item in a survey will successfully eliminate low effort responses (Huang et al., 2012). This, in combination with using a words-to-time reading time estimation tool on the passages that the participants will read, resulted in a total time of four minutes. The reading time estimation tool uses the average speed that a person reads at, which is 200 words per minute, to estimate how long it will take for the average person to read the text inputted (Azeez, 2020; Brysbaert, 2019). While the survey in its entirety should take the average participant around 7-10 minutes to complete, the cutoff of 3 minutes was used to account for “speed readers”.

Participants were provided with a brief explanation of what plea bargaining is prior to being shown the vignette; this was used to ensure that participants all have the

same level of baseline plea bargaining knowledge. Following this explanation, participants were given a short questionnaire (6 questions about plea bargaining, multiple choice) prior to being provided with the vignette (Appendix B). This questionnaire was used to determine whether participants have sufficient knowledge of the plea-bargaining process. “Sufficient knowledge” is defined as a basic level knowledge of plea bargaining that will ensure that the participant’s decision to accept or deny a plea bargain is not being muddled by their confusion on the subject. Participants who could not establish this baseline knowledge were excluded from the study. In order to be included in the analysis, participants had to answer at least 3 out of the 6 questions correct.

The final criterion that was enacted to determine which participants to exclude were their answers to the short answer questions. Some participants provided nonsensical letters and/or numbers (i.e., “dfnaihdfiaosh”) as their answers, showing that they put little to no effort into the questions, and likely did not read and answer the plea bargain and confidence questions with any more effort. This type of nonsensical response is a form of careless responding (Holland & Christian, 2009). The breakdown of how many participants were excluded from the study is shown in Appendix E.

In order to ensure that the vignettes used were only measuring the influence of the independent variable (temporal discounting or loss aversion), several variables that would influence decision-making or that are known to effect defendant decision-making were controlled for or were held constant across the vignettes. For example, if biographical information was provided in the vignette, it may have caused gender or racial bias for the participant. Therefore, biographical information of the ‘defendant’ was controlled for by having the vignette be in second person pronouns (you/your) so that the participant could

‘fill in’ this information on their own. Strength of evidence for or against a defendant has been shown to have an effect on guilty defendants; the stronger the evidence against a defendant, the more likely that defendant is to accept a plea bargain offer (Redlich et al., 2017). Likewise, probability of conviction also has an effect on decision-making (Kramer, Wolbransky, & Heilbrun, 2007). These factors (strength of evidence, probability of conviction) were controlled for by omitting any information about evidence from the vignette. The social influence of an attorney’s recommendation of whether to accept or deny the plea bargain can affect a defendant’s decision-making; generally, a defendant is more likely to accept a plea bargain if that is the recommendation from their attorney (Redlich et al., 2017). Therefore, attorney recommendation information was limited to the attorney not recommending either option over the other. Type and severity of punishment has been shown to effect guilty and innocent defendants’ decision-making (Gregory et al., 1978; Bordens, 1984); this was controlled by keeping constant the consequences throughout all vignettes (incarceration if they do not accept the plea bargain, and probation/community service as options for if they do). Guilt or innocence of the defendant has an effect on plea bargain decision-making. A guilty defendant is significantly more willing to accept a plea bargain more often than an innocent defendant (Tor et. Al, 2010). Therefore, the guilt or innocence of the hypothetical defendant was held constant across all vignettes (guilty).

2.1 Study One

The independent variable being manipulated is temporal discounting. Temporal discounting is examined by manipulating the charges, and therefore the sentence, in the vignette. There are two different levels, 1) plea bargain of lesser charges resulting in a

sentence of in-person community service starting immediately (proximal outcome), and 2) lesser charges resulting in community service, collectively due at the end of the two years (distal outcome). Not accepting the plea bargain will result in 1 year in jail. It is expected that temporal discounting will cause participants to favor distal outcomes, and therefore more participants will accept the plea bargain offering a distal outcome rather than a proximal outcome.

Participants were randomly assigned (by Qualtrics) to one of the two conditions; they were presented with a vignette with the temporal discounting variable manipulated (Appendix C).

The dependent variable is binary; participants were asked whether they wish to accept the plea bargain or not accept the plea bargain. Additionally, participants were asked to answer a confidence scale item rating confidence in decision plea bargain (qualitative data from follow up questions will be summarized, not examined statistically; Appendix D).

2.2 Study Two

The independent variable being manipulated is loss aversion. Loss aversion is examined by manipulating whether bail was offered or denied; there are two different levels, 1) bail is accepted and the defendant is not currently incarcerated and 2) bail was denied and the defendant is contemplating this decision while in jail. Accepting the plea bargain will result in one year of probation. It is expected that participants in the second condition will accept the plea bargain more than participants in the first condition, as a loss of freedom has already been experienced.

Participants were randomly assigned (by Qualtrics) to one of the two conditions; they were presented with a vignette with the loss aversion variable manipulated (Appendix C).

The dependent variable is binary; participants were asked whether they wish to accept the plea bargain or not accept the plea bargain. Additionally, participants were asked to answer a confidence scale item rating confidence in decision plea bargain (qualitative data from follow up questions will be summarized, not examined statistically) (Appendix D).

2.3 Statistical analyses

A Chi-square Test of Independence, with *t*-test follow up analyses, was used for both studies. Each study used a categorical independent variable and a binary, categorical dependent variable (yes, I will accept the plea offer and no, I will not accept the plea offer), so a Pearson's chi-square test of independence analysis was used. A Pearson's chi-square test of independence is used to determine whether there is a statistically significant difference between expected frequencies and observed frequencies for categorical variables. Here, the test is being used to assess whether the observations are independent from one another to determine whether one outcome is independently related to the experimental condition. Then, a *t*-test comparing confidence item (How confident are you...) scores of the proximal versus distal conditions was conducted as a follow up to determine whether there were any differences in decision-making confidence between experimental conditions.

2.4 Hypotheses

Temporal discounting has been shown to affect defendant decision making in guilty pleas generally. Individuals are more likely to plead guilty if the consequence of doing so is distal rather than proximal. It is hypothesized that participants will be more likely to accept a plea bargain when the potential outcome is distal, rather than proximal, as individuals tend to favor distal outcomes.

Loss aversion has been exploratorily shown to affect decision making in defendants, as defendants who are already incarcerated are more likely to plead guilty as opposed to taking the risk of going to trial. Therefore, it is hypothesized that participants will be more likely to accept a plea bargain if they are being detained at the time of the plea bargain offer.

3. Results

The chi-square test of independence test provides information about whether the observed frequencies in the data are different from what would be expected if the two variables were unrelated. In other words, this test can be used to determine whether there is an association between two categorical variables. The null hypothesis for this test is that the two variables are unrelated. For study 1, the two variables are temporal discounting condition and plea bargain decision. For study 2, the two variables are loss aversion condition and plea bargain decision making. It was hypothesized that for each study, there would be a significant association between the condition variable and plea bargain decision making. For study 1, there was a total of 298 participants included. For study 2, there was a total of 296 participants included.

