

# Prediction Mistakes in the Criminal Justice System: Evidence from Linking Prosecutor Surveys to Court Records\*

Emma Harrington<sup>†</sup> · William Murdock III<sup>‡</sup> · Hannah Shaffer<sup>§</sup>

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## Abstract

In criminal cases, how often do mispredictions about future violent crime cause defendants to be incarcerated who could have been safely released — or, conversely, cause defendants to be released who later commit violent crime in their community? Identifying these prediction errors is challenging because decisions that appear to reflect mispredictions may instead reflect competing criminal-justice objectives (e.g., to extend second chances to young people despite their higher risk of violence). We overcome this identification challenge by linking an original survey of 162 North Carolina prosecutors to their 104,039 real-world cases. The survey elicits prosecutors' beliefs about how rates of violent re-arrest vary with defendant age and criminal record. We find that prosecutors' misperceptions increase relative incarceration rates for older defendants and those with longer criminal records. Our estimates imply that replacing a prosecutor in the bottom fifth of the accuracy distribution with a prosecutor from the top fifth would reduce violent re-arrest by 8.5 percent and incarceration by 5.4 percent. We further find that these gains would not come at the expense of increasing racial disparities.

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<sup>†</sup>University of Virginia ([emma.k.harrington4@gmail.com](mailto:emma.k.harrington4@gmail.com))

<sup>‡</sup>Harvard University ([william.murdock@gmail.com](mailto:william.murdock@gmail.com))

<sup>§</sup>University of Chicago Law School ([hannah.c.shaffer@gmail.com](mailto:hannah.c.shaffer@gmail.com))

One in sixty Americans are the victim of a violent crime each year (Morgan and Thompson, 2021). A significant share of violent crime is committed by people who have had recent contact with the criminal justice system. In North Carolina state court, the empirical setting of our paper, 31 percent of the defendants charged with a violent offense had contact with the felony court system in the past five years. In theory, the court system could have intervened to prevent these future violent crime from occurring by incarcerating these individuals and mechanically preventing them from violently re-offending in the community. However, using incapacitation to combat violent crime would be a blunt instrument. Only 8 percent of felony defendants in North Carolina go on to violently re-offend within five years, and even among defendants with violent crimes, only 11 percent violently re-offend. As a result, decision-makers might aim to use incapacitation defendants more selectively. But this hinges on being able to predict which defendants will violently re-offend if released. To what extent do errors in these predictions cause decision-makers to incarcerate defendants whom they would otherwise release (and vice-versa)? Could correcting decision-makers' misperceptions reduce violent crime without increasing incarceration?

Identify decision-makers' misperceptions is challenging and, indeed, often impossible using observational, choice data alone (Kleinberg et al., 2018; Rambachan, 2021; Chan et al., 2022). To see this, imagine lining up a group of defendants based on their risk of violent re-offense. If we then observed incarceration outcomes for these defendants, it is likely that some high risk defendants would be released while some low risk defendants would be incarcerated. This mis-ordering of incarceration outcomes could reflect misperceptions. However, it could also reflect conflicting sentencing considerations. For instance, decision-makers may seek to punish past wrongs even when the risk of future crime is low, or extend second chances to certain defendants even when the risk of future crime is high. This mis-ordering could also reflect constraints. Decision-makers may feel compelled to follow sentencing laws or the wishes of other criminal-justice decision-makers. Therefore, a decision that appears to reflect misperceptions may simply reflect objectives or constraints that are in tension with reducing

future violent crime.

Our paper overcomes this identification challenge by eliciting prosecutors' beliefs about rates of future violent crime for different groups of defendants — specifically for defendants of different ages and criminal-record lengths. We then link each prosecutor's subjective beliefs to the real-world incarceration and re-arrest outcomes in her cases.<sup>1</sup> Our linked dataset includes 162 North Carolina state prosecutors, each of whom handled an average of 642 felony cases in North Carolina Superior Court between 1995 and 2019. Using this linked dataset, we find that prosecutors' misperceptions about certain predictors of future violence — specifically, age and criminal-record — distort the patterns of realized incarceration rates in their assigned cases. We further find that prosecutors with more accurate beliefs simultaneously reduce rates of violent re-arrest and incarceration, without increasing racial disparities in incarceration.

