

# Prosecutor Plea Bargaining and Conviction Rate Structure: Evidence from an Experiment

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## **Abstract**

Prosecutors in the United States are often incentivized directly or indirectly to maximize their conviction rate. Since prosecutors have broad discretion when deciding which cases to pursue, these conviction-rate-centered incentives may affect charges brought and plea bargains offered. This study reports the results of a controlled laboratory experiment, with participants in the role of prosecutors. The design varies by whether or not conviction rates include guilty pleas. We find that including plea bargains in the conviction rate increases the number of plea offers made and increases the difference between the severity of the crime offered in the plea and the one threatened for trial. Prosecutors who favor more lenient plea offers and trial charges are more likely to increase the trial penalty when plea bargains count as convictions.

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# 1 Introduction

Prosecutors in the United States have tremendous discretion in charging decisions and can use this discretion to bargain with defendants (see e.g. Alschuler (1979)). Prosecutors may offer a reduced charge, and a corresponding reduced sentence recommendation, in exchange for a guilty plea. In practice, more than 90% of convictions are the result of guilty pleas (Barkai (1977); Bibas (2004)). Prosecutorial discretion with respect to plea bargains can move cases through the criminal justice system more quickly and at a lower monetary cost. But what unintended costs arise from the changes in incentives accompanying the institution of plea bargaining? This study explores such costs using a controlled laboratory study.

Do prosecutors care about their convictions rates? After all, Standard 3-1.2(b) of the ABA's Criminal Justice Standards explicitly states, "The primary duty of the prosecutor is to seek justice within the bounds of the law, not merely to convict." In conversations, prosecutors and defense attorneys alike say that prosecutors are not simply focused on convictions; rather, they want to punish guilty people appropriately and not convict innocent people. At the same time, Leonetti (2012) takes as given that "conviction rates and sentence lengths are used both as indicators of success and as grounds for retention or promotion . . . [P]rosecutors with the highest conviction and sentencing statistics are in the best position for career advancement, but those who exercise their discretion to achieve the most just and beneficial outcomes are not." Barkow (2009) and Silverglate (2011) agree that higher conviction rates are more likely to lead to promotions or high-paying private sector work. Anecdotes circulate of rewards to prosecutors for convictions, such as a Colorado district attorney who offered pay bonuses to prosecutors who tried at least five cases a year and won at least 70 percent of them (Fender (2011)),<sup>1</sup> or a report of Louisiana prosecutors who gave each other informal awards for murder convictions (Balko (2013)). Similarly, in a letter to the editor three decades after convicting an innocent Louisiana man of capital murder, the responsible former prosecutor admitted that, at the time, he had been more concerned with "obtaining a conviction of a person who I believed to be guilty" than with pursuing known leads that might have yielded exculpatory evidence (Stroud (2015)).

Other scholars have recognized the emphasis that prosecutors place on conviction rates. Shamir

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<sup>1</sup> Joy and McMunigal (2011) acknowledge that such bonus schemes are not technically violations of the ABA's Model Rules of Professional Conduct, though they argue for making prosecutor bonuses unethical.

and Shamir (2012) develop a model of court congestion built on the assumptions that prosecutors maximize either conviction rates or numbers of convictions, while Ferguson-Gilbert (2001) sets forth a general overview of why prosecutors seek to maximize conviction rates. Rasmusen et al. (2009) note that prosecutors often tout their conviction rates when running for elections, and media accounts provide examples of campaign battles over conviction rates (“Dallas County DA” (2010), Dujardin (2017); Rodricks (2022)). There is theoretical and empirical evidence that when prosecutors are beholden to voters, elections can spur increases in the relative number of cases taken to trial relative to those resolved through plea bargaining (Bandyopadhyay and McCannon (2014); Dyke (2007)). Gordon and Huber (2002) show that, when information about specific cases is limited, voters who care about Type I and II errors can best achieve their electoral goals by voting for prosecutors who successfully obtain convictions. Further, when prosecutors are not directly accountable to voters, institutional incentives nevertheless encourage them to maintain a high conviction rate (Zacharias (1991); Bibas (2004)).

Plea bargains are beneficial to the criminal justice system for many reasons. From a voters’ perspective, a criminal trial costs time and money. An early study found that criminal trials in nine state courts consumed an average of 11 hours of court time, with actual times varying widely by offense and jurisdiction (Sipes *et al.* (1988)). Criminal trials in federal courts lasted four-and-a-half days in the early 1990s (Cook *et al.* (1995)). In 1998, the Los Angeles Times reported that the average criminal trial lasted two weeks, and that the daily cost of a Los Angeles Superior Court was just under \$9,500 (“The Cost of Justice” (1998)). A 1999 study of nine state courts found that the average duration of a criminal case was 161 days when resolved via a guilty plea, compared to 272 days when resolved with a trial (Ostrom and Hanson (1999)). Plea bargains reduce the costs of deciding cases, and they place fewer demands on citizens who would otherwise be called for jury duty.

From the prosecutor’s perspective, plea bargains not only prevent the need for trial preparation (and the opportunity costs of their time at trial) but also eliminate the risk of losing at trial. Due to discovery rules, defendants often do not have to disclose their evidence of innocence prior to trial, which makes trials unattractive for prosecutors from a risk and ambiguity perspective. A guilty plea, even to a lesser offense than would be charged at trial, yields a certain outcome, while trials sit squarely in the realm of uncertainty. As such, plea bargaining allows prosecutors to prosecute a wider range of cases, including those with weaker evidence, while also increasing the probability

of a guilty finding at trial.

Plea bargains introduce costs into the criminal justice system as well. If prosecutors can pursue more marginal cases (i.e., weaker evidence) due to plea bargaining, there may be a corresponding increase in innocent people embroiled in the criminal justice system. There is a large literature arguing that the plea bargaining process may contribute to the innocence problem, in part because of altered prosecutorial incentives (see. e.g. Bibas (2004)). That is, innocent defendants may be induced to plead guilty to a lesser offense rather than face the uncertainty of a trial out of fear, risk, loss, and/or ambiguity aversion.<sup>2</sup>

Such problems may be particularly salient for poorer defendants who cannot afford bail/bond (and have to make plea bargain decisions from behind bars) or who rely upon public defenders or court-appointed attorneys for legal defense. Court-appointed attorneys are often paid a flat rate per case whether it is decided by plea or by trial, which may incentivize them to encourage clients to take plea bargains to reduce the time spent on the case. In contrast, an hourly-paid private defense attorney may prefer more time-consuming trials and therefore advise against plea bargains that are bad for the defendant. Indeed, many criminal defense attorneys handle both hourly and court-appointed cases, so any given attorney may face conflicting incentives across clients. See Agan et al. (2018) for a discussion of criminal defense lawyer incentives and citations to additional literature. Many additional factors, such as poverty, race, fear, gender, risk preferences, etc., could influence a person's willingness to take a plea bargain, even though these factors are irrelevant to proving the elements of the charged crimes. Experimental studies show that bargaining behavior depends on individual risk preferences, on the stake size, and on the bargaining power the individual possesses (McCannon & Wilson, 2016).

A variety of proposals have been made with the intention of curbing guilty pleas by innocent defendants. Reinganum (1988) finds that restricting prosecutorial discretion such that they must offer uniform plea bargains for a given charge can improve welfare; the proposal works by limiting prosecutors' ability to offer larger sentence differentials when cases against defendants are weaker. Another more extreme proposal is to abolish plea bargaining altogether (Schulhofer (1984)). Others suggest screening cases prior to referring them to a prosecutor to ensure the available

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<sup>2</sup> See our sister paper Ralston et al. 2019 for a study of the innocence problem and how economic preferences over uncertainty relate to plea bargaining decisions of truly innocent and truly guilty individuals.

evidence meets a predefined threshold (Wright and Miller (2002)). The purpose of such screening would be to allow prosecutors to bargain only with defendants who are more likely to be guilty.

It is difficult to explore these potential problems with naturally occurring criminal justice data. For instance, cases that are dropped or not pursued will not show up in trial or plea bargaining records. Likewise, it would be difficult, invasive, and expensive (and likely not even possible) to measure or obtain accurate data on evidence strength and case by case options prosecutors weigh when making their decisions. The experimental laboratory provides us an opportunity to control many of these factors so that incentives and decisions can be cleanly explored. The outcomes of such experiments can help justify undertaking (or not) more invasive and costly data collection methods.

Our study approaches plea bargaining from the perspective of prosecutorial incentives to obtain higher conviction rates. We examine the relationship between how conviction rates are calculated – including or excluding bargained-for guilty pleas – and prosecutor behavior in a controlled experimental setting.<sup>3</sup> A benefit of our approach is that it holds constant the deterrence effect of prosecutorial decisions. Ever since Becker (1968), many studies have sought to explore the deterrence effect of policies and criminal justice procedures. Zeiler et al. (2018) outlines many such theoretical models and experimental studies that have done so. Our study takes a different approach and explores incentives' upstream deterrence. By holding constant the set of “cases” that prosecutors face, we can explore the incentive effects upon prosecutor decisions without concern about the dynamic interaction between incentives, prosecutor decisions, and how such decisions influence the flow of case types (which may also have their own influence upon prosecutor decisions.)