3.1 Participants

A comparison of the general demographics between study one and the study two showed minimal differences. Study one participants ($M = 37.30$; $SD = 11.81$) showed a similar mean age to study two's participants ($M = 39.94$; $SD = 12.13$), on average (Table 6a; Table 7a). Study one's sample seemed to have had a larger number of participants identifying as female compared to study two ($\chi^2 (3) = 5.285$, $p = .152$), but both studies samples displayed a higher number of male-identifying participants than female-identifying participants (Table 6b; Table 7b). There were no statistical differences in gender for plea bargain decision making for study one ($\chi^2 (2) = 5.493$, $p = .064$) or for study two ($\chi^2 (3) = .232$, $p = .972$). Only one participant between both studies identified as non-binary. Study one and study two displayed differences in racial demographics, with an overwhelming majority of both samples identifying as Caucasian (Table 6c; Table 7c). There were statistical differences in race for plea bargain decision making for study one ($\chi^2 (5) = 20.130$, $p = .001$), but not for study two ($\chi^2 (5) = 3.063$, $p = .690$). Both samples showed similar numbers regarding the highest level of education of the participants, with the majority in both samples having a bachelor's degree (Table 6d; Table 7d). There were no statistical differences in education for plea bargain decision making for study one ($\chi^2 (3) = .636$, $p = .888$) or for study two ($\chi^2 (4) = 2.315$, $p = .678$). Lastly, both samples showed similar numbers in terms of previous experience with the criminal justice system or with plea bargaining, with only about 10%-15% of participants having prior experience (Table 6e; Table 7e). There were no statistical differences in previous experience with the criminal justice system for plea bargain decision making for study one ($\chi^2 (2) = 2.459$, $p = .292$) or for study two ($\chi^2 (2) = 2.626$, $p = .323$). Likewise,

there were no statistical differences in previous plea bargain experience for plea bargain decision making for study one ($\chi^2(2) = .334, p = .846$) or for study two ($\chi^2(2) = 3.972, p = .137$). For each condition, the majority of participants chose to accept the plea bargain offer rather than reject it; this was expected, as outcomes data shows that the majority of defendants who are offered a plea bargain choose to accept it (Tor et. al., 2010).

Interestingly, regardless of condition, more participants in study one (41 out of 296) decided to forego a plea bargain to go to trial than in study two (18 out of 298). We would expect that these numbers would not differ, since all information was kept constant aside from the manipulated variables and the proportion of participants assigned to each condition was randomly assigned. This may have occurred due to the differences in demographics; racial demographics in particular was different among the groups for study one. This is expanded on further in the discussion section.

3.2.1 Study 1 Preliminary Analyses

A larger proportion of participants in the distal consequence condition (27 out of 149) condition decided to reject the plea bargain and go to trial than the proportion of participants in the proximal consequence condition (14 out of 147) condition (Table 1).

3.2.2 Assumptions

All assumptions associated with both chi-square tests of independence were met. All assumptions associated with independent samples t-tests were tested and there was no evidence of assumption violation, with the exception of the normality assumption. Due to this, bootstrapping was used to estimate the standard errors for the t-test analyses.

According to Field (2018, p. 337), "If you are worried about the assumption of normality

or simply want confidence intervals that don't rely on this assumption, then you can use bootstrapping." Bootstrapping repeatedly picks samples (with replacement) from the data when creating standard errors for the statistical test and confidence intervals. Since there was a violation of the assumptions of normality, evidenced by the distributions being heavily negatively skewed (Table 3), the standard errors were bootstrapped. Levene's test indicated equal variances for the proximal consequence condition, so the assumption of homogeneity of variance was likely not violated ($F = .206, p = .651$). For the distal consequence condition, equal variances were not assumed ($F = 4.760, p = .031$), so the equal variances not assumed t statistic was used. An alpha level of .05 was used for all statistical tests.

3.2.3. Study 1 Primary Analyses

A chi-square test of independence was conducted to determine if there was a statistically significant relationship between the two variables. In other words, this test was used to investigate whether participants were more likely to accept a plea bargain when the consequence of doing so was farther away rather than closer. The chi-square results indicate that there is a significant association between temporal discounting and plea bargain decision making, $\chi^2(1) = 4.583, p = .032$, Cramer's $V = .124$.

An independent samples t-test was conducted to determine if the confidence levels of participants statistically significantly different between participants who chose to accept a plea bargain versus participants who chose to go to trial. One test was conducted for each condition. Confidence levels did significantly differ between participants who chose to accept the plea bargain and participants who chose to go to trial, in both the distal consequence condition ($t(32.62) = 2.834, p = .008; d = .728$) as

well as in the proximal consequence condition ($t(145) = 2.495, p = .014; d = .701$). For the distal consequence condition, participants who decided to offer take the plea bargain were more confident in their decision ($M = 82.61\%, SD = 18.77\%$) than those who decided to go to trial ($M = 68.00\%, SD = 26.00\%$). For the proximal consequence condition, participants who decided to take the plea bargain were more confident in their decision ($M = 82.34\%, SD = 18.31\%$) than those who decided to go to trial ($M = 69.36\%, SD = 20.47\%$).

3.3.1 Study 2 Preliminary Analyses

A similar proportion of participants in the *currently in jail* (9 out of 145) condition decided to reject the plea bargain and go to trial compared to the proportion of participants in the out on bail (9 out of 153) condition (Table 1).

3.3.2 Assumptions

All assumptions associated with both chi-square tests of independence were met. All assumptions associated with independent samples t-tests were tested and there was no evidence of assumption violation, with the exception of the normality assumption. Due to this, bootstrapping was used to estimate the standard errors for the t-test analyses. As with study one, bootstrapping was used. Bootstrapping repeatedly picks samples (with replacement) from the data when creating standard errors for the statistical test and confidence intervals. Since there was a violation of the assumptions of normality, evidenced by the distributions being heavily negatively skewed (Table 3), the standard errors were bootstrapped. Levene's test indicated equal variances for the out on bail condition, so the assumption of homogeneity of variance was likely not violated ($F =$

1.946, $p = .165$). For the *currently in jail* condition, equal variances were not assumed ($F = 4.980$, $p = .027$), so the equal variances not assumed t statistic was used. An alpha level of .05 was used for all statistical tests.

3.3.3 Study 2 Primary Analyses

A chi-square test of independence was conducted to determine if there was a statistically significant relationship between the two variables. In other words, this test was used to investigate whether participants were more likely to accept a plea bargain when they had already “experienced” a loss of freedom, as opposed to not having “experienced” that loss. The chi-square results indicate that there is not a significant association between loss aversion and plea bargain decision making, $\chi^2(1) = .014$, $p = .906$, Cramer’s $V = .007$.