We chose to survey prosecutors because prosecutors are widely considered to be the most influential actors in criminal courts (e.g., Pfaff, 2017; Stith, 2008; Davis, 2007). Prosecutors have discretion over whether to move forward with the case and which charge to choose (e.g., Armed Robbery or Burglary). Although prosecutors do not directly determine sentencing outcomes, prosecutors can choose whether to press for a sentence with incarceration (versus, e.g., probation) in plea-deal negotiations.<sup>2</sup> Since virtually all cases resolve via a plea deal, the prosecutor's plea offer often determines whether the defendant receives a sentence with incarceration.<sup>3</sup>

To build intuition for our empirical analyses, we model the prosecutor's choice of whether to press for an incarceration sentence. The prosecutor considers the likeli-

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<sup>1</sup>For clarity, we refer to prosecutors using the pronouns "she/her" and to defendants using the pronouns "he/him."

<sup>2</sup>In any given case, prosecutors may be constrained by the sentencing judge, sentencing laws, and the quality of the evidence. The typical prosecutor in our survey indicates that judges limit her ability to impose an incarceration sentence in 30 percent of cases in which she seeks incarceration and in 6 percent of cases in which she does not seek incarceration. Surveyed prosecutors indicate that the state sentencing guidelines and uncooperative witnesses limit their ability to impose incarceration in a larger share of cases (33 and 50 percent respectively).

<sup>3</sup>In North Carolina, 98 percent of state felony cases resolve via a plea rather than trial.

hood that the defendant will commit a violent crime if released (which would both harm the community and reflect poorly on her decision to release him). The prosecutor also weighs the perceived costs of incarceration to the defendant, state, and community, which may differ by defendant characteristics (if, e.g., younger defendants benefit more from second chances).<sup>4</sup> The prosecutor will press for incarceration if the perceived benefits from incapacitating the defendant exceed the costs of incarcerating him. Our model makes two central predictions. First, if a prosecutor overestimates the likelihood of future violence for a group of defendants, she will incarcerate more defendants in that group than she otherwise would have if she knew the true risk. Second, a prosecutor with more accurate beliefs will more selectively incarcerate those defendants who are most likely to re-offend. Therefore, for any given level of incarceration, a more accurate prosecutor will achieve a lower rate of violent re-arrest by (1) *incarcerating* defendants who are more likely to commit violent crimes and (2) *releasing* defendants who are less likely to commit violent crimes.

To test these predictions, our survey elicits prosecutors' beliefs about two predictors of future violent crime — a defendant's age and criminal record. Specifically, we elicit each prosecutor's beliefs about the average rate of violent re-arrest among defendants of different ages and among defendants with longer and shorter criminal records.<sup>5</sup> We focus on age because defendants often "age out" of crime: re-arrest rates decay exponentially with age, particularly for violent offenses. Indeed, age explains roughly 60 percent of a widely-used algorithm's prediction of future violence (Stevenson and Slobogin, 2018).<sup>6</sup> We focus on criminal records because of the widespread belief that

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<sup>4</sup>In our framework, incarceration costs include all of incarceration's consequences other than incapacitation. Costs could be negative if, e.g., incarceration sufficiently deters crime. These deterrent effects can differ by defendant characteristics. For instance, Jordan (2022) finds that defendants with longer criminal records are less likely to be deterred from future crime by a prison sentence.

<sup>5</sup>Prosecutors were asked about the rate of violent re-arrest within five years of a defendant's release from prison for a defendant in five different age groups (16-19, 20-25, 26-35, 36-50, and 50+) and five different criminal-record categories (based on North Carolina's sentencing guidelines).