We are not alone though in experimentally exploring the decision making of prosecutors. Many such studies explore topics such as expectations of trial outcomes, guesses of jury decisions, and what would be the best plea bargains (see review in Charness and DeAngelo 2018). Charness and DeAngelo (2018) discuss that criminal justice experiments often (though not exclusively) suffer from being either hypothetical in nature (no actual consequential trials/penalties/plea bargains are

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<sup>3</sup> Note that the prosecutor's bonus system reported in Fender (2011) excluded guilty pleas from calculation of the conviction rate, while the Dallas DA in “Dallas County DA” (2010) included guilty pleas in his claimed conviction rate. Silverglate (2011) reports that federal white-collar prosecutors used conviction rates bolstered by guilty pleas to land highly-paid criminal defense jobs at “white-shoe law firms.”

being implemented from decisions) or the experiment is conducted in neutral frames (participants are not “role-playing”.) Our study differs by placing subjects into a framed role as a prosecutor where their decisions will affect other experimental subjects. Our experiment is non-hypothetical in a framed environment, which puts us in an uncommon position among the extant experimental law and economics literature.

We find that incentivizing plea bargaining by making accepted pleas count toward a prosecutor’s conviction rate increases the likelihood that a plea is offered, and that the differential increases between the offered plea punishment amount and the threatened punishment at trial. Some prosecutors favor a strategy of more lenient plea offers and threatened trial charges, while others tend to be harsher on both plea offers and threatened trial charges. We discuss how different “types” of prosecutors (which we call “Carrot” or “Stick” type prosecutors) differ in their decision making in our environment. The more lenient prosecutor-types are more likely to increase the gap between plea offer and trial threat when conviction rates include plea bargains.

## 2 Motivational Model

To explore prosecutorial incentives regarding the value of convictions by plea bargain, we first develop a simple model of a prosecutor’s decision-making process. Consider a prosecutor who must decide what, if anything, to charge a defendant with. Let the available charges be the interval  $(0, \bar{c}]$ . The probability of obtaining a conviction at trial with charge  $c \in (0, \bar{c}]$  is given by  $p(c)$ , and this is common knowledge. For simplicity, we assume that  $p(\bar{c}) = 0$ , that  $p(c)$  is continuously differentiable and that  $p'(c) < 0$ . Finally, we assume that  $\lim_{c \rightarrow 0^+} p(c) = 1$ .

The prosecutor must first decide whether to drop the charges altogether. If they decide to do so the game ends, and both the defendant and the prosecutor have payoffs of zero. If the prosecutor decides not to drop the charges, they decide whether to plea bargain or not. If they decide not to plea bargain, they choose a charge,  $c_s \in (0, \bar{c}]$ . If the defendant is convicted, then the defendant has a payoff of  $-c_s$ , and the prosecutor has a payoff of  $c_s$ <sup>4</sup>. If the defendant is found not guilty, the defendant has a payoff of 0, while the prosecutor has a payoff of  $-c_s$ .

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<sup>4</sup> Note that the model presented serves as a theoretical motivation for our study. However, our experiment implements a take-it-or-leave-it bargaining procedure and incentivizes convictions to simplify the environment for our participants. However, as show in Section 4, our results are consistent with the model presented in Section 2.

If the prosecutor does decide to offer a plea bargain, the prosecutor and defendant simultaneously announce a charge they are willing to accept as part of a plea bargain. Let  $c_p^p$  be the demand of the prosecutor, and  $c_p^d$  be the demand of the defendant. If  $c_p^p > c_p^d$ , the prosecutor chooses a charge that they will take to trial,  $c_t \in [0, \bar{c}]$ . A conviction is obtained with probability  $p(c_t)$ , the game ends, and payoffs are analogous to those outlined above.

If  $c_p^p \leq c_p^d$ , there is no trial, and a sentence of  $c_p^p$  is imposed, and the game ends. The defendant has a payoff of  $-c_p^p$ , while the prosecutor has a payoff of  $bc_p^p$ . The parameter  $b > 0$  indicates the value of obtaining a conviction via plea bargain, relative to obtaining it via trial. If  $b = 1$ , for instance, then obtaining a conviction via plea bargain is weighted just as heavily as a conviction obtained at trial. If, however,  $b < 1$ , a conviction obtained via plea bargain is not considered to be as valuable to the prosecutor as the same conviction obtained via a trial.

We first consider the prosecutor's choice of  $c_t$ . We assume, for simplicity, that the prosecutor's expected payoff at trial is single peaked. Denote the prosecutor's optimal choice as  $c_t^*$ . That is,

$$c_t^* \equiv \arg \max_{c_t} p(c_t)c_t - (1 - p(c_t))c_t.$$

Turning attention to the prosecutor's demand during the plea bargaining process, note that their demand must satisfy

$$2p(c_t^*)c_t^* - c_t^* \leq bc_p^p,$$

since the demand must yield at least as much expected utility as the outside option obtained at trial. Similarly, for the defendant, their demand must satisfy

$$-c_t^*p(c_t^*) \leq -c_p^d.$$

To ensure that a plea bargain that is mutually acceptable for both parties exists, we assume that

$p(c_t^*) \leq 1/(2 - b)$ . This restriction implies that value to the prosecutor of a sentence obtained via plea bargain is not discounted to the point that the prosecutor would prefer to simply go to trial.<sup>5</sup> The set of plea bargains that are mutually acceptable is

$$\left[ \frac{2p(c_t^*)c_t^* - c_t^*}{b}, c_t^*p(c_t^*) \right].$$

Following Nash (1950), we focus on the equilibrium corresponding to the midpoint of this interval, so that the equilibrium plea bargain is given by

$$c_p^* \equiv \frac{1}{2} \left( \frac{2p(c_t^*)c_t^* - c_t^*}{b} + c_t^*p(c_t^*) \right).$$

Now turn attention to the case in which the prosecutor opts not to plea bargain. In this event, the prosecutor would simply choose a charge of  $c_t^*$ . Since the equilibrium payoff of plea bargaining is strictly higher than the expected payoff of going to trial with a charge of  $c_t^*$ , the prosecutor will always plea bargain.<sup>6</sup> Finally, the prosecutor will never drop charges, provided  $p(c_t^*) \geq 1/(2 + b)$ .

### 3 Experimental Design

We are primarily interested in determining the effect of comparing the case of  $\mathbf{b} = \mathbf{1}$  (where the prosecutor is indifferent between obtaining a conviction via plea bargaining or via trial), and the case where  $\mathbf{b} < \mathbf{1}$  (where the prosecutor, all else equal, prefers to obtain conviction at trial). The results of this comparison are striking. Since  $\mathbf{c}_p^*$  is decreasing in  $\mathbf{b}$ , and  $\mathbf{c}_t^* > \mathbf{c}_p^*$ , the difference between the equilibrium plea offer and the charge at trial is increasing in  $\mathbf{b}$ . This

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<sup>5</sup> Since, in practice, prosecutors almost always make a plea offer, this assumption is not particularly restrictive. If this assumption fails, the prosecutor would simply decline to plea bargain, and go directly to trial with a charge of  $c_t^*$ .

<sup>6</sup> To see this, note that the payoff of plea bargaining is  $bc_p^*$ , and the expected payoff of going to trial without plea bargaining is  $2p(c_t^*)c_t^* - c_t^*$ . Since we assume that  $p(c_t^*) \leq 1/(2 - b)$ , the payoff the former exceeds that of the latter.



prediction is the primary motivation for our experimental design. While our simple model illustrates this clearly, it is far from a realistic setting. In the interest of realism, our experiment will involve a more complex setting that allows for evidence of guilt and innocence, ambiguity regarding the evidence, and potential defendants having the opportunity to actually steal money from other subjects. Further, our experiment will consider a plea bargaining process that involves a single take-it-or-leave-it offer.<sup>7</sup> As such, our experiment is exploratory, in the spirit of Smith (1982).

### 3.1 Background

The current study on prosecutor decision making is part of a larger study of the criminal justice system, which also includes studies of juror and defendant decision making, the details of which can be found in Aimone et al. (2019) and Ralston et al. (2019) respectively.<sup>8</sup> We first provide a rough outline of the overarching study and then provide details of the prosecutor study that is the focus of the current paper. In the criminal justice system, crime decisions come first, followed by a bargaining game between prosecutors and defendants within which decisions on charges/plea bargains and trials are made, and finally juror decision making concludes a trial. Wanting to have a salient experimental economic decision environment (one that can bring data to bear upon the theory of the preceding section), we conducted our experimental sessions in the opposite order. We first conducted juror decision-making sessions, as they could credibly and in an incentive compatible way, be conducted without prosecutor or defendant decisions being in place.

#### 3.1.1 Summary of Juror Experiment Sessions

The necessary role of the juror experiment sessions in the three-part experiment, is to generate real saliently incentivized human juror decisions that could be used in defendant trials to form a peer-jury determined verdict of guilty or not-guilty. In these juror experiment sessions (see Aimone et al. 2019), jurors were told that future sessions would be conducted in which real people (potential defendants) would be given

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<sup>7</sup> Since, in equilibrium, all the “surplus” would go to the prosecutor under such a bargaining model, the equilibrium plea offer would be equal to  $c_t^*p(c_t^*)$  which does not depend on  $b$ . While the literature clearly indicates that this equilibrium is not likely to describe actual behavior, this change implies that our experiment is testing our hypothesis in an unfavorable setting, which, as we will show, suggests that the predictions of our model are robust to other settings.

<sup>8</sup> We conducted two seed sessions as well, which included both prosecutor and defendant participants that enabled us, along with the jury sessions, to pay the prosecutors in the current study using real participant decisions and standard non-deception techniques. These seed sessions are described in further detail in section 3.3.

an opportunity to take money from other subjects and some people may be accused of a crime and a trial may be held to determine a defendant's guilt status. In brief, jurors were tasked with determining a verdict for every possible trial that they could have been presented. Jurors were told that for these trials three jurors' decisions for that trial situation (crime level, evidence of innocence, and evidence of guilt), would be randomly chosen from the pool of juror decisions until a unanimous decision was drawn and that would determine the defendant's guilt status. Jurors earned a flat rate for participation (we used same rate as real-world first day jury duty pay in our county), and did not earn outcome based pay (like in the real-world as well). We did not need prosecutors or defendants to be present to conduct these studies. We next conducted the prosecutor experiment sessions, which are the focus of the current paper.