An independent samples t-test was conducted to determine if the confidence levels of participants statistically significantly differed between participants who chose to accept a plea bargain versus participants who chose to go to trial. One test was conducted for each condition. Confidence levels did significantly differ between participants who chose to accept and participants who chose to go to trial, for both the *currently in jail* condition ($t(8.44) = 2.448$, $p = .039$; $d = 1.34$) as well as the *out on bail* condition ($t(151) = 2.615$, $p = .010$; $d = .899$). For the *currently in jail* condition, participants who decided to offer take the plea bargain were more confident in their decision ($M = 80.68\%$, $SD = 18.92\%$) than those who decided to go to trial ($M = 56.33\%$, $SD = 29.44\%$). For the *out on bail* condition, participants who decided to offer take the plea bargain were more confident in their decision ($M = 82.11\%$, $SD = 19.61\%$) than those who decided to go to trial ($M = 64.22\%$, $SD = 24.63\%$).

3.4. Qualitative Data

Three open-answer questions were asked of each participant after the vignette and post-vignette questions were asked. These questions were qualitatively analyzed by coding common themes.

The first question asked participants what factors went into their decision to either accept or reject the plea bargain offer. A large frequency of participants who chose to accept the plea bargain offer stated that they did so to avoid jail time, or because community service was more attractive of an outcome than possible jail time. A notable number of participants stated that they chose to accept the plea bargain offer because they did not think they would win if they went to trial, and a smaller number of participants stated that they did not want to go through the time and hassle of having a trial. Another common theme among participants who chose to accept the plea bargain was that they knew they were guilty, so they did not think that they should have a chance to prove their innocence at trial. Participants who chose not to accept the plea bargain offer and go to trial frequently reported that they did so because they did not think they were guilty, they did not think the courts had enough evidence to find them guilty, or they thought that the other driver was the one at fault.

Question two asked participants if they considered the consequences of pleading guilty on their future. Participants who chose to accept the plea bargain reported that they mostly thought about the effects of a guilty charge on their career, social life, and family. A notable number of participants reported that they weighed the repercussions of a guilty charge if they went to trial and thought it would be better to have a guilty charge via plea bargain for their future. A common theme found was that participants considered that

they would figuratively lose a year of their lives if they ended up going to jail. A notable number of participants also reported that they did not take into consideration the impacts of a guilty charge on their record. Participants who chose not to accept the plea bargain and go to trial mostly reported that they considered the effect of a charge on their record on their future career and work. As with the participants who said yes to the plea bargain, several participants noted that they did not take any future repercussions into account.

Lastly, the third question asked participants if they could have had one additional piece of information to help their decision making, what that would be. Participants who chose to accept the plea bargain reported that they would want to know what evidence the courts had against them, as well as a recommendation from their attorney. A notable number of participants reported that they had all the information they needed or that they could not think of anything else they would want to know. Participants who chose not to accept the plea bargain and go to trial mostly reported that they would want to know what others in similar position have done, as well as if there was any hard evidence or eyewitnesses to prove their guilt at trial.

4. Discussion

4.1 Hypotheses

The primary goal of study one was to examine whether there was a significant relationship between temporal discounting and plea bargain decision making. Results from study one showed a significant association between temporal discounting and plea bargain decision making. The moderate effect size showed that this relationship was moderately strong. These results provide support for the notion that individuals are more

likely to accept a plea bargain offer when the consequence of doing so is distal, or further away, rather than proximal, or closer, to when the individual is making the decision.

These findings correspond with the existing literature around temporal discounting and legal decision making. Previous studies exploring temporal discounting on defendant decision making found that individuals gave guilty confessions or accepted plea bargains more often when it would limit a proximal punishment (Madon et al., 2012; Schneider & Zottoli, 2019). In other words, individuals were more likely to plead guilty if the consequence of doing so was distal. Since temporal discounting describes a tendency to favor distal consequences over proximal ones, one would expect that this trend would translate to plea bargaining as well. Therefore, it was expected that participants would choose to accept a plea bargain more often when the consequence of doing so was further away, rather than closer. The effect of temporal discounting on plea bargain decision making in the current study performed in the expected direction, with distal consequences resulting in more plea bargain acceptances than proximal consequences.

These findings are somewhat consistent with the literature around the shadow of a trial model. The shadow of a trial model states that defendants rationally weigh outcomes to determine which outcome would be more beneficial. However, it was found that temporal discounting had an effect on decision making, and this shows that individuals may not always have the capacity to rationally outweigh outcomes to determine the most beneficial outcome. The outcomes in both conditions were nearly identical, and yet participants significantly differed in decision making. The shadow of a trial model infers that participants would have chosen the same outcomes.

The results from this study can be used to inform researchers examining defendant decision making that not only does temporal discounting play a role when the length of prison sentence is manipulated, but also when the time between sentencing and beginning of punishment is manipulated. This was among the first studies to examine temporal discounting concerning the time between sentencing and beginning of punishment. This information can also be used to inform attorneys, and other courtroom actors, how the framing of plea bargain offers can affect how a defendant will make their decision to either accept it or not accept it, even when the severity of punishment is held constant.

The primary goal of study two was to examine whether there was a significant relationship between loss aversion and plea bargain decision making. Results from study two showed no significant association between loss aversion and plea bargain decision making. The minimal effect size of .007 showed that there was little to no practical significance in these findings. These results provide no support for the notion that individuals are more likely to accept a plea bargain offer when they have experienced a loss of freedom prior to making the decision than if they have not experienced a loss of freedom.

Contrary to what was expected based off previous loss aversion literature, the findings from the current study do not support a significant relationship between loss aversion and legal decision making. While not many studies have explored the role of loss aversion on defendant decision making, it was expected that loss aversion would play some role, as evidenced by outcomes data collected from real defendants that shows incarcerated defendants are more than twice as likely to plead guilty than nonincarcerated

ones (Kellough & Wortley, 2002; Dobbie, Goldin, & Yang, 2016). Loss aversion in this context describes how incarcerated individuals would be less likely to make any decisions that would let them remain incarcerated, like going to trial. Therefore, it was expected that the results from this study would reflect this description.

The inconsistency between the observed data from real defendants and this survey-based study could be interesting to explore in future studies. This may point to some defendants not being able to fully understand the nature of prison or jail (if they have not previously experienced this) when contemplating pleading guilty, either via plea bargain or in other contexts. It may be that, if these defendants were given more information about jail and prison conditions, they may be more or less likely to take any risks that would impact their freedom.

Analyses on confidence in plea bargain decision were done on an exploratory basis. It was found that participants who chose to accept the plea bargain deal were significantly more confident than participants who chose to go to trial. From this, it could be implied that participants who chose to accept the plea bargain offer put more thought into their decision than those that did not accept the plea bargain offer. However, more research into the relationship between confidence and defendant decision making in plea bargaining must be done to make that claim. As stated previously, the evidence around the relationship between confidence and accuracy of decision is not strong, and therefore these results should not be weighed heavily. Furthermore, it could have been that factors other than confidence in one's decision could have impacted how participants responded to that question (i.e., confidence in the criminal justice system or plea-bargaining system).

The results from both studies can be used to inform defendant decision making research. The realm of defendant decision making literature is relatively new and is growing, and the strength and relationship between known factors that affect a defendant's decision making are still unclear. It may be that loss aversion and temporal discounting on their own do not affect decision making as much as they do in relation to other known variables, such as strength of evidence and attorney recommendation (Redlich, Babas, Edkins, & Madon, 2017; McAllister & Bregman, 1986; Larry et al., 1978). Since defendants in real life conditions will be faced with several variables, examining the interactions between these factors, and determining how they affect one another will help to see the big picture in regards to defendant decision making. Much more work needs to be done to understand these factors, but the information gathered from these studies can be used as a stepping stone to get to that point.