<sup>6</sup>Age-out exists in North Carolina (Figure A.1(a)) and across the U.S. (Hirschi and Gottfredson, 1983; Bushway and Piehl, 2007; Kim and Bushway, 2018). Age-out does not seem to be a simple function of the likelihood of being caught. Similar patterns exist in violent infractions within the prison system (Figure A.2) and reported victimization by peers (Figure A.3).

they are strong predictors of future crime, which partially motivates their central role in sentencing laws.<sup>7</sup>

As predicted by the model, we find a link between a prosecutor's idiosyncratic beliefs about what predicts violent re-arrest and the patterns of incarceration in her cases. For example, prosecutors who overestimate the predictiveness of criminal records (more than other prosecutors) tend to incarcerate defendants with longer criminal records at higher rates than those with shorter criminal records (relative to other prosecutors).

Our identifying assumption is that prosecutors' idiosyncratic beliefs about certain groups are independent of their other reasons for incarcerating defendants in that specific group. This assumption would be violated if, for example, prosecutors who believed that older defendants were more likely to violently re-offend also received more severe cases for older defendants than younger defendants. Reassuringly, prosecutors' beliefs are neither systematically related to the baseline characteristics of their assigned cases nor past re-arrest outcomes in their specific cases. This identifying assumption would also be violated if prosecutors' idiosyncratic beliefs about certain groups of defendants were correlated with their idiosyncratic preferences for punishing those groups. Reassuringly, prosecutors' beliefs are not systematically related to their own politics and demographics, which may be correlated with their punishment preferences.

To further validate this reduced form relationship, we also leverage a different module of our survey, which uses case hypotheticals that randomly vary the defendant's age. This module asks prosecutors to indicate their preferred punishments for each hypothetical defendant. We find that a prosecutor's belief about the age-out of violent crime predicts how that prosecutor's preferred sentence responds to the random variation in defendant age across hypotheticals.

Taken together, these results provide evidence that prosecutors do weigh the risk of violent re-offense in their decision-making process, which implies that prosecutors' sys-

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<sup>7</sup>The North Carolina Sentencing Commission specifically considered "the defendant's risk of future criminality" when setting penalties for criminal records (Freeman, 2000).

tematic misperceptions distort the realized relationships between defendant age and incarceration and between criminal records and incarceration. Surveyed prosecutors underestimate the age-out of violent re-arrest by a factor of two and overestimate the predictive power of prior records by a factor of four. The reduced-form relationship between prosecutors' beliefs and realized incarceration outcomes suggests that correcting prosecutors' misperceptions would narrow the gap in incarceration rates between older defendants (who are over 50) and younger defendants (who are under 20) by 1.5 percentage points and the gap between defendants with the longest and shortest criminal records by 1.9 percentage points.<sup>8</sup>

Even with empirically accurate beliefs about violent re-arrest, prosecutors would nevertheless incarcerate older defendants and defendants with longer records at relatively higher rates. These differences likely reflect the fact that prosecutors weigh other objections beyond reducing future violence. Prosecutors may, for example, believe that incarceration has larger adverse effects on young people and those with fewer prior convictions (Lotti, 2022). These findings are consistent with Cowgill (2018); Albright (2019); Stevenson and Doleac (2021), who find that algorithmic risk tools are often not used, potentially because the tools' recommendations conflict with other criminal-justice objectives.

To consider whether more accurate prosecutors can reduce rates of future violence without simply increasing incarceration, we leverage the quasi-random assignment of cases of similar severity to prosecutors with similar experience in an office crime-unit (e.g., Charlotte's drug unit). We find that replacing a prosecutor in the bottom fifth of the accuracy distribution with a prosecutor in the top fifth would reduce violent re-arrest by 8.5 percent, while simultaneously reducing incarceration by 5.4 percent. Thus, the reduction in violent re-arrest alone understates the gains from more accurate prosecutors. Holding incarceration rates fixed, prosecutors in the top fifth of the accu-

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<sup>8</sup>To estimate the effect of correcting prosecutors' beliefs on relative incarceration rates, we multiply the magnitude of the belief correction by the estimated relationship between prosecutors' misperceptions and realized incarceration.

racy distribution could reduce violent re-arrest by 9.6 percent relative to those in the bottom fifth.<sup>9</sup> If we instead hold violent re-arrest fixed, these more accurate prosecutors could reduce incarceration by 48 percent.<sup>10</sup>

Taken together, these results suggest that the selection of prosecutors matters: recruiting and retaining prosecutors who more accurately predict violent re-arrest could simultaneously reduce violent crime and incarceration.