### *3.1.2 Summary of Prosecutor Experiment Sessions*

The full details of the prosecutor experiment is found in section 3.2 below. Here, we explain the necessary role of the prosecutor experiment sessions in the three-part experiment. We need from the prosecutor experiment sessions 1) participant decisions whether or not to pursue charges against an accused defendant in a case; 2) participant plea bargain offers for a certain case; and 3) participant choices of what charges would be pursued at trial. Both the prosecutor experiment decisions and juror experiment decisions are needed for defendant sessions which were conducted last.

### *3.1.3 Summary of Defendant Experiment Sessions*

The defendant experiment (see Ralston et al. 2019) gave potential defendants a series of opportunities to steal from another participant in a modified dictator game. In each of these opportunities, the computer randomly allocated \$10 between one participant (the potential defendant) and another participant and gave the defendant participant the option to take a portion of the funds allocated to the other participant. Whether the participant stole or not, the computer could generate an accusation<sup>9</sup> of a crime, along with crime and evidence types. The defendant reported for the range of potential plea bargain and trial situations what they would do in each situation. If there was an accusation of a crime, they would be randomly assigned a prosecutor's decision (from the already conducted prosecutor study) for their crime and evidence levels associated with the accusation, and the defendant's own decision in the plea or trial situation chosen by that prosecutor would determine what happened. Ultimately, if the decisions of the

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<sup>9</sup> We will refer to the computer-generated claim that a crime has occurred as an "accusation." We will refer to the decision by the prosecutor as a "charge."

prosecutor and defendant indicated a trial occurred, a three-person jury would be randomly chosen from the pool of juror decisions (that were collected in the previously run juror experiment sessions) to determine whether the defendant was found guilty or not guilty at their trial.

### 3.1.4 Evidence Generation

The three types of experiment sessions above all center around the idea of a defendant who may be truly innocent or may be truly guilty of taking money from another participant. All three participant types (jurors, prosecutors, and defendants) are concerned with the evidence of that taking (or “crime”). Since these experiment sessions are linked, they all involve the same evidence generation process that differs based upon whether the defendant is truly innocent or truly guilty (a status known to the defendant participant but unknown to the prosecutor and juror participants).

Figure 1 below shows how likely a given defendant would be to have any evidence of innocence and any evidence of guilt. This information was provided to the experimental participants in their instructions (see Appendix B for the prosecutors’ instructions.) As can be seen in Figure 1, while there was a 70% chance that a truly guilty defendant would have some evidence of guilt there was only a 30% chance for a truly innocent defendant to have some evidence of guilt (and therefore be accused of a crime by the computer). Participants in the experiment were also told that those who were truly guilty were less likely to receive any evidence of innocence (30% chance) than those who were truly innocent (who had an 80% chance of having some evidence of innocence.) For example, the figure shows us that there is only a 6% chance a truly innocent individual has some evidence of guilt and no evidence of innocence ( $.3 * .2$ ), while there is a 49% chance a truly guilty individual has some evidence of guilt and no evidence of innocence ( $.7 * .7$ ).

	Prosecutorial Evidence of Guilt		Defense Evidence of Innocence	
	If Truly Innocent Defendant	If Truly Guilty Defendant	If Truly Innocent Defendant	If Truly Guilty Defendant
<b>Some Evidence of Guilt</b>	30 of every 100 truly innocent	70 of every 100 truly guilty	80 of every 100 truly innocent	30 of every 100 truly guilty
<b>No Evidence of Guilt</b>	70 of every 100 truly innocent	30 of every 100 truly guilty	20 of every 100 truly innocent	70 of every 100 truly guilty

**Figure 1: Evidence generation tables seen by participants**

Participants were also told that there were three sizes of crime (Small, Medium, and Large) and three levels each of evidence of guilt and innocence (Weak, Medium, and Strong). While the probabilities of having some evidence of innocence or guilt were known for both the truly innocent and the truly guilty, prosecutor participants were not told the values of the individual probabilities of Strong, Medium, and Weak evidence. To induce participants' beliefs about such probabilities to be in the same general direction and similar to what would be expected in the "real world", prosecutors were told in regard to evidence of guilt that:

"As the names suggest, STRONG evidence is harder to get (and implies there is more evidence of guilt) than MEDIUM evidence. MEDIUM evidence is harder to get (and implies there is more evidence of guilt) than WEAK evidence. For each of these three levels, a prosecutor is always more likely to get a particular level of evidence of guilt if the defendant is truly guilty compared to a truly innocent defendant."

And in regard to evidence of innocence that:

"As the names suggest, STRONG evidence is harder to get (and implies there is more evidence of innocence) than MEDIUM evidence. MEDIUM evidence is harder to get (and implies there is more evidence of innocence) than WEAK evidence. For each of these three levels, a defendant is always more likely to get a particular level of evidence of innocence if the defendant is truly innocent compared to a truly guilty defendant."<sup>10</sup>

The experiment was designed to mimic conditions found in the real criminal justice system. The reduced level of detail in Figure 1 about the evidence generation process reflects the lack of detail available to real-world prosecutors, defendants, and jurors about how evidence arises. In a real trial, no party knows exactly how much more likely it is for a truly innocent person to have strong alibi (e.g., CCTV footage showing them at the time of the crime) compared to a medium alibi (e.g., a friend who says the defendant was with them at the time of the crime).<sup>11</sup>

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<sup>10</sup> For more details about the exact probabilities used to generate evidence of guilt and innocence the reader can see Figure SI1. Remember though, that participants did not receive this level of detail on the evidence generation process.

<sup>11</sup> Note our study uses non-neutral language rather than a more standard neutral language approach. There are factors in the criminal justice realm that could affect decisions that we think would be lost were instructions neutral in language. A "sense of justice" or "responsibility" that comes when one is a prosecutor facing a theft situation would, for instance, be lost in a neutral language environment. Similarly, if defendants' decisions were framed to prosecutors neutrally as "choice A" or "choice B" rather than as crimes or theft, then there would be no aspect of deservingness of punishment. It would be a bargaining environment still, but factors like inequality aversion, altruism, etc. may play

## 3.2 Prosecutor's decisions

After the creation of the court case from the decisions of the defendants in the modified dictator game,<sup>12</sup> participants in the role of prosecutors were presented with all possible combinations of generated accusations and evidence of guilt. Prosecutors were made aware of the evidence generation process in the same way as participants were in all other experiments. Participants were given two tasks: a belief elicitation and then a prosecutorial decision. Prior to making prosecutorial decisions, prosecutors were shown possible accusations of crime and evidence levels of guilt and asked to provide beliefs about the likelihood a jury would convict a defendant of the accused level of crime based on the evidence of guilt described. Participants were told their answers on these beliefs would not affect their pay in the experiment. We think this task helps ensure participants are cognizant of the connection between differential evidence levels and differential probabilities of conviction at trial, an important connection for prosecutorial plea/trial decisions. We do not discuss these beliefs further in the paper nor do we attempt to control for these beliefs in regressions or analyses. Such controls may be misleading as the beliefs were not incentivized and participants may update these beliefs in different ways as the experiment progresses.

After completing the belief elicitation, prosecutors were again shown every possible combination of accused crime and level of evidence of guilt. For each possible combination, prosecutors chose how to handle the case: drop the case, proceed straight to trial without offering a plea deal, or offer a plea deal.

If prosecutors chose either to continue to trial or to offer a plea deal, they next had to choose what level of crime to charge the defendant with at trial (Small, Medium, or Large), as well as the punishment for this crime (Low or High). This punishment was only implemented if the jury found the defendant guilty at trial. If prosecutors chose to offer a plea deal, they also had to choose a plea offer, consisting of a charged crime and a proposed punishment level, that the defendant could accept in order to avoid the trial. We imposed the condition that severity of the crime in the plea

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very different roles in determining outcomes. We conclude that while a similar experiment could be designed using neutral language, that we could not generalize to the criminal justice system the results from such a study in as believable a manner.

<sup>12</sup> See § 3.3 below for a description of the seed experiments used to determine prosecutors' payoffs in this experiment.

offer (Small, Medium, or Large) must be less than the severity of the crime charged at trial. For example, prosecutors could offer a plea bargain that allowed a defendant to plead guilty to a small crime to avoid going to trial for a medium crime, but they could not offer a plea bargain such that a defendant could plead guilty to a medium crime to avoid going to trial for a small crime.

In choosing between taking the defendant to trial or offering a plea bargain, prosecutors had to decide what charge to level against a defendant. Prosecutors did not necessarily have to charge the same crime as the initial accusation generated by the computer, and they had some leeway in deciding the severity of the charged crime. If prosecutors wished to increase the severity of the charge above the initial accusation, the strength of the evidence of guilt decreased. Conversely, if a prosecutor wished to decrease the severity from the initial accusation, the strength of evidence of guilt increased. This is summarized in Table 1.

When making these decisions, prosecutors were also made aware that defendants received evidence of innocence of some level (None, Weak, Medium, or Strong) that was unobservable to prosecutors. Further, prosecutors were told that the defendants' evidence of innocence would be adjusted if the prosecutor decided to increase or decrease the severity of the charged crime from the initial accusation. Specifically, if a prosecutor increased the severity of the charge, the defendant's evidence of innocence increased in strength. Conversely, if a prosecutor decreased the severity of the charge, the defendant's evidence of innocence decreased.