4.2 Limitations

When interpreting the results of both studies, there are several limitations that should be kept in mind. One such limitation was issues with the effort put into the survey by participants. Both studies were completed on an online platform. It is possible that individuals who participated in the study were not putting in the sufficient effort to the survey due to this format. Participants did receive credit for completing the survey, so they had some amount of motivation to provide accurate and quality responses on the survey. However, they completed the survey on their own time and in their chosen environment, so any amount of distractions could have caused poor effort from the participants. This is evidenced by the scores on the plea-bargaining comprehension questionnaire, as a good number of participants performed poorly on the assessment

despite the answers being clear in the passage. Participants answering the survey were not monitored for effort aside from filtering out participants who took less than 180 seconds to take the survey. Therefore, we do not know whether the participants were actually reading the vignettes and making well thought-out decisions or filling out the survey at random simply to get to the end of the survey to receive compensation.

Regarding the lack of significant findings in study two, this may have resulted from participants not being able put themselves into the situation of the hypothetical defendant. Previous loss aversion studies used samples of actual defendants in jail and out on bail who were contemplating plea bargain offers, and participants who have never experienced this may not have been able to fully immerse themselves into the scenario. Therefore, collecting loss aversion data from actual defendant samples may provide a more accurate representation of the effect of loss aversion on decision making.

In terms of the findings regarding confidence levels, there are several limitations. Since this study took place in only a few minutes and the participants had much less time to decide than they would in real life, a lack of confidence in their answer could have resulted from this time pressure. It may have been that, given more time to decide, they would have chosen a different path and might have had more confidence in their answer since they had more time to decide, and could utilize other people and resources to help to inform their decision. Additionally, several other factors could have been at play when participants were rating their confidence. For example, participants' confidence in the criminal justice system as a whole, or the plea-bargaining system, could have impacted how they answered the questions. Additionally, as shown by some of the qualitative data collected, it could have been that the lack of information, like a lack of attorney

recommendation or a lack of knowledge of evidence against them, effected participants' confidence in their decision. Therefore, the results from the confidence question must be interpreted with these factors in mind.

Lastly, it is important to take into account the demographic differences between the samples. Study one showed a significant difference in race between participants who accepted the plea bargain offer and participants who rejected the offer. The ratio of African Americans who decided to accept the plea bargain offer compared to those who rejected it was almost twice as much as with White or Caucasian participants; the ratio of Asian participants was almost twice as much as that of African Americans. This shows that participants of color in this sample accepted a plea bargain significantly more often than White or Caucasian participants. However, the majority of participants in the sample identified as White or Caucasian, and this is not representative of the population one would expect to see involved in the criminal justice system (Bonczar, 2003). According to the Bureau of Justice Statistics, for non-violent crimes white individuals are often underrepresented in the criminal justice system, while Hispanic and Black individuals are overrepresented (Beck, 2021). It could have been that with a sample that was more representative of the population one would see involved in the criminal justice system, different results may have been found. Further research into the interplay between race and cognitive biases can be conducted to determine whether these biases influence different races incongruently.

4.3 Potential Implications and Recommendations for Future Research

For study one, the results indicate that the framing of punishments have an association with how defendants go about deciding on plea bargains. When a punishment

is framed closer in time, rather than farther, the defendant is more likely to accept the plea bargain, even when the severity of punishment is the same. This shows that these individuals may not be taking into account more important factors, such as how having an offense on their record or how likely they are to win at trial, when they are making these decisions. These results can be used to help attorneys in how to frame plea bargain offers in order to not be manipulative towards defendants; plea deals framed in immediate consequences may cause a defendant to reject a beneficial plea deal that they may not have otherwise rejected. As stated previously, a completely rational defendant would accept a plea deal when the outcome of that plea deal was worth more than the outcome of going to trial. It could be that a defendant would reject a plea deal, even when the outcome of the plea deal was better than going to trial, if the punishment were framed as a proximal punishment.

It is important to look at these findings since we expected to find an association based off previous literature; however, since not a lot of studies have been done in this format, more research on this is imperative to better understand how these variables interplay with one another. In order to provide a clearer picture of the relationship between loss aversion and plea bargain decision making, as well as the relationship between temporal discounting and plea bargain decision making, future studies must be conducted.

It is also important to consider that there was no “constant” condition. That is, for study one, there was no condition that did not mention the nature of the punishment, so it could be said that the mention of jail time or community service is what swayed decision making rather than the manipulation of temporal discounting. Likewise, for study two,

the mention of being in jail at all or the mention of the bail system may have influenced decision making in some participants, rather than the actual manipulation of loss aversion. Future research that utilizes similar methodology may include the notion of a “constant” condition that does not include information the nature of jail or punishment at all. If there is a difference in decision making, then we would have more evidence to support that the variables of interest are the ones that are impacting decision making, rather than other factors.

There was a high ratio of plea bargain acceptances to plea bargain rejections. While this was not surprising as the majority of actual plea deals are accepted by defendants, the overwhelming majority of acceptances was unexpected. The vignette used intended to leave guilt ambiguous so that the participant could see themselves potentially winning at trial, and therefore a less extreme ratio was expected. It could have been that the community service option was too good for participants to pass up, and therefore participants may have accepted the plea bargain due to the nature of the punishment rather than due to the manipulated variables. Further studies should take into account the nature of the punishment in terms of severity as compared to the nature of a jail or prison sentence in order to reduce this high rate of plea bargain acceptances.

Further investigation into the interplay between loss aversion and plea bargain decision making is important to determine how these two variables affect one another. Additionally, a more lab based study would help the participants put themselves in the scenario, and would help reduce the low effort problems that came about from the online surveys. Lastly, asking real-life defendants who are undergoing plea bargain decisions

about their decision making could also give a more accurate depiction of what factors go into accepting or rejecting a plea bargain.

It is possible that several factors may have impacted participant's decision to either accept or not accept the plea bargain. One such factor may have been the lack of information around the attorney recommendation, as evidenced by the common themes found in the qualitative short answer questions. Another factor that may come into play is the attitudes of the sample that was collected from. Despite using Amazon MTurk, which has been shown to display diverse samples, the majority of participants in both studies were Caucasian and had at least a bachelor's degree. This is not representative of the population that is usually involved in the criminal justice system (Bonczar, 2003). Therefore, the nature of the sample may have resulted in more participants to choose one decision or another. For example, Caucasian individuals have been shown to have more trust in attorneys than Black individuals, and therefore may have been more inclined to accept a plea bargain offer from an attorney (Pierce & Brodsky, 2002). The findings from both studies must be interpreted whilst taking into account the differences in populations between the samples of the studies and the population one would see in real life defendants in terms of racial demographics.