Our analyses contribute to recent debates about the benefits and costs of algorithms that predict future violence.<sup>11</sup> Many worry that algorithms exacerbate racial disparities by reproducing patterns of discrimination in the criminal system (e.g., [O'Neil, 2016](#); [Angwin, 2016](#)).<sup>12</sup> Indeed, an algorithm in North Carolina that predicted future violence would likely have a disparate impact since Black defendants in North Carolina are re-arrested for violent offenses at over twice the rate as non-Black defendants. By contrast, we find that more accurate prosecutors reduce incarceration rates for Black and non-Black defendants to a similar extent. Thus, directly correcting prosecutors' beliefs about future violence may reduce future violence without exacerbating racial disparities. In addition, the complexity of sentencing objectives raises concerns that black-box algorithms may overlook facets of the decision-problem (such as, e.g., an objective to extend second chances to young people). By contrast, directly correcting prosecutors' beliefs about future violence may achieve many of algorithms' benefits without introducing these potential blind spots.

Our paper contributes to the literature evaluating how human decision-makers' choices

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<sup>9</sup>These inferences use our estimate of the average rate of substitution between incarceration and violent re-arrest, which is based on two complementary designs. The first design uses discontinuities in incarceration rates induced by the sentencing guidelines as in [Rose and Shem-Tov \(2021\)](#). The second uses a split-sample design to estimate the average relationship between prosecutors' incarceration and violent re-arrest rates.

<sup>10</sup>More accurate prosecutors could substantially reduce incarceration because the link between incarceration and violent re-arrest is relatively weak, so a large decrease in incarceration is necessary to undo their gains in violent re-arrest.

<sup>11</sup>Algorithms are increasingly prevalent at every juncture of the criminal pipeline: at bail (e.g., [Albright, 2019](#)), sentencing (e.g., [Collins, 2018](#); [Stevenson and Doleac, 2021](#)), and parole ([Pew, 2011](#)).

<sup>12</sup>When outcome data is racially biased, algorithms learn to predict bias. Yet, when outcome data is unbiased, race-aware algorithms could downweight biased inputs ([Rambachan and Roth, 2019](#)).

affect future misconduct, often relative to what an algorithm would have recommended.<sup>13</sup> Our paper makes a methodological contribution to this literature. Rather than relying on observational data, we directly elicit prosecutors' beliefs and then link these beliefs to prosecutors' real-world cases. This allows us to test the importance of prediction mistakes more directly than past work. This approach also allows us to study the impact of prediction mistakes in the sentencing context, where decision-makers have more complicated objectives than in settings such as bail.

We also contribute to the literature attempting to open up the black box of prosecutors' decision-making.<sup>14</sup> Past work that models prosecutors' plea-deal negotiations often simplifies prosecutors' objective to maximizing convictions and sentence length (e.g., Reinganum, 1988; Silveira, 2017).<sup>15</sup> However, prosecutors' sentencing objectives are likely more complicated: Prosecutors face time pressures and legal constraints and so may extend lenient plea offers to resolve negotiations or comply with sentencing laws (Rasmusen et al., 2009; Yang, 2016). When considering whether to offer a lenient deal, a prosecutor may also weigh the risk that the defendant will later commit a violent crime since this would reflect poorly on the decision to offer a lenient deal.<sup>16</sup> Our paper provides direct evidence that prosecutors weigh the risks of future violence in their decision-making and that their (mis)predictions about future violence have real-world consequences.

The remainder of this paper is organized as follows. Section I presents a simple model

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<sup>13</sup>At one end of the spectrum, Kuziemko (2013) finds that human decision-makers can improve upon deterministic sentencing rules in the parole context. At the other end of the spectrum, Kleinberg et al. (2018) finds that human decision-makers allocate jail-time less efficiently than an algorithm would in the bail context. A recent strand of this literature investigates variation in decision-makers' prediction skill (Kleinberg et al., 2018; Rambachan, 2021; Jordan, 2022). A related literature considers variation in diagnostic ability in the health care context (Gowrisankaran et al., 2017; Chan et al., 2022; Mullainathan and Obermeyer, 2022).