**Table 1: Result of changing charge on final evidence of guilt level**

Initial Crime Level	Initial Evidence	Change Charge to Small	Change Charge to Medium	Change Charge to Large
Large	Weak	Strong	Medium	x
	Medium	Strong	Strong	x
	Strong	Strong	Strong	x
Medium	Weak	Medium	x	Not Allowed
	Medium	Strong	x	Weak
	Strong	Strong	x	Medium
Small	Weak	x	Not Allowed	Not Allowed
	Medium	x	Weak	Not Allowed
	Strong	x	Medium	Weak

Each prosecutor made decisions for all possible combinations of crime severities and levels of evidence of guilt. Once completed, prosecutor decisions were later paired with real defendant decisions on how to respond to the prosecution's charges made against them. The details of defendant sessions can be found in Ralston et al. (2019).<sup>13</sup> Following defendant decisions, the case could be resolved by acceptance of a plea bargain or by dismissal of the case. If the case was not resolved at this stage, the case went to a jury trial that drew on decisions previously made in the project's jury experiment. There, participants acting as jurors made individual decisions on guilty/not guilty for all possible combinations of charged crime levels and strengths of evidence of guilt and innocence. In a trial during this paper's phase of the experiment, the individual decisions of three jurors were randomly drawn for the specific combination of charged crime and evidence levels; if all three agreed, the jury had a verdict. If all three did not agree, then a mistrial was declared, and the computer randomly drew another three-person jury. This process continued until all members of a jury agreed on a judgment of either guilty or not guilty. Further details on the jury experiment can be found in Aimone et al. (2019).

Prosecutor participants were paid based on their within-group performance of 100 simulated cases (drawn from real behavior of human defendants in seed sessions.) That is, the participant with the highest conviction rate received the highest payoff, the second highest conviction rate earned the second highest payoff, and all other players only earned show-up and completion fees. In roughly half of sessions, the conviction rate was the number of convictions resulting from a trial divided by the number of cases taken to trial. In the other half of the sessions, in addition to trial results, every plea deal accepted by a defendant counted as a conviction in the numerator of the conviction rate and as a case in the denominator.

### **3.3 Seed Experiments**

A natural question while running the prosecutor experiments is how to know whether a defendant would accept a plea bargain, since there were no participants present and playing the

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<sup>13</sup> Note having our lab prosecutors know that their plea and trial decisions can affect real defendants is a critically important aspect of our study. "Real world" prosecutors face not only personal incentives ranging from salary, bonuses, promotions, and career advancements, but they know that their decisions affect real people and that they are partly responsible for ensuring that "justice" is served. We want that in our study as well, which we do when our prosecutors know their decisions can affect real people in the future. If this "sense of justice" is meaningful to people (in the lab or in the "real world"), it might affect prosecutors' decisions and push them away from some behaviors that in some circumstance may be monetarily profit maximizing, like dropping all charges except where prosecutors have strong evidence of guilt.

role of defendants. For this, we used two seed experiment sessions, which were run before the prosecutor sessions analyzed in this paper. These seed experiments were pen-and-paper versions of the prosecutor and defendant experiments described above. The seed experiments utilized a strategy-elicitation method, so that participant decisions for each possible contingency were recorded and able to be used to determine participant payoffs. The prosecutor decisions in the seed study and the defendant decisions (for both the truly innocent and the truly guilty of taking money from a real victim participant in the seed study) were used to determine each other's payments (and the payments of the victim of theft). The data collected in these seed experiments were used to identify plea acceptance rates for each possible situation that the prosecutors in the current experiment could face. Thus, this study used real, salient data for both prosecutors and defendants when calculating conviction rates. For jury outcome decisions, calculations used the real, human participant juror judgment decision data collected for each possible trial combination of crime level, prosecution evidence of guilt, and defense evidence of innocence. See Aimone et al. (2019) for a detailed description of the juror experiment process and data.

### **3.4 Procedures/Parameters**

Data comes from 10 sessions made up of a total of 60 prosecutors (32 in the INCLUDED treatment and 28 in the EXCLUDED treatments). Participants completed the experiment in the computer program ZTREE (Fischbacher (2007)) which included a series of comprehension questions prior to making decisions to help ensure participants understand the instructions. Sessions lasted for about 90 minutes.<sup>14</sup> Potential participant payoffs varied on the basis of whether the participant was a law student or an undergraduate student. Law students were included to compare the behavior of those with some legal training to the behavior of those with no legal training. 11 participants were law students (8 in the EXCLUDED treatment and 3 in the INCLUDED treatment). The number of law students was ultimately smaller than we hoped and thus while we control for being a law student (see regressions in Table 5 below), we do not analyze the data separately or draw conclusions based off of this participant type. All undergraduate participants were paid a \$5 show-up payment and \$5 for completing the experiment. In addition,

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<sup>14</sup> After finishing the prosecutor game described here, all participants also participated as prosecutors in a second game identical to the game they played the first time, but where bonuses were paid out randomly rather than based upon the conviction rate (this game always occurred second). We do not discuss that data here. Participants were paid cash for one of the two games, randomly selected.



there was a \$10 bonus for having the highest conviction rate within their group. There was a lower bonus of \$7.5 for having the second highest conviction rate within their group. There was no bonus for other prosecutors in a group. All law students were paid a \$5 show-up payment and \$15 for completing the experiment. In addition, there was a \$25 bonus for having highest conviction rate within their group. There was a lower bonus of \$15 for having the second highest conviction rate within their group. There was no bonus for other prosecutors in a group.

## 4 Results

A first look at the raw averages of decisions of prosecutors shows whether their charging decisions differ when plea bargains are and are not treated as convictions. Results are presented in Table 2<sup>15</sup>. The first three rows of Table 2 report the percentage of prosecutors who drop the case, go straight to trial, or offer a plea bargain. The second column provides results for the entire sample, the third column (INCLUDED) provides results for the prosecutors whose plea bargains counted toward the conviction rate, and the fourth column (EXCLUDED) provides results for the prosecutors whose plea bargains did not count toward the conviction rate.

**Table 2: Summary statistics of prosecutor participants by treatment**

	Entire Sample	INCLUDED	EXCLUDED
Dropped Case	17.2%	17.9%	16.7%
Straight to Trial	42.2%	32.5%	50.7%
Offered Plea	40.6%	49.6%	32.6%
Trial penalty	1.34	1.40	1.26
Female	63.3%	50.0%	75%
Conviction Rate <sup>16</sup>	57.6%	51.1%	65.0%

**Finding 1.** *Incentivization of plea bargaining increases the amount of plea offers made and decreases the number of cases taken straight to trial.*

The first thing that jumps out from Table 2 is that prosecutors respond significantly to

<sup>15</sup> For a detailed breakdown of how severity of crime, prosecutor evidence, and incentivization of plea-bargaining affects dropped cases, cases brought straight to trial, plea bargaining, and trial threats, see Appendix A.

<sup>16</sup> We include conviction rates as part of our summary statistics. However, further analyses on conviction rate are not performed. This paper is concerned with prosecutor behavior, not the final outcomes of the justice system which depend on many confounding factors and are less likely to be externally valid.

incentives that reward plea bargaining. Saliently incentivizing plea bargaining increases the frequency that prosecutors offer pleas from 32.6% of cases in EXCLUDED to 49.6% of cases in INCLUDED ( $p < 0.01$ ).<sup>17</sup> This increase appears to be coming from a corresponding decrease in cases taken straight to trial from 50.7% of cases in EXCLUDED to only 32.5% of cases in INCLUDED ( $p < 0.01$ ). Note the similar frequency of cases that were dropped between EXCLUDED and INCLUDED (16.7% and 17.9% respectively,  $p = 0.715$ ) which suggests that incentivization of plea bargains does not significantly change decisions to drop cases, and that participants largely substitute between going straight to trial and offering pleas.

We next ask whether prosecutors also change the substance of the plea offers and threatened trial charges when their incentives change. Our measure is the trial penalty of plea offers. All plea offers contain a certain crime level and punishment that will be agreed to if the plea bargain is accepted and a threat (credible in our experiment) of a crime and punishment for what the prosecutor will charge at trial if the plea bargain is rejected. To measure the trial penalty, we developed an ordinal ranking of crime/punishment levels as described in Table 3.

**Table 3. Ordinal Ranking of Crime Punishment Levels**

<b>Crime Level</b>	<b>Punishment Level</b>	<b>Ordinal Rank</b>
Small	Low	1
Small	High	2
Medium	Low	3
Medium	High	4
Large	Low	5
Large	High	6

The trial penalty is defined as the difference between the ordinal ranks of the threatened (and uncertain) crime/punishment charge if the case goes to trial and the certain crime/punishment offered in the plea bargain. The average trial penalty is reported in the fourth row of Table 2 for the entire sample, INCLUDED, and EXCLUDED. The average trial penalty is 1.34 across the entire sample.

**Finding 2.** *Incentivization of plea bargaining increases the trial penalty.*

<sup>17</sup> Unless otherwise noted, all p-values in this section are from two-tailed Mann-Whitney tests.

Table 2 shows that the trial penalty is larger in the presence of plea bargain incentivization ( $p = 0.05$ ). When plea bargains are excluded from calculation of the conviction rate, the trial penalty is 1.26; the differential increases to 1.40 when pleas are included in the conviction rate. Thus, when incentivized to make pleas, prosecutors not only make more plea offers, but they also make the plea offers more attractive by increasing the difference between the two punishment amounts.

We also investigate Findings 1 and 2 using parametric regression analysis, the results of which are presented in Table 4. The dependent variables for models 1, 2, and 3 are binary, whereas the dependent variables in models 4, 5, and 6 are ordinal. Therefore, we use probit regressions for models 1, 2, and 3 and ordinary least squares for models 4, 5, and 6. These parametric regression models provide additional evidence for Finding 1, but less evidence for Finding 2.