Lastly, as mentioned earlier, it was found that attorneys are more confident in their decision when they offer a plea bargain deal to a defendant. This is similar to what was found in the current study where participants were more confident in their decision when they choose to go to trial. More research into the confidence of attorneys and defendants is imperative in understanding the decision-making processes of these groups. There is a gap in the literature regarding defendants' confidence in their decision making.

4.4. Conclusion

The criminal justice system in the United States is described as a system of pleas (Lafler v. Cooper, 2012); the primary way that criminal defendants are convicted in the United States is via guilty plea, and this trend is projected to continue for the foreseeable future. As we work to better understand the several factors that affect how a defendant evaluates plea decisions, we can begin to determine which of these factors are truly manipulative towards these defendants. This work can serve to reform policies that wrongly incentivize guilty pleas for defendants.

Tables.

Table 1.

Preliminary Data for Study 1

	Did Not Accept Plea Bargain	Accepted Plea Bargain	Total
Distal Consequence	14	133	147
Proximal Consequence	27	122	149
Total	41	255	296

Table 2.
Preliminary Data for Study 2

	Did Not Accept Plea Bargain	Accepted Plea Bargain	Total
Currently in Jail	9	136	145
Out on Jail	9	144	153
Total	18	280	298

Table 3.
Skewness of Confidence Data for Each Condition

	Skewness Statistic	Standard Error
Temporal Discounting: Distal Consequence Condition	-.980	.199
Temporal Discounting: Proximal Consequence Condition	-1.196	.200
Loss Aversion: Currently in Jail Condition	-1.361	.201
Loss Aversion: Out on Bail Condition	-1.380	.196

Table 4.

t-test Results Comparing Accepted vs Not Accepted Plea Bargain for Study 1

Condition	n	Mean	SD	t	df	p	CI Lower	CI Upper
Distal Consequence	149	79.97	20.79	2.834	32.61	.008	4.12	25.11
Proximal Consequence	147	81.10	18.84	2.495	145	.014	2.70	23.26

Table 5.

t-test Results Comparing Accepted vs Not Accepted Plea Bargain for Study 2

Condition	n	Mean	SD	t	df	p	CI Lower	CI Upper
Currently in Jail	145	79.17	20.45	2.448	8.44	.039	1.62	47.08
Out on Bail	153	81.06	20.29	2.615	151	.010	4.37	31.40

Table 6a.

Demographics: Age

	Mean	SD
Study One	37.30	11.81
Study Two	36.94	12.13

Table 6b.
Demographics: Gender

	Study One	Study Two
Male	167	153
Female	128	84
Nonbinary	0	1

Table 6c.

Demographics: Race

	Study One	Study Two
Asian	47	57
Black or African American	33	30
Hispanic or Latino	15	26
Native American or Alaskan Native	1	2
White or Caucasian	198	178
Other	2	2

Table 6d.

Demographics: Highest Level of Education

	Study One	Study Two
Some High School	0	1
High School	28	25
Diploma/GED		
Some	71	63
College/Associate's		
Bachelor's	150	162
Graduate or	47	45
Professional		

Table 6e.

Demographics: Previous Experience

		Study One	Study Two
Previous Experience with Criminal Justice System	Yes	43	51
	No	248	240
Previous Experience with Plea Bargaining	Yes	30	45
	No	264	246

Table 7a.

Plea Bargain Decision by Gender Crosstabulation

		Male	Female	Other	Total
Study One	Did Not Accept Plea Bargain	30	11	0	41
	Accepted Plea Bargain	137	117	1	255
	Total	167	128	1	196
Study Two	Did Not Accept Plea Bargain	11	6	0	17
	Accepted Plea Bargain	142	78	2	223
	Total	153	84	2	240

Table 7b.
Plea Bargain Decision by Race Crosstabulation

		Asia n	Black or African America n	Hispani c or Latino	Native America n or Alaskan Native	White or Caucasia n	Othe r	Tota l
Stud y One	Did Not Accept Plea Bargain	15	6	1	0	18	1	41
	Accepte d Plea Bargain	32	27	14	1	180	1	255
	Total	47	33	15	1	198	2	296
Stud y Two	Did Not Accept Plea Bargain	6	1	2	0	9	0	18
	Accepte d Plea Bargain	51	29	24	2	169	2	277
	Total	57	30	26	2	178	2	295

Table 7c.

Plea Bargain Decision by Education Level Crosstabulation

		Some high school or less	High school diploma	Some college/ Associate's degree	Bachelor's degree	Graduate or Professional degree	Total
Study One	Did Not Accept Plea Bargain	0	3	9	23	6	41
	Accepted Plea Bargain	0	25	62	127	41	255
	Total	0	28	71	150	47	296
Study Two	Did Not Accept Plea Bargain	0	0	4	10	4	18
	Accepted Plea Bargain	1	25	59	152	41	178
	Total	1	25	63	162	45	296

Table 7d.

Plea Bargain Decision by Previous Experience Crosstabulation

		Previous Experience with Criminal Justice System	No Previous Experience with Criminal Justice System	Previous Experience with Plea Bargaining	No Previous Experience with Plea Bargaining
Study One	Did Not Accept Plea Bargain	9	32	4	37
	Accepted Plea Bargain	34	216	26	227
	Total	43	248	30	264
Study Two	Did Not Accept Plea Bargain	1	17	0	18
	Accepted Plea Bargain	50	223	45	228
	Total	51	240	45	246

Appendices.

Appendix A

Demographics Questionnaire

1. What is your age?
2. What gender do you identify with?
 - a. Male
 - b. Female
 - c. Non-binary
 - d. Other
 - i. specify
3. What is your race (choose all that apply)?
 - a. Asian
 - b. Black or African American
 - c. Hispanic or Latino
 - d. Native American or Alaskan Native
 - e. White or Caucasian
 - f. Other
 - i. specify
4. What is your highest level of education?
 - a. Some high school or less
 - b. High school diploma/GED
 - c. Some college
 - d. Bachelor's degree/Associate's degree

e. Graduate or professional degree (i.e., Master's, MD, doctorate)

5. Do you have any previous experience with the criminal justice system (i.e., arrested, charged with a crime)?

a. Yes

b. No

c. Prefer not to answer

6. Do you have any previous experience with plea bargaining?

a. Yes

b. No

c. Prefer not to answer

Appendix B

Plea Bargaining Explanation and Comprehension Questions

Plea Bargaining Explanation:

The majority of criminal cases are resolved through a plea bargain (sometimes called a plea negotiation or plea agreement), and this usually takes place before a case reaches trial. If a plea bargain happens, there will be no trial. By accepting a plea bargain, the defendant agrees to plead guilty, usually to a lesser charge than one the defendant is being accused of, in exchange for a more lenient sentence to have some of the charges be dropped. This bargain is proposed by the prosecuting attorney and approved by a judge. The defendant is under no obligation to accept a plea bargain, and many factors may go into a defendant's decision to either accept or reject a plea bargain. While the defendant's attorney may give an opinion or advice to the defendant, the decision lies solely on the defendant's shoulders.