<sup>14</sup>Much of the literature on prosecutors has focused on prosecutors' impacts on racial disparities (Rehavi and Starr, 2014; Tuttle, 2019; Sloan, 2022; Harrington and Shaffer, 2023).

<sup>15</sup>Supporting the prevailing assumption that prosecutors only seek to maximize punishments, federal prosecutors with longer average sentences are more likely to be promoted (Boylan, 2005).

<sup>16</sup>In Glaeser et al. (2000)'s model, local prosecutors put more weight on future crime, and federal prosecutors put more weight on building their human capital. This rationalizes differences in the types of drug cases handled by the state and federal system.



of prosecutorial decision-making. Section II describes the data and setting. Section III describes prosecutors' misperceptions. Section IV investigates how prosecutors' misperceptions impact incarceration patterns. Section V compares the case outcomes of more and less accurate prosecutors. Section VI concludes.

## I Model of Prosecutor Decision-making

This section describes a simple model that illustrates how prosecutors' (mis)perceptions impact incarceration and future crime. The prosecutor  $p$  chooses whether to bargain for a plea-deal with incarceration ( $y = 1$ ) or a deal without incarceration ( $y = 0$ ).<sup>17</sup> The prosecutor's payoff depends on whether the defendant  $d$  is incarcerated and whether he commits a violent crime if he is allowed to re-enter the community (rather than being incarcerated). If the prosecutor offers a plea-deal without prison and the defendant commits a violent crime, the prosecutor bears a cost of  $\kappa > 0$ . This cost could reflect the prosecutor's desire to reduce violent crime; alternatively, it could reflect her desire to maintain her reputation in the office.

The prosecutor can avoid the risk of costly re-offense by incarcerating the defendant — since, by definition, the defendant cannot commit a violent crime in the community while in prison. This incapacitation effect creates a mechanical relationship between incarceration and the incidence of future crime in the community.

Yet imposing a prison sentence can also be costly,  $c_{p,d} \geq 0$ . This cost may reflect prosecutor- and defendant-specific factors. A prosecutor may, for example, want to give certain defendants a second chance and so heavily weigh the cost of incarceration for these defendants ( $c_{p,d} > 0$ ). Alternatively, a prosecutor may think that a defendant's past offenses warrant a harsh punishment, regardless of the risk of future crime ( $c_{p,d} < 0$ ).<sup>18</sup>

<sup>17</sup>We focus on the binary choice to press for incarceration since prosecutors in North Carolina choose the punishment type but sometimes leave the sentence *length* up to the judge.

<sup>18</sup>Of course, these are many other motives for punishment beyond incapacitation. A prosecutor may consider, for example, specific or general deterrence and the costs of incarceration to the state.

Since the prosecutor does not know whether a defendant will commit a violent crime if released, she forms a subjective expectation about the defendant's likelihood of future violence ( $\tilde{\pi}_{p,d}$ ). We assume that prosecutors' idiosyncratic beliefs about the relative riskiness of a group of defendants are independent of their idiosyncratic costs of incarcerating defendants in that group:  $(\tilde{\pi}_{p,d} - \tilde{\pi}_p) - (\tilde{\pi}_d - \tilde{\pi}) \perp (c_{p,d} - \bar{c}_p) - (\bar{c}_d - \bar{c})$ . Importantly, this allows prosecutors' beliefs about risk to be correlated with their average costs of incarcerating defendants. It also allows prosecutors' beliefs about a specific defendant group to be correlated with the average costs of incarcerating that group (e.g., prosecutors may perceive defendants with longer criminal records both to be higher risk and less costly to incarcerate).

**Solving the Prosecutor's Problem:** For each defendant, the prosecutor solves:

$$\min_{y \in \{0,1\}} c_{d,p}y + \kappa \tilde{\pi}_{p,d}(1 - y).$$

The prosecutor will bargain for a plea deal with incarceration when the cost of incarcerating the defendant are lower than the expected cost of future violence:

$$c_{d,p} \leq \kappa \cdot \tilde{\pi}_{p,d}. \tag{1}$$

This threshold rule has two testable predictions.