VARIABLES	(1) Drop Case	(2) Offer Plea	(3) Straight to Trial	(4) Plea Offer	(5) Trial Threat	(6) Plea/Threat Diff
Pleas Incentivized	0.0164 (0.188)	0.508*** (0.139)	-0.650*** (0.202)	-0.238 (0.165)	-0.131 (0.183)	0.107 (0.0807)
Evidence Level	1.365*** (0.204)	-0.214** (0.0946)	0.932*** (0.104)	0.685*** (0.0937)	0.716*** (0.0945)	0.0319 (0.0635)
Crime Level	0.541*** (0.109)	0.103* (0.0580)	0.201*** (0.0722)	0.925*** (0.0829)	1.160*** (0.0941)	0.235*** (0.0468)
Law Student	-0.118 (0.243)	0.381*** (0.140)	-0.444* (0.235)	-0.268** (0.133)	-0.0413 (0.168)	0.227* (0.132)
Female	-0.0498 (0.191)	-0.00870 (0.132)	0.0674 (0.188)	0.225 (0.188)	-0.0176 (0.225)	-0.243** (0.117)
Constant	2.321*** (0.460)	-0.333 (0.260)	-2.192*** (0.307)	1.067*** (0.227)	-0.239 (0.238)	0.828*** (0.175)
Observations	540	540	540	219	219	219

Robust standard errors clustered at the subject level in parentheses

\*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

Table 4: Regression models of treatment effects

## 5

### 5 Discussion

We provide experimental evidence for the effects of plea bargain incentives on prosecutors' plea bargaining behavior. In the American criminal justice system, it is likely that prosecutors benefit from achieving higher conviction rates, whether directly or indirectly. The structure of prosecutor salaries varies from place to place, and some prosecutor offices may give higher pay raises to prosecutors who are more successful in obtaining convictions. Other offices may reward successful prosecutors indirectly through increased responsibilities and opportunities for promotion and advancement. And even if there are no compensation-based incentives within a prosecutor's office, success in convicting defendants can build an individual prosecutor's reputation as a lawyer, which can yield sizable earnings benefits if the prosecutor eventually goes into private practice. If prosecutors benefit from higher conviction rates, then the inclusion of guilty pleas in the calculation of the conviction rate could impact the way prosecutors make decisions about plea bargaining.

Our experiment rewards participants in the role of prosecutors and examines their decisions when plea bargains are and are not included in the calculation of the conviction rate. The results indicate that including plea bargains in the conviction rates leads to more plea offers and a widening of the trial penalty. Moreover, approximately 43% of our prosecutors approach plea bargaining with lower plea offers and threatened punishments, which we call a "carrot" approach; the remainder favor higher plea offers and threatened punishments, which we call a "stick" approach. "Sticks" might believe that defendants behave in accordance with loss aversion, while "carrots" might believe that defendants are more willing to accept pleas if they offer relatively light punishments. The results show that "carrots" increase their trial penalties when plea bargains are included in the conviction rate.

Observers of the criminal justice system have expressed concern that prosecutors seek to manipulate the outcomes of criminal cases via the strategic use of plea bargaining. Our study shows that inclusion of plea bargains in the reward systems of prosecutors can increase the number of pleas offered and the difference in severity between the crime offered as a plea bargain and the one threatened for prosecution at trial. That is, counting a bargained-for guilty plea as a conviction may further incentivize prosecutors in manipulating case outcomes through plea offers. Future work may find beneficial exploring within naturally occurring empirical data whether conviction

rates vary with the incentivization of plea bargains.

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# Appendix A: Experimental Instructions

This section shows a detailed breakdown of all treatment effects present in our study on the major outcomes we consider as bar graphs with standard errors. The treatments present in our study are 1) inclusion of accepted pleas in the conviction rate (blue bars represent exclusion of accepted pleas in the conviction rate, red bars represent inclusion), 2) severity of crime, and 3) prosecutor’s level of evidence of defendant’s guilt. The prosecutor decisions we analyze are binary (drop case, offer plea, and go straight to trial) or ordinal<sup>19</sup> (plea bargain penalty, trial penalty, and the difference between the two). The ordinal variables require that a plea bargain was offered. This requirement entails that some bars will have no standard error bars, since there are some combinations of treatments where only one subject offered a plea bargain.

We note that the color blue represents decisions made where plea bargains are excluded in the calculation of the conviction rate, whereas the red color represents decisions made where plea bargains are included in the calculation of the conviction rate.

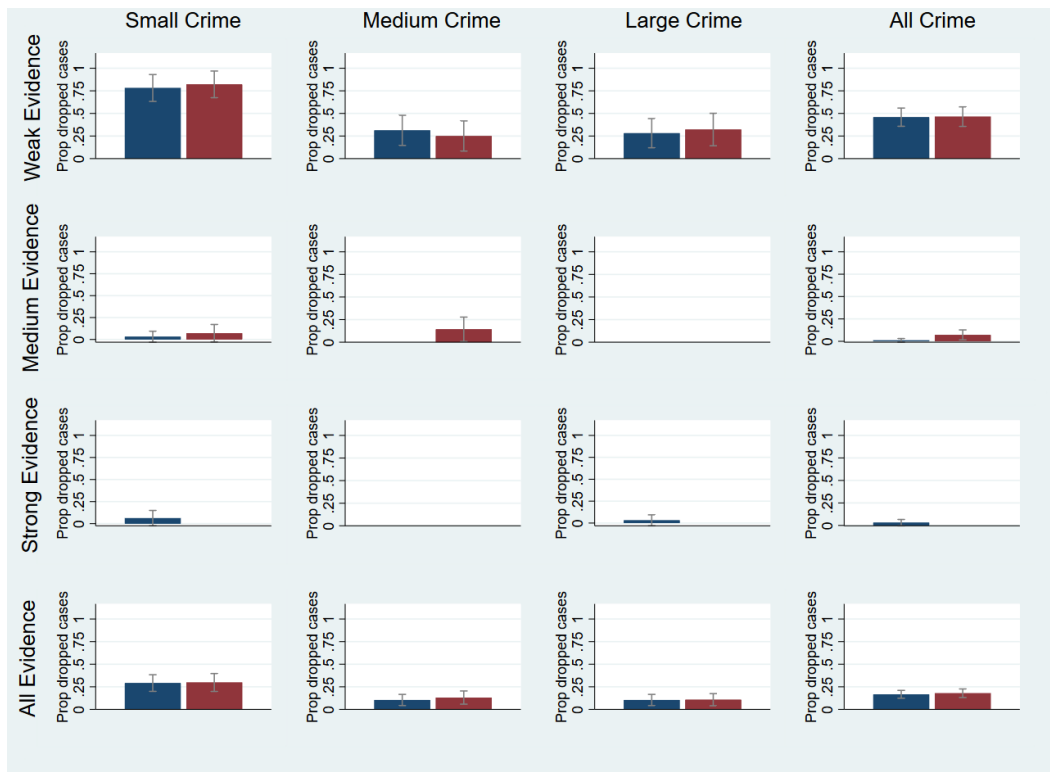


Figure 1: Proportion of dropped cases

<sup>19</sup> For more details about the ordinal variables we study, see Table 3 (page 18).