Here is an example of a plea bargain scenario:

Suppose Dan is arrested and charged with two counts of aggravated assault/battery, based on his alleged use of a baseball bat in a bar fight. A plea bargain might be reached in Dan's case in one of several ways:

1. The prosecuting attorney handling the case approaches Dan and his defense attorney and offers to allow Dan to plead guilty to a less serious charge, such as simple assault/battery or even disorderly conduct.

2. The prosecuting attorney handling the case approaches Dan and his defense attorney and offers to allow Dan to plead guilty to one charge or "count" of aggravated assault/battery, in exchange for dismissal of the second count.
3. The government's evidence against Dan is so strong, and the injuries suffered by the assault victim so serious, that Dan agrees to plead guilty to the original charge of aggravated assault/battery in exchange for a less severe sentence than he would likely receive if a jury found him guilty at trial

Plea Bargaining Comprehension Questions: (correct answers are bolded)

A plea bargain is BEST described as:

- a. **An agreement between a defendant and a prosecuting attorney to reduce the defendant's sentence in exchange for the defendant pleading guilty**
 - b. A contract between prosecutors and the defendant to accept the maximum sentence
 - c. A contract for the defendant to obtain a higher sentence than what normally would be expected at trial
 - d. All of the answers are correct
-
2. Who makes the ultimate decision on whether to accept or reject a plea bargain?
 - a. the prosecuting attorney
 - b. the jury
 - c. **the defendant**
 - d. the defense attorney

e. the judge

3. True or false: If a defendant accepts a plea bargain, they are agreeing to plead guilty.

a. True

b. False

4. True or false: Regardless of whether a defendant accepts a plea bargain offer, there will still be a trial.

a. True

b. False

5. True or false: A defendant must accept a plea bargain that is proposed to them by a prosecuting attorney.

a. True

b. False

6. Which of the following is a possible outcome of a plea bargain?

a. The defendant is facing two charges, and accepting the plea bargain means they plead guilty to one charge in order to drop the other

b. The defendant agrees to accept a plea bargain to ensure a lesser sentence than the one they would face if convicted at trial

- c. The defendant agrees to plead guilty to a lesser charge than the one they are currently facing
- d. All of the above are possible outcomes of a plea bargain**

Appendix C

Vignettes

Instructions: You are about to play the role of a criminal defendant who has been indicted (formally accused) for *texting and driving and reckless driving*. It is important for you to treat the information and choices you make in this scenario as if they were real, considering your options and the potential consequences of your choices very carefully. Above all things, it is important that you treat this scenario as if it were real.

For temporal discounting study:

You are driving in the left lane of the interstate going 80 MPH in a 70 MPH zone when you receive a text message. You go to read the text, but do not notice that the car in the lane next to you is merging into your lane. They are not using their turn signal or looking in their blind spot, where you are located. You look up from your phone and immediately slam your breaks when you see the car. However, you are not quick enough and you crash into the rear of the car. The driver and passenger in that car are injured and are immediately rushed to the hospital. The driver has minimal injuries, and the passenger has several broken bones and a concussion. Upon this incident, you are arrested. You are being charged with two criminal charges: reckless driving and texting and driving. If convicted of both charges, you could receive a prison sentence of 1 year. This is your first offense. The prosecuting attorney is offering a plea bargain: **if you plead guilty to the lesser charge of texting and driving, you must complete 100 hours of community service that is to be completed by the end of 2021. You can begin these hours as soon or as late as you would like, as long as they are complete by the end of 2021 OR if**

you plead guilty to the lesser charge of texting and driving, you must complete 100 hours of community service beginning on Monday. You must attend mandated community service and report to your supervisor bi-weekly until you complete your hours. Your attorney does not offer a recommendation for either option. If you do not accept this plea bargain, you will have a chance to prove your innocence during your trial.

Variable of temporal discounting:

- (1) closer consequence: immediately go to mandatory, timed community service
- (2) distal consequence: complete community service hours sometime in the next year

For loss aversion study:

You are driving in the left lane of the interstate going 80 MPH in a 70 MPH zone when you receive a text message. You go to read the text, but do not notice that the car in the lane next to you is merging into your lane. They are not using their turn signal or looking in their blind spot, where you are located. You look up from your phone and immediately slam your breaks when you see the car. However, you are not quick enough and you crash into the rear of the car. The driver and passenger in that car are injured and are immediately rushed to the hospital. The driver has minimal injuries, and the passenger has several broken bones and a concussion. Upon this incident, you are arrested and brought to jail. **You are not able to make bail and are currently in jail awaiting your trial. You do not have access to any jail facilities (i.e., rec room, exercise room) and you are only allowed to communicate with your family once every few days OR you**

are able to make bail and are now at home awaiting your trial. (Bail is a set amount of money that you give to the courts in order to be let out of jail, with the promise to appear in court when you are asked. If you appear in court, you are given the money back.) You are being charged with two criminal charges: reckless driving and texting and driving. If convicted of both charges, you could receive a prison sentence of 1 year. This is your first offense. The prosecuting attorney is offering a plea bargain: if you plead guilty to the lesser charge of texting and driving, you must complete 100 hours of community service that is to be completed by the end of 2021. Your attorney does not offer a recommendation for either option. If you do not accept this plea bargain, you will have a chance to prove your innocence during your trial.

Variable of loss aversion:

(1) 'you' will already be in jail at the time of this decision (loss of freedom is already being experienced)

(2) 'you' will not be in jail, you will be out on bail (loss of freedom is avoided)

Appendix D

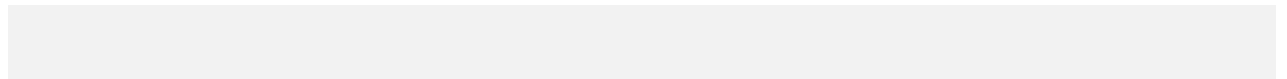
Post Vignette Questionnaire

1. Will you accept this plea bargain offer?

- Yes
- No

2. How confident are you in this decision on a scale of 0 to 100 percent, where 0 is no confidence and 100 is total confidence?