1. A prosecutor who overestimates the risk of future violence for a group of defendants ( $\tilde{\pi}_{p,X_d} > \pi_{X_d}$ ) will incarcerate more defendants in that group than she otherwise would if she knew the true risk.

Since the prosecutor cares about future violent crime ( $\kappa > 0$ ), a higher subjective expectation about future violence will increase her threshold for incarceration (in Equation 1). Overestimating the risk of violence leads the prosecutor to incarcerate some defendants for whom the costs of incarceration are higher than the true expected cost of violent re-offense. Figure 1(a) illustrates the resulting distortion in incarceration decisions.

2. At any given incarceration rate, more accurate prosecutors reduce future violence.

A more accurate prosecutor is less likely to either over- or under-estimate the risk of future violence for a group of defendants, and so she has fewer distortions in her incarceration choices (as in Figure 1(a)). Since we have assumed that a prosecutor’s accuracy is independent of her idiosyncratic costs of incarcerating defendants in different groups, the only systematic difference between prosecutors with more and less accurate beliefs is the elimination of these distortions. The gains from eliminating these distortions consequently show up in a lower rate of future violence at any given incarceration rate. Graphically, this means that more accurate prosecutors operate on a better production possibility frontier between incarceration and future violence, as illustrated in Figure 1(b).

## II Data: Linking Prosecutors’ Beliefs to the Court Records

We link our survey of prosecutors to the cases they handled in the North Carolina Superior Court records. Section II.A outlines the prosecutor’s role in a typical case. Section II.B describes our survey, and Section II.C describes the court records.

### II.A Prosecutorial Discretion and Constraints

Prosecutors have discretion over the charge and the sentence offered during plea deal negotiations. When the prosecutor initially receives the case, she can decide to dismiss it entirely: indeed, prosecutors in North Carolina dismiss 14 percent of felony cases. If the prosecutor decides to move forward with the case, she typically extends a plea offer to the defense. In North Carolina, prosecutors and defense attorneys bargain over the charge and sentence *type* — which is almost always a prison or supervised probation sentence.<sup>19</sup> In some jurisdictions, negotiated pleas also determine the sentence length, but in others, the length is left open to the sentencing judge. In all jurisdictions, judges can reject negotiated plea deals but rarely do so in practice (McConkie, 2015). In the 2

<sup>19</sup>About 88 percent of convictions in North Carolina Superior Court resulted in either prison or supervised probation between 1995 and 2019.

percent of cases in which plea bargaining breaks down, the case goes to trial.

I think we might want to include this: In any given case, prosecutors may be constrained by the sentencing judge, sentencing laws, and the quality of the evidence. The typical prosecutor in our survey indicates that judges limit her ability to impose an incarceration sentence in 30 percent of cases in which she seeks incarceration and in 6 percent of cases in which she does not seek incarceration. Surveyed prosecutors indicate that the state sentencing guidelines and uncooperative witnesses limit their ability to impose incarceration in a larger share of cases (33 and 50 percent respectively).

A prosecutor's charge and sentence offer may be constrained by the evidence, the judge, and sentencing laws. Negotiations occur in the shadow of trial so prosecutors can only credibly bring charges that they have the evidence to prove at trial.<sup>20</sup> Similarly, negotiations occur in the shadow of what judges will accept and so prosecutors may be constrained by judicial preferences. In practice, however, prosecutors report that this typically is not binding.<sup>21</sup> In North Carolina, charge and sentence offers must conform to the state sentencing guidelines. However, prosecutors can (and often do) adjust the charge to change the presumptive punishment under the guidelines (Harrington and Shaffer, 2023).

## II.B Prosecutor Survey

We fielded our survey with support from the North Carolina Conference of District Attorneys and the participating elected District Attorneys. Sixteen of the state's forty-three District Attorneys chose to participate, including those in the state's four largest cities — Charlotte, Raleigh, Greensboro, and Durham (see the map in Figure A.4). We fielded the survey from May to November 2020, following an in-person pilot in two additional offices in November 2019.