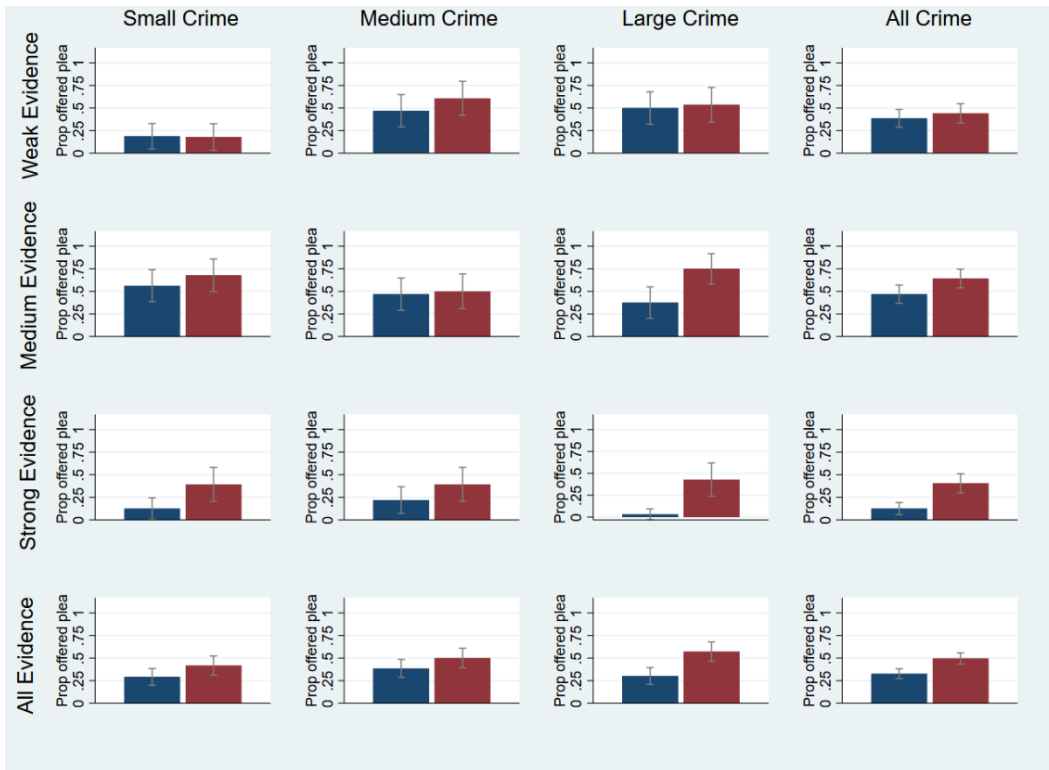


Figure 2: Proportion of cases where pleas were offered

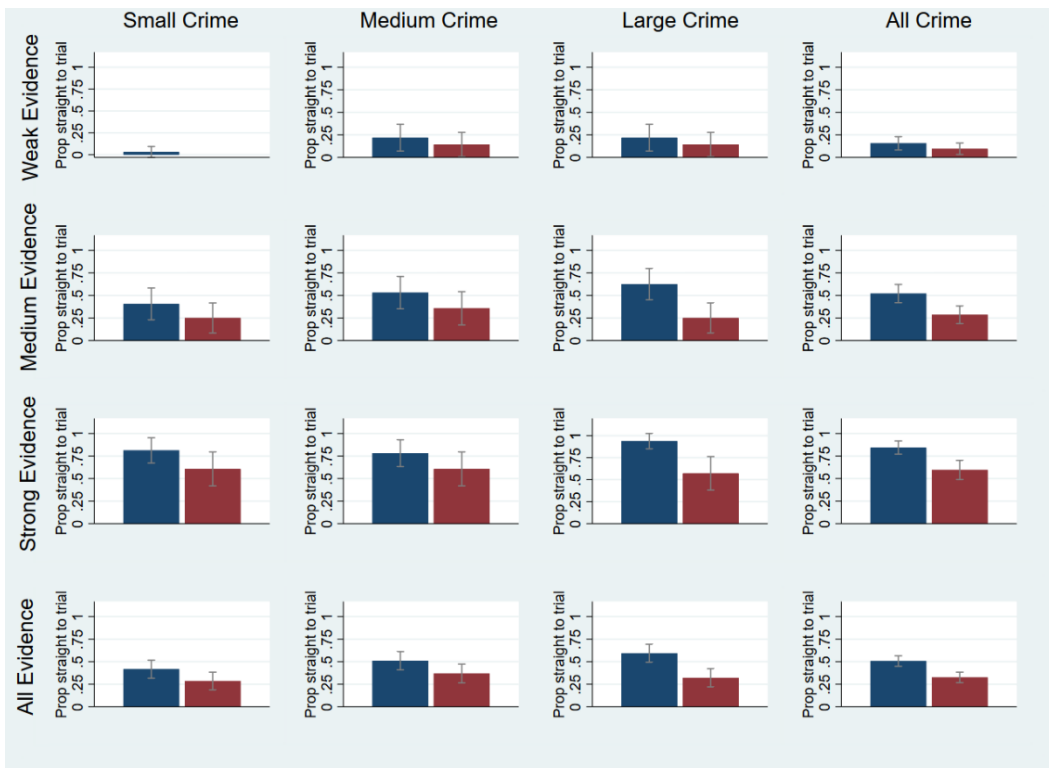


Figure 3: Proportion of cases taken straight to trial



Figure 4: Average plea bargain amount

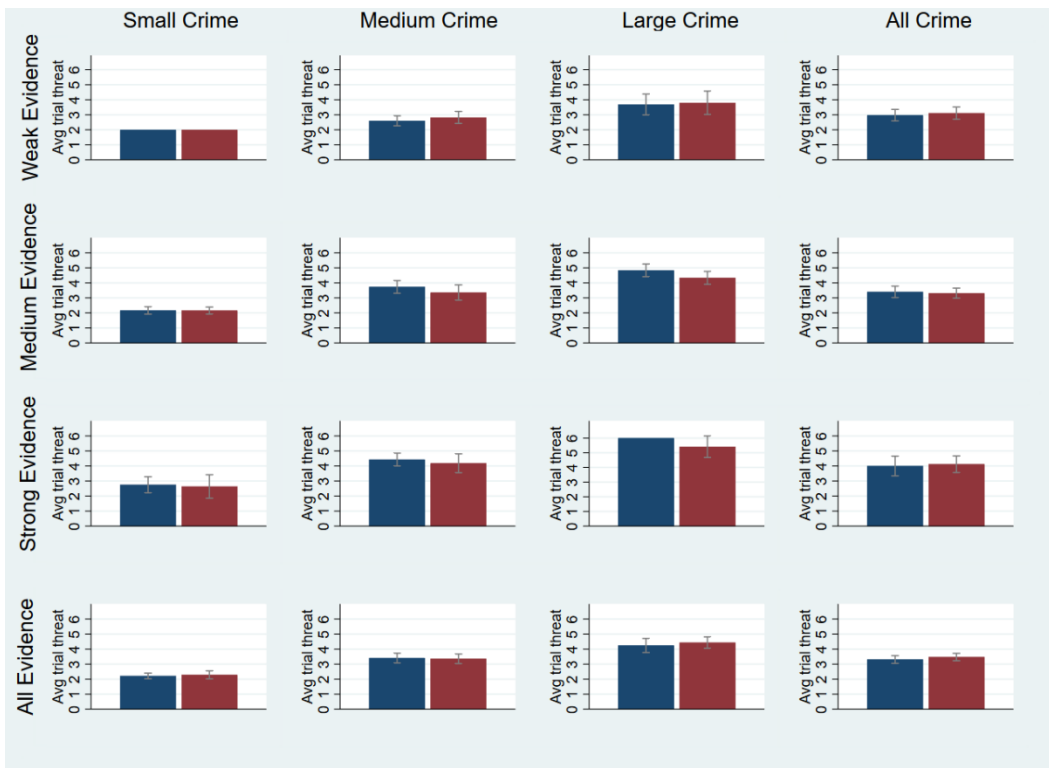


Figure 5: Average trial threat amount

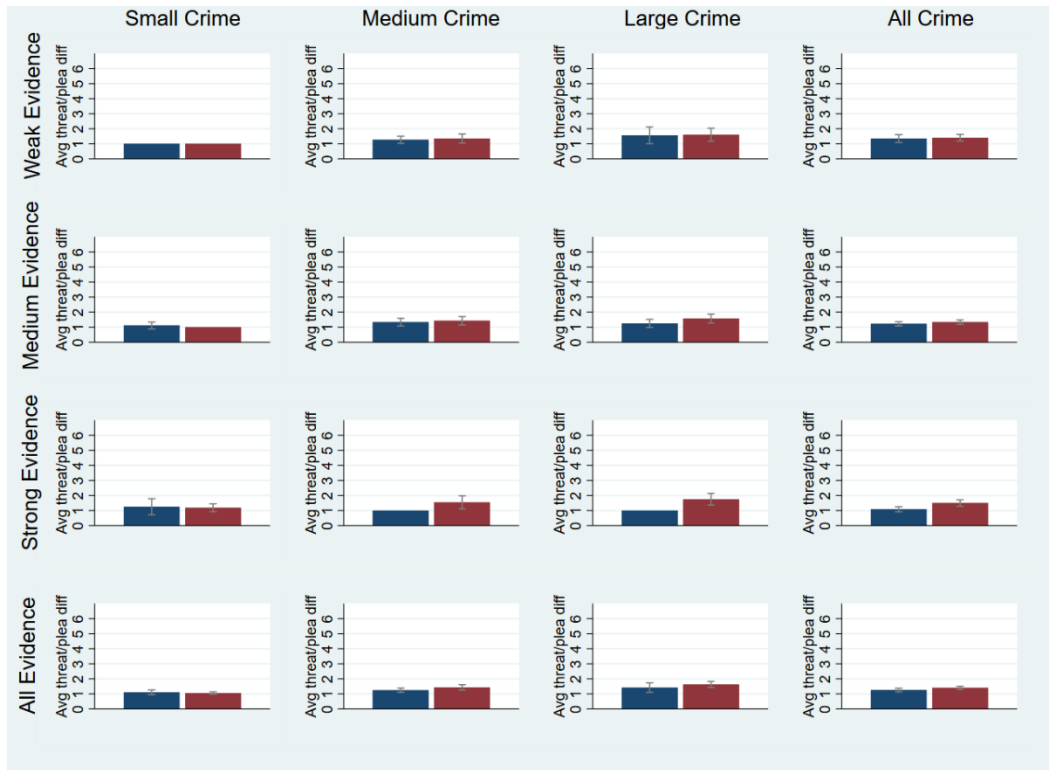


Figure 6: Average plea/threat differential

## Appendix B: Experimental Instructions

We include sample instructions used in a typical experimental session. The particular instructions included are those used for sessions run with law students using accepted guilty pleas and guilty verdicts in the calculation of the conviction rate. In a session where only guilty verdicts were used to calculate the conviction rate, the instructions would have clearly stated so.

The only within experiment differences between law student and undergraduate student instructions were the rewards for performance. Instead of being rewarded with \$25 for obtaining the highest conviction rate in a group, undergraduates were rewarded with \$10. Similarly, a second place finish was rewarded with \$7.5 instead of \$15.

Group sizes were variable, starting at 3 at a minimum and being as large as 5. The size depended on how many participants showed up for a particular session. Again, the language used in the instructions would change to specify the correct group size.

## **Instructions**

Thank you for participating in today's experiment. You will receive a \$5 payment for coming to the lab today. In addition, you will be paid \$15 for participating and completing today's experiment. You may also obtain an additional bonus of either \$25 or \$15.

You will be in the role of a prosecutor in today's experiment. You are in a group of participants who all have this role. One of your group will receive the bonus of \$25, and another participant in your group will receive the bonus of \$15

Your decisions will be used, together with the decisions of other participants in the same role as you, to determine outcomes for participants in a separate set of future experiments.

The nature of the future experiments, which will be explained to you in detail in a few moments, will involve situations in which participants have the opportunity to take money (real US\$) which does not belong to them from another participant (from now on, we will refer to this as a theft).

You will provide decisions that determine the monetary punishment, if any, for a participant who has been accused of a theft (from now on, we will refer to a participant who has been accused as a defendant).

Each scenario for which you will provide decisions will involve a defendant. You will have some level of evidence of his or her guilt. The defendant may also have evidence of his or her innocence.