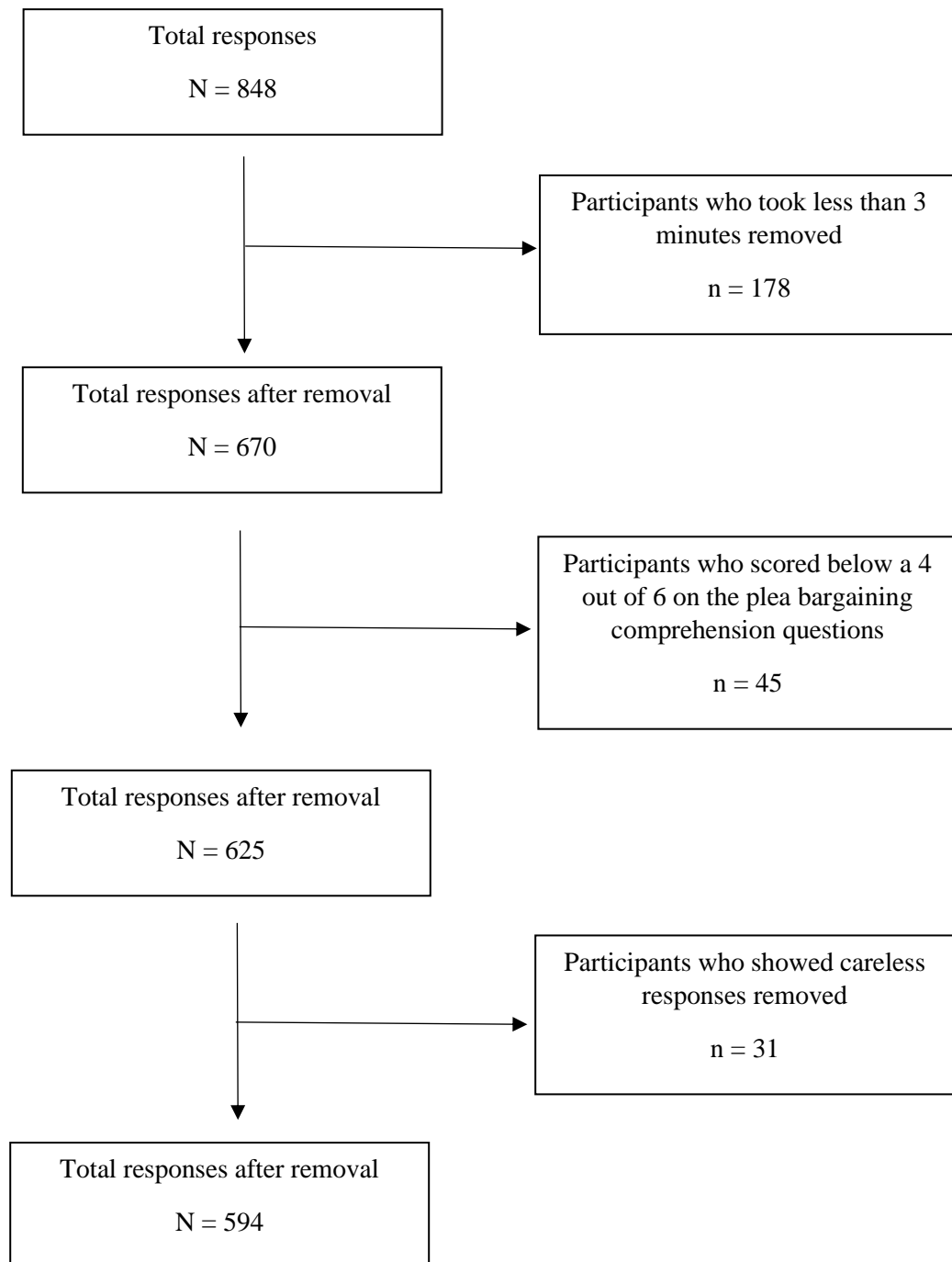
0 10 20 30 40 50 60 70 80 90 100



Follow-up questions (open answer):

1. What factors went into your decision to either accept or reject a plea bargain?
2. Did you weigh in the consequences of pleading guilty on your future (career, education, opportunities, socially, etc?)
3. If you could have had one more additional piece of information, what would you have wanted to know?

Appendix E.



References

- Ainslie, G. (1975). Is pleading really a bargain? *Journal of Empirical Legal Studies*, 8(s1), 200-221. <https://doi.org/10.1111/j.1740-1461.2011.01234.x>
- Azeez, T. (2020). *Read-O-Meter*. NIRAM. <https://niram.org/read/>
- Beck, A. J. US Department of Justice. Bureau of Justice Statistics. (2021). *Race and Ethnicity of Violent Crime Offenders and Arrestees, 2018*. (NCJ 255969).
- Behrend, T.S., Sharek, D.J., Meade, A.W., Wiebe, E.N. (2011). The viability of crowdsourcing for survey research. *Behavioral Research Methods*, 43(3), 800-813. <http://dx.doi.org/10.3758/s13428-011-0081-0>.
- Bergman, P. & Berman, S. J. (2020). *The Criminal Law Handbook: Know Your Rights, Survive the System, 16th Edition*. Nolo.
- Bibas, S. (2004). Plea bargaining outside the shadow of trial. *Harvard Law Review*, 117, 2463–2547. <http://dx.doi.org/10.2307/4093404>
- Bonczar, T. (2003). Prevalence of imprisonment in the US population. Washington, DC: Bureau of Justice Statistics.
- Bordens, K. S. (1984). The effects of likelihood of conviction, threatened punishment, and assumed role on mock plea bargain decisions. *Basic and Applied Social Psychology*, 5, 59 –74. http://dx.doi.org/10.1207/s15324834basp0501_4
- Bordens, K. S. & Basset, J. (1985). The plea bargaining process from the defendant's perspective: a field investigation. *Basic and Applied Social Psychology*, 6(2), 93-110. http://dx.doi.org/10.1207/s15324834basp0602_1

- Bornstein, B. H., Golding, J. M., Neushatz, J., Kimbrough, C., Reed, K., Magyarics, C., & Leucht, K. (2017). Mock juror sampling issues in jury simulation research: a meta-analysis, *Law and Human Behavior*, 41(1), 13-28.
<http://dx.doi.org/10.1037/lhb0000223>
- Brown, M., & Bunnell, S. (2006). Negotiating justice: Prosecutorial perspectives on federal plea bargaining in the District of Columbia. *American Law Review*, 43, 1063–1093
- Brunyé, T. T., Ditman, T., Mahoney, C. R., Augustyn, J. S., & Taylor, H. A. (2009). When you and I share perspectives: Pronouns modulate perspective taking during narrative comprehension. *Psychological Science*, 20(1), 27–32. <https://doi.org/10.1111/j.1467-9280.2008.02249.x>
- Brysbaert, M. (2019). How many words do we read per minute? A review and meta-analysis of reading rate. *Journal of Memory and Language*, 109.
<https://doi.org/10.1016/j.jml.2019.104047>
- Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science*, 6(1), 3-5. <https://doi.org/10.1177%2F1745691610393980>
- Cagno, D. D. & Grieco, D. (2018). Measuring and disentangling ambiguity and confidence in the lab, *Games*, 10(9). <https://doi.org/10.3390/g10010009>
- Dept of Justice. *Legal Terms Glossary*. [https://www.justice.gov/usao/justice-101/glossary#:~:text=plea%20deal%20\(or%20plea%20bargain,of%20a%20more%20lenient%20sentence.](https://www.justice.gov/usao/justice-101/glossary#:~:text=plea%20deal%20(or%20plea%20bargain,of%20a%20more%20lenient%20sentence.)