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<sup>20</sup>Evidence includes physical evidence, video footage, and witness testimony. Defense motions to suppress evidence as, e.g., the product of an illegal search, may limit the admissible evidence.

<sup>21</sup>Surveyed prosecutors reported that judges prevented them from imposing their desired sentence in 30 percent of cases when they wanted incarceration and 6 percent of cases when they did not.

Prosecutors completed the survey online, and, in most participating offices, the elected District Attorney directly emailed anonymous links to prosecutors encouraging them to complete the survey. District Attorneys' support led to a 52 percent participation rate in participating offices. We surveyed a total of 186 Superior Court prosecutors, including both District Attorneys and Assistant District Attorneys (or line prosecutors).<sup>22</sup> We linked 176 survey respondents to the records (a 95 percent match rate). Of these prosecutors, 162 completed the survey (a 92 percent completion rate). On average, each prosecutor handled 642 felony cases between 1995 and 2019. Together, these prosecutors handled a quarter of all Superior Court cases in 2019, the year before fielding the survey.

The survey elicited information about prosecutors' beliefs about the predictors of violent re-arrest (described in detail in Section III.A), as well as rich information about their personal backgrounds. We asked about prosecutors' tenure, past experience as defense attorneys, demographics, and political ideology. We validate prosecutors' reported demographics and political ideology using North Carolina Voter Records (see Appendix C.3 for details). Surveyed prosecutors' experience, demographics, and politics appear to be broadly representative of line prosecutors in North Carolina (see Table 1).<sup>23</sup> Prosecutors also responded to a set of hypothetical cases, where we randomized the defendant's age (described in Appendix D). On average, prosecutors spent one hour on the survey, and, after taking the survey, 90 prosecutors chose to debrief with us in online video sessions. Appendix E provides the text for each survey question in our analysis.

Prosecutors were not explicitly incentivized to give accurate responses to verifiable questions on the survey. During the pilot, several prosecutors told us that such incen-

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<sup>22</sup>We surveyed an additional 17 prosecutors who only handled misdemeanors (rather than felonies) or who were hired in 2020 so could not merge to our 1995–2019 Superior Court data.

<sup>23</sup>Approximately a third of surveyed prosecutors were registered Democrats (Column 6 of row 1 of Table 1), marginally more than in the full sample (in column 4). Only 9 percent of prosecutors in both the surveyed population and full sample were Black (row 2, compared to 20 percent of the North Carolina population) and women composed 41 percent of surveyed prosecutors and 45 percent of the full sample (Row 3). Prosecutors were typically in their early forties (Row 4) with a decade of experience (row 5).

tives would be considered unprofessional and reduce participation. Despite the lack of incentives, many prosecutors mentioned during the debrief that they carefully considered their responses, and, on average, prosecutors spent an average of 2.3 minutes on the two prediction questions that are central to this paper.<sup>24</sup>

## II.C Superior Court Records

We link prosecutors' survey responses to their court cases from 1995 to 2019 in North Carolina Superior Court.<sup>25</sup> North Carolina Superior Court handles almost all of the felony cases in the state. Each year, about 40,000 cases are handled in North Carolina Superior Court. For reference, across all U.S. federal courts, only about 80,000 felonies are filed each year (*Criminal Federal Judicial Caseload Statistics, 2019*).

To link prosecutors' survey responses to the court records, we use fuzzy string matching to construct consistent prosecutor identifiers in the records, which are populated in 95% of all cases. Prosecutor identifiers also help us group defendants' concurrent offenses into "cases" handled by a single prosecutor. When defendants have multiple concurrent offenses, they may accept plea-deals with sentences on some charges in exchange for dropping other charges. Without consolidating these offenses together, we would have an incomplete picture of the prosecutor's decision in each case. Appendix C provides details on these cleaning procedures.