You will decide whether to drop the charges against the defendant or to prosecute the defendant. If you decide to prosecute the defendant you will determine the severity of the charge as well as the possible monetary punishments he or she would face if found guilty. You will also be able to offer a plea bargain. A plea bargain is a charge and a level of monetary punishment that is offered to the defendant if he or she pleads guilty.

If the accused participant decides to plead not-guilty when charged with a theft, there is a trial. In a trial, the evidence of guilt you have, as well as any evidence of innocence the defendant provides, will result in either a guilty or not-guilty finding. The decisions of participants in the role of jurors will be used to make such findings. Participants in the role of jurors have been instructed to make a finding of guilty only if the evidence presented proves guilt beyond a reasonable doubt.

Please take these tasks seriously as real people will be affected by your decisions.

As mentioned earlier you will be paid in cash for your decisions as a prosecutor today. After you finish making your decisions we will ask you to fill out a short survey and you will be paid in cash as you leave the lab.

The decisions you make today will be used in the event that a participant in a future experiment is accused of a theft in the exact manner described to you today. That is, your decisions will only be used in the exact situations that you will evaluate in this experiment.

In this future experiment, \$10 will be divided between two participants who are partners. The computer will randomly choose a division of the \$10 which allocates a portion of the money to each of the two participants. This preset division is revealed to one of the participants. This participant then must report the preset division chosen by the computer. The division reported by the participant will be implemented. However this participant can choose to take some of the money that is supposed to go to his or her partner by misrepresenting the preset division chosen by the computer.

After the participant reports the division of money (which may or may not correspond to the preset division chosen by the computer) the computer will generate either evidence of a theft or no evidence of a theft. If there is evidence of a theft, the computer will make an accusation. An accusation can be of a SMALL theft (a theft between \$0.10 and \$1.00), a MEDIUM theft (a theft between \$1.10 and \$2.00) or a LARGE theft (a theft between \$2.10 and \$3.00).

Note that an accusation may or may not be true. While a defendant will know for certain whether or not they are guilty of a theft, neither the prosecutor nor the jurors know for certain.

The computer is more likely to make an accusation if the defendant is truly guilty. In particular, 70% of truly guilty defendants will receive an accusation, and 30% of truly innocent defendants will receive an accusation.

If the computer makes an accusation, then there is some evidence of guilt to support this accusation. This evidence of guilt can be WEAK, MEDIUM or STRONG.

As the names suggest, STRONG evidence is harder to get (and implies there is more evidence of guilt) than MEDIUM evidence. MEDIUM evidence is harder to get (and implies there is more evidence of guilt) than WEAK evidence. For each of these three levels, a prosecutor is always more likely to get a particular level of evidence of guilt if the defendant is truly guilty compared to a truly innocent defendant.

If the computer makes an accusation, then the defendant may or may not have some evidence of innocence. Evidence of innocence can be WEAK, MEDIUM or STRONG. As the names suggest, STRONG evidence is harder to get (and implies there is more evidence of innocence) than MEDIUM evidence. MEDIUM evidence is harder to get (and implies there is more evidence of innocence) than WEAK evidence. For each of these three levels, a defendant is always more likely to get a particular level of evidence of innocence if the defendant is truly innocent compared to a truly guilty defendant.

A truly guilty defendant will have no evidence of innocence 70% of the time (note that this means that a truly guilty defendant will have some evidence of innocence 30% of the time). A truly innocent defendant will have some evidence of innocence 80% of the time (so that a truly innocent defendant will have no evidence of innocence 20% of the time).

This information is summarized in the tables below.

		<b>Prosecutorial Evidence of Guilt</b>		<b>Defense Evidence of Innocence</b>	
		<b>If Truly Innocent Defendant</b>	<b>If Truly Guilty Defendant</b>	<b>If Truly Innocent Defendant</b>	<b>If Truly Guilty Defendant</b>
<b>Some Evidence of Guilt</b>	<b>No Evidence of Guilt</b>	70 of every 100 truly innocent	30 of every 100 truly guilty	20 of every 100 truly innocent	70 of every 100 truly guilty
	<b>Some Evidence of Guilt</b>	30 of every 100 truly innocent	70 of every 100 truly guilty	80 of every 100 truly innocent	30 of every 100 truly guilty

If, after an accusation, a defendant goes to trial for a given level of theft (SMALL, MEDIUM or LARGE) then the evidence of guilt available to support that charge (WEAK, MEDIUM or STRONG), as well as any evidence of innocence the defendant decides to provide (WEAK, MEDIUM or STRONG) is shown to three jurors. These jurors independently evaluate all evidence presented, and are instructed to make a recommendation of a guilty finding only if they are convinced of the defendant’s guilt “beyond a reasonable doubt.” Jurors are told that: “Proof beyond a reasonable doubt is proof of such a convincing character that you would be willing to rely and act upon it without hesitation in making the most important decisions of your own affairs.” If all three juror recommendations are the same, then the unanimous decision determines whether the defendant is found guilty (if all three jurors chose “Guilty”) or not-guilty (if all three jurors chose “Not-Guilty”). If all three jurors’ decisions are not the same, then the trial is called a “mistrial” and the computer will randomly select another alternative set of three jurors. This process continues until the first time the decisions of all three selected juror decisions match.

In an earlier experiment, jurors have already made recommendations regarding guilty findings in all the possible trials that could arise in today’s experiment. It is the decisions from this earlier experiment that will be used to determine the outcome of trials in today’s experiment.

If, after an accusation, a defendant is found guilty, then a monetary punishment is subtracted from his or her earnings in the experiment. This monetary punishment is higher for larger thefts. For each level of thefts, there is a low interval of possible punishments, and a high interval of possible punishments. The possible punishments for each level of theft are summarized in the table below.

	<b>Low interval of possible punishment</b>	<b>High interval of possible punishment</b>
<b>SMALL theft</b>	\$0.10-\$0.30	\$0.40-\$0.60
<b>MEDIUM theft</b>	\$0.60-\$0.80	\$0.90-\$1.10
<b>LARGE theft</b>	\$1.10-\$1.30	\$1.40-\$1.60

If a defendant is accused of a certain level of theft, and there is a given level of evidence of guilt to support this accusation, the defendant may be charged with a different level of theft. If a defendant is charged with level of theft that is different than the initial accusation, then the evidence of guilt in support of this different theft is reduced accordingly.

For example, suppose a defendant is accused of a SMALL theft, and there is STRONG evidence of guilt in support of this accusation. This defendant could be charged with a MEDIUM theft, and there would be MEDIUM evidence of guilt to support this charge. This defendant could also be charged with a LARGE theft, and there would be WEAK evidence of guilt in support of this charge.

If a defendant is accused of a SMALL theft, and there is MEDIUM evidence of guilt in support of this accusation, this defendant could be charged with a MEDIUM theft, and there would be WEAK evidence of guilt to support this charge. However, this defendant could not be charged with a LARGE theft, because there is insufficient evidence of guilt to support this charge.

If a defendant is accused of a SMALL theft, and there is WEAK evidence of guilt in support of this accusation, then this defendant cannot be charged with any other level of theft. This is because there is insufficient evidence of guilt to support any other charge.

To provide another example, suppose a defendant is accused of a MEDIUM theft, and there is STRONG evidence of guilt in support of this accusation. This defendant could be charged with a LARGE theft, and there would be MEDIUM evidence of guilt to support this charge. This



defendant could also be charged with a SMALL theft, and there would be STRONG evidence of guilt in support of this charge (there is no higher level of evidence of guilt than STRONG).

If a defendant is accused of a MEDIUM theft, and there is MEDIUM evidence of guilt in support of this accusation, this defendant could be charged with a SMALL theft, and there would be STRONG evidence of guilt to support this charge. This defendant could also be charged with a LARGE theft, and there is WEAK evidence of guilt to support this charge.

If a defendant is accused of a MEDIUM theft, and there is WEAK evidence of guilt in support of this accusation, then this defendant could be charged with a SMALL theft, and there is MEDIUM evidence of guilt to support this charge. However, this defendant cannot be charged with a LARGE theft, because there is insufficient evidence to support the charge.

Lastly, suppose a defendant is accused of a LARGE theft, and there is STRONG evidence of guilt in support of this accusation. This defendant could be charged with either a SMALL or MEDIUM theft, and there would be STRONG evidence of guilt to support either of these charges (there is no higher level of evidence of guilt than STRONG)

Similarly, if a defendant is accused of a LARGE theft, and there is MEDIUM evidence of guilt in support of this accusation, this defendant could be charged with either a SMALL or MEDIUM theft, and there would be STRONG evidence of guilt to support either of these charges.

If a defendant is accused of a LARGE theft, and there is WEAK evidence of guilt in support of this accusation, then this defendant could be charged with a MEDIUM theft, and there would be MEDIUM evidence of guilt to support the charge. This defendant could also be charged with a SMALL theft, and there would be STRONG evidence of guilt to support this charge.

It is important to note that if a defendant is charged with a level of theft that differs from the initial accusation, then his or her level of evidence of innocence also adjusts accordingly.

For example, suppose a defendant is accused of a SMALL theft, and has STRONG evidence of innocence against this accusation. If he or she were charged with either a MEDIUM or LARGE theft, there would be STRONG evidence of innocence against either of these charges.

Suppose a defendant is accused of a SMALL theft, and has MEDIUM evidence of innocence against this accusation. If he or she were charged with either a MEDIUM or LARGE theft, there would be STRONG evidence of innocence against either of these charges.

Suppose a defendant is accused of a SMALL theft, and there is WEAK evidence of innocence against this accusation. If the defendant were charged with a MEDIUM theft, then there would be MEDIUM evidence of innocence against this charge. If this defendant were charged with a LARGE theft, there would be STRONG evidence of innocence against this charge.