- Devers, L. (2011). *Plea and charge bargaining research summary*. Washington, DC: Bureau of Justice Assistance.
- Dobbie, W., Goldin, J., & Yang, C. (2016). The effects of pre-trial detention on conviction, future crime, and employment. *American Economic Review*, 108(2), 201-249. <http://dx.doi.org/10.1257/aer.20161503>
- Edkins, V. A. & Dervan, L. E. (2018). Freedom now or a future later: pitting the lasting implications of collateral consequences against pretrial detention in decisions to plead guilty. *Psychology, Public Policy, and Law*, 24(2), 204–215. <https://doi.org/10.1037/law0000159>
- Eltorai, A. E. N., Ghanian, S., Adams Jr., C. A., Born, C. T., & Daniels, A. H. (2014). Readability of patient education materials on the American Association for Surgery of Trauma website. *Arch Trauma Res*, 3(2). <http://dx.doi.org/10.5812/atr.18161>
- Field, A. (2018). *Discovering statistics using IBM SPSS Statistics: North American edition*. (5th ed.). Thousand Oaks, CA: Sage Publications, Inc. North American Version- Paperback ISBN 9781526436566
- Fischhoff, B., Goitein, B., & Shapira, Z. (1983). Subjective expected utility: a model of decision-making, *Advances in Psychology*, 16, 183-207. [https://doi.org/10.1016/S0166-4115\(08\)62199-8](https://doi.org/10.1016/S0166-4115(08)62199-8)
- Kincaid, J.P., Fishburne, R.P., Rogers, R.L., & Chissom, B.S. (1975). Derivation of new readability formulas (automated readability index, fog count, and flesch reading

ease formula) for Navy enlisted personnel. *Research Branch Report*, 8–75. Chief of Naval Technical Training: Naval Air Station Memphis.

Gregory, W. L., Mowen, J. C., & Linder, D. E. (1978). Social psychology and plea bargaining: Applications, methodology, and theory. *Journal of Personality and Social Psychology*, 36(12), 1521–1530. <https://doi.org/10.1037/0022-3514.36.12.1521>

Holland, J. L. & Christian, L. M. (2009). The influence of topic interest and interactive probing on responses to open-ended questions in web surveys. *Social Science Computer Review*, 27(2), 196-212. <https://doi.org/10.1177/0894439308327481>

Huang, J. L., Curran, P. G., Keeney, J., Poposki, E. M., & DeShon, R. P. (2012). Detecting and deterring insufficient effort responding to surveys. *Journal of Business and Psychology*, 27(1), 99–114. <https://doi.org/10.1007/s10869-011-9231-8>

Kahneman, D. & Tversky, A. (1979). An analysis of decision under risk. *Econometrica*, 47(2), 263-291.

Kramer, G., Wolbransky, M. M., & Heilbrun, K. (2007). Plea bargaining recommendations by criminal defense attorneys: evidence strength, potential sentence, and defendant preference, *Behavioral Sciences & the Law*, 24(4): 573-585. <https://doi.org/10.1002/bsl.759>

Kellough, G., & Wortley, S. (2002). Remand for plea: Bail decisions and plea bargaining as commensurate decisions. *British Journal of Criminology*, 42, 186–210. <http://dx.doi.org/10.1093/bjc/42.1.186>

Lafler v. Cooper, 566 U.S. 156 (2012).

Luttrell AB,P, Pettya R,E, Cunningham W, Díazd D. Metacognitive confidence: A neuroscience approach. *Int. J. Soc. Psychol.* 2013;28:317–332.

Madon, S., Guyll, M., Scherr, K. C., Greathouse, S., & Wells, G. L. (2012). Temporal discounting: The differential effect of proximal and distal consequences on confession decisions. *Law and Human Behavior*, 36, 13–20.
<http://dx.doi.org/10.1037/h0093962>

Mazzella, R. & Feingold, A. (1994). The effects of physical attractiveness, race, socioeconomic status, and gender of defendants and victims on judgements of mock jurors: a meta-analysis, *Journal of Applied Social Psychology*, 24(15).
<https://doi.org/10.1111/j.1559-1816.1994.tb01552.x>

McAllister, H. A. & Bregman, N. J. (1986). Plea bargaining by defendants: A decision theory approach. *Journal of Social Psychology*, 126(1), 105-110.
<https://doi.org/10.1080/00224545.1986.9713576>

Packard, G. M. & Berger, J. (2018). With or without you: When second person pronouns engage listeners. *Advances in Consumer Research*, 46, 736-737.

Pierce, C. S. & Brodsky, S. L. (2002). Trust and understanding in the attorney-juvenile relationship, *Behavioral Sciences and the Law*, 20, 89-107.
<http://dx.doi.org/10.1002/bsl.478>

- Redlich, A. D., Bibas, S., Edkins, V. A., & Madon, S. (2017). The psychology of defendant plea decision-making. *American Psychologist*, 72(4), 339–352. <https://doi.org/10.1037/a0040436>
- Redlich, A. D., & Bonventre, C. L. (2015). Content and comprehensibility of juvenile and adult tender-of-plea forms: Implications for knowing, intelligent, and voluntary guilty pleas. *Law and Human Behavior*, 39(2), 162–176. <https://doi.org/10.1037/lhb0000118>
- Redlich, A. D. & Summers, A. (2012). Voluntary, knowing, and intelligent pleas: understanding the plea inquiry. *Psychology, Public Policy, and Law*, 18(4), 626–643. <https://doi.org/10.1037/a0026066>
- Rosenfeld, B. & Penrod, S. D. (2011). *Research Methods in Forensic Psychology*, John Wiley & Sons Inc.
- Schneider, R. A., & Zottoli, T. M. (2019). Disentangling the effects of plea discount and potential trial sentence on decisions to plead guilty. *Legal and Criminological Psychology*, 24(2), 288–304. <https://doi.org/10.1111/lcrp.12157>
- Smith, D. A. (1986). The plea bargaining controversy. *The Journal of Criminal Law and Criminology*, 77(3), 949–968. <https://doi.org/10.2307/1143445>
- Tor, A., Gazal-Ayal, O., & Garcia, S. M. (2010). Fairness and the willingness to accept plea bargain offers. *Journal of Empirical Legal Studies*, 7(1), 97–116. <https://doi.org/10.1111/j.1740-1461.2009.01171.x>

- Tversky, A. & Kahneman, D. (1974). Judgement under uncertainty: Heuristics and biases. *Science*, 185 (4157), 1124-1131.
<https://doi.org/10.1126/science.185.4157.1124>
- United States Sentencing Commission. (2018). *Overview of federal criminal cases fiscal year 2017*. Retrieved from https://www.ussc.gov/sites/default/files/pdf/research-and-publications/research-publications/2018/FY17_Overview_Federal_Criminal_Cases.pdf
- Votruba, A. M. & Tisdale, C. N. (2020). Examining prosecutorial decision making in plea bargaining: an experimental paradigm in a community sample, *Analyses of Social Issues and Public Policy*, 1-26. <http://dx.doi.org/10.1111/asap.12234>
- Wilson, M. J. W. (2016). Defense attorney bias and the rush to the plea, *Kansas Law Review*, 65(2). <https://doi.org/10.17161/1808.25553>
- Zimmerman, D. M. & Hunter, S. (2018). Factors affecting false guilty pleas in a mock plea bargaining scenario. *Legal and Criminological Psychology*, 23, 53-67.
- Zylerberg, A., Barttfeld, P., & Sigman, M. (2012). The construction of confidence in a perceptual decision. *Front. Integr. Neurosc*, 6(79).
<http://dx.doi.org/10.3389/fnint.2012.00079>