Suppose a defendant is accused of a SMALL theft, and there is NO evidence of innocence against this accusation. If the defendant were charged with a MEDIUM theft, then there would be WEAK evidence of innocence against this charge. If this defendant were charged with a LARGE theft, there would be MEDIUM evidence of innocence against this charge.

Suppose a defendant is accused of a MEDIUM theft, and there is STRONG evidence of innocence against this accusation. If this defendant were charged with a LARGE theft, there would be STRONG evidence of innocence against this charge. If this defendant were charged with a SMALL theft, there would be MEDIUM evidence of innocence against this charge.

Suppose a defendant is accused of a MEDIUM theft, and there is MEDIUM evidence of innocence against this accusation. If this defendant were charged with a SMALL theft, and there would be WEAK evidence of innocence against this charge. If this defendant were charged with a LARGE theft, there would be STRONG evidence of innocence against this charge.

Suppose a defendant is accused of a MEDIUM theft, and there is WEAK evidence of innocence against this accusation. If this defendant were charged with a SMALL theft, there would be NO evidence of innocence against this charge. If this defendant were charged with LARGE theft, there would be MEDIUM evidence of innocence against this charge.

Suppose a defendant is accused of a MEDIUM theft, and there is NO evidence of innocence against this accusation. If this defendant were charged with a SMALL theft, there would be NO evidence of innocence against this charge. If this defendant were charged with LARGE theft, there would be WEAK evidence of innocence against this charge.

Suppose a defendant is accused of a LARGE theft, and there is STRONG evidence of innocence against this accusation. If this defendant were charged with a MEDIUM theft, there would be MEDIUM evidence of innocence against this charge. If this defendant were charged with a SMALL theft, there would be WEAK evidence of innocence against this charge.

Suppose a defendant is accused of a LARGE theft, and there is MEDIUM evidence of innocence against this accusation. If this defendant were charged with a MEDIUM theft, there would be WEAK evidence of innocence against this charge. If this defendant were charged with a SMALL theft, there would be NO evidence of innocence against this charge.

Suppose a defendant is accused of a LARGE theft, and there is WEAK evidence of innocence against this accusation. If this defendant were charged with either a MEDIUM or SMALL theft, there would be NO evidence of innocence against either of these charges.

Suppose a defendant is accused of a LARGE theft, and there is NO evidence of innocence against this accusation. If this defendant were charged with either a MEDIUM or SMALL theft, there would be NO evidence of innocence against either of these charges.

When a participant in the future experiment is accused of a theft (either SMALL, MEDIUM or LARGE), we will use your decisions today to determine what monetary punishment, if any, they will face.

Acting in the role of a prosecutor, you will observe two pieces of information before you make any decisions: the accused level of theft (SMALL, MEDIUM or LARGE) and the level of evidence of guilt in support of the accusation. Remember that you will not know for certain if the defendant is guilty or not. You will not know the level of evidence of innocence, if any, that the defendant has at the time that you make your decisions. However, the defendant will be aware of the level of evidence of guilt that you, as the prosecutor have. Defendants may also choose to exercise their right to not testify on their own behalf. Note: all jurors were instructed that:

“A defendant has the option to make their evidence of innocence available or not. This right to not “testify” is guaranteed by the United States Constitution and should not be taken as implying guilt.”

After observing the accused level of theft (SMALL, MEDIUM or LARGE) and the level of evidence of guilt in support of the accusation, you will decide between three options:

**Drop the charge.** In this case, there is no trial, and the defendant does not face any monetary punishment.

**Proceed to trial without offering a plea bargain.** In this option, you choose a level of theft to charge the defendant with (SMALL, MEDIUM or LARGE theft). In addition, you will choose whether the defendant will pay a monetary punishment from the low interval or the high interval corresponding to the level of theft you are charging him or her with. Of course, the defendant will not pay any monetary penalty if he or she is found not-guilty by the jury. Also, remember that if the charge differs from the accusation, then that the evidence of guilt and the (unobserved) evidence of innocence is adjusted accordingly.

**Offer a plea bargain.** A plea bargain is an offer that you make to a defendant in order to avoid a trial. It consists of a charge (SMALL, MEDIUM or LARGE theft) and associated monetary punishment that you are willing to offer to the defendant in exchange for a guilty plea. If you choose to offer a plea bargain you also choose a charge (SMALL, MEDIUM or LARGE theft) and associated interval of monetary punishment that you will take to trial if the defendant does not accept your offered plea bargain. When choosing these things, you cannot opt for a plea bargain that compares unfavorably with the charge and interval of punishment that go to trial if the plea bargain is rejected.

You will make decisions in every possible scenario a prosecutor could face. Since there are three possible levels of theft, and three possible levels of evidence of guilt, that means you will make decisions in nine different scenarios.

After you have made decisions in each of the nine scenarios, you will go through all nine scenarios for a second time. We will refer to first set of decisions as cycle one, and the second set of decisions (in the same nine scenarios) as cycle two. At the end of the experiment one of these two cycles will be chosen to determine payments.

We will use your decisions today to determine outcomes in future experiments. To help determine payments in today's experiment we will use the decisions of participants in the roles of defendants and jurors collected in a past experiment. We will compare your decisions with instances in which past defendants made decisions for when they were accused of a theft (SMALL, MEDIUM or LARGE), there was some evidence of guilt in support of the accusation (WEAK, MEDIUM or STRONG), and there was either no evidence of innocence or the level of evidence of innocence was WEAK, MEDIUM or STRONG.

We will use your decisions in that exact scenario to determine what the outcome would have been if you had been matched with this past defendant. If there would be a trial, the decisions of jurors from past experiments will be used to determine whether or not the trial results in a finding of guilty or not-guilty.

We will match your decisions in cycle one with one hundred instances in which past defendants have been accused, and determine the outcome as described above. We will then match your decisions in cycle two against these same one hundred instances.

For each of these two cycles, we will calculate your conviction rate, which is the percentage of instances in which you opted to charge a defendant with a crime, and there was a guilty finding. A guilty finding occurs when a defendant pleads guilty or is found guilty in a trial. Note that accepted plea bargains are included in the calculation of this conviction rate.

If cycle one is randomly chosen for payment, then the \$25 bonus goes to the prosecutor (in your group of 3) who had the highest conviction rate. The bonus of \$15 goes to the prosecutor (in your group of 3) who had the second highest conviction rate. The remaining prosecutor in your group do not get a bonus.

If cycle two is randomly chosen for payment, then the recipients of the \$25 bonus and the \$15 bonus (among your group of 3) is determined randomly, with each person in your group of 3 having an equal probability of receiving either bonus. No one person can receive both bonuses.

Before you make decisions in cycle one, we will also ask you to tell us how likely a prosecutor is to obtain a verdict of guilty at trial in several situations. Your answers to these questions will not affect your payoffs in any way.

## **Summary**

1. In today's experiment you will be in the role of a prosecutor.
2. You will be asked to make decisions in nine scenarios. In a given scenario you will observe two pieces of information: the level of theft a defendant is accused of (SMALL, MEDIUM or LARGE), and the level of evidence of guilt to support that accusation (WEAK, MEDIUM or STRONG).
3. You will choose to either: 1) drop the charge, 2) proceed to trial without offering a plea bargain, 3) offer a plea bargain.
4. The decisions of the prosecutors, in today's experiment, will be used, in future experiments to affect the real monetary pay of real participants who are the role of defendants in those future experiments.
5. Your decisions as a prosecutor will be matched with the decisions of real participants of past experiments in the roles of defendants and jurors to determine the outcomes of accusations. We will compare your decisions with those of defendants in 100 accusations.
6. You will provide decisions for all nine scenarios twice. The first time you provide answers is cycle one. The second time you provide answers is cycle two.
7. For each of these two cycles, we will calculate your conviction rate, which is the percentage of instances in which you opted to charge a defendant with a crime, and there was a guilty finding. A guilty finding occurs when a defendant pleads guilty or is found guilty in a trial. Note that accepted plea bargains are included in the calculation of this conviction rate.
8. If cycle one is randomly chosen for payment, then the \$25 bonus goes to the prosecutor (in your group of 3) who had the highest conviction rate. The bonus of \$15 goes to the prosecutor (in your group of 3) who had the second highest conviction rate. The remaining prosecutor in your group do not get a bonus. If cycle two is randomly chosen for payment, then the recipients of the \$25 bonus and the \$15 bonus (among your group of 3) is determined randomly, with each person in your group of 3 having an equal probability of receiving either bonus. No one person can receive both bonuses.

## Supplemental Information:

### Figure SI1: Detailed evidence generation procedure

	Prosecutorial Evidence			Defense Evidence	
	If Truly Innocent Defendant	If Truly Guilty Defendant		If Truly Innocent Defendant	If Truly Guilty Defendant
<b>Strong Evidence of Guilt</b>	5 of every 100 truly innocent	15 of every 100 truly guilty	<b>Strong Evidence of Innocence</b>	15 of every 100 truly innocent	5 of every 100 truly guilty
<b>Medium Evidence of Guilt</b>	10 of every 100 truly innocent	25 of every 100 truly guilty	<b>Medium Evidence of Innocence</b>	25 of every 100 truly innocent	10 of every 100 truly guilty
<b>Weak Evidence of Guilt</b>	15 of every 100 truly innocent	30 of every 100 truly guilty	<b>Weak Evidence of Innocence</b>	40 of every 100 truly innocent	15 of every 100 truly guilty
<b>No Evidence of Guilt</b>	70 of every 100 truly innocent	30 of every 100 truly guilty	<b>No Evidence of Innocence</b>	20 of every 100 truly innocent	70 of every 100 truly guilty