**Sample Restrictions:** We make several sample restrictions for our analysis. We focus on new felony cases, since prosecutors do not play an active role in probation violations. We exclude cases that are missing defendant age or race (1.3 percent of cases). Our primary sample also excludes murder and rape, which are typically handled by specialized prosecutors (4.0 percent of new felony cases); drug trafficking, which is often handled by the federal system (5.5 percent of cases); and driving while under the influence, which is typically handled by the lower, district court system (0.8 percent of

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<sup>24</sup>Some prosecutors also mentioned that they (incorrectly) thought that their superiors might see their responses.

<sup>25</sup>The court records are managed by the North Carolina Administrative Office of the Courts.

cases). Our main results are robust to including these offenses (Tables A.6 and A.10).

**Case Outcomes.** Our analyses consider both sentencing and re-arrest outcomes. When analyzing sentencing, we focus on whether the defendant was sentenced to prison, although we also consider the length of incarceration.<sup>26</sup> Approximately a fifth of defendants are incarcerated (row 9 of Table 1) for an average of fourteen months (column 3 in row 11).

When analyzing re-arrest, we focus on whether a defendant is re-arrested for a felony charge within five years of the resolution of his current case. We start the clock at the time of the case's resolution so that we capture the period in which the defendant could have been incapacitated. We primarily focus on violent re-arrest, which occurs in 8.6 percent of cases (row 15), since these offenses more clearly involve social harm. We use a consistent definition of violent crimes in the court records and survey questions about re-arrest. Specifically, we define violent crimes as felony assault, murder, manslaughter, serious sex offenses, robbery, burglary, kidnapping, or arson.

**Case Characteristics.** The court records allow us to reconstruct much of the information that the prosecutor would have seen upon first opening the defendant's case file. Particularly, we observe the defendant's most serious — or “lead” — arresting charge.<sup>27</sup> We can reconstruct the defendant's prior record of felony convictions using the observed outcomes from his previous cases.<sup>28</sup> Together, a defendant's lead arresting charge and prior criminal record determine his initial presumptive punishment under the state sentencing guidelines, which is often the starting point for plea-deal negotiations.

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<sup>26</sup>We define prison sentences as a term of incarceration of at least six months because sentences of at least this length are served in state prison (rather than in a county jail) and primarily post-conviction (rather than pretrial).

<sup>27</sup>To determine the lead charge, we use the offense classes from the state sentencing guidelines to rank severity and use average incarceration rates for charges to break ties.

<sup>28</sup>We can observe all prior felony convictions in North Carolina since 1995. We do not see most misdemeanors, which are handled in the lower, District Courts.

### III Misperceptions about Predictors of Violent Re-Arrest

Section III.A describes our method for eliciting prosecutors' beliefs about the predictors of violent re-arrest on our survey. Section III.B characterizes prosecutors' beliefs, including both the wide heterogeneity and average biases.

#### III.A Eliciting Prosecutors' Misperceptions

The survey elicits prosecutors' beliefs about how the average rate of violent re-arrest varies with defendant age and criminal record. Specifically, the survey asks each prosecutor to consider a hypothetical defendant in her jurisdiction who has just been released from prison after serving a one-year incarceration sentence. We specify the term of incarceration to hold treatment constant and to ensure that prosecutors consider a defendant who is in the community.<sup>29</sup> We asked prosecutors about post-release re-arrest rates since these are verifiable in the court records.

We then ask the prosecutor to report the percent chance that this hypothetical defendant would be re-arrested for a violent offense within the next five years. We define violent offenses as "felony assault, murder, manslaughter, serious sex offenses, robbery, burglary, kidnapping, or arson."

Figure 2(a) shows the interface for defendant age. Prosecutors were asked about the likelihood of re-arrest for hypothetical defendants in five different age groups (16–19, 20–25, 26–35, 36–50, and 50+).<sup>30</sup> Analogously, prosecutors were asked about defendants in five different criminal-record categories (Figure 2(b)). To summarize a defendant's criminal record, we use North Carolina's statutory formula for calculating criminal-record "prior points," where, for example, a conviction for a misdemeanor (e.g., shoplifting) adds one point while a mid-level felony (e.g., robbery) adds four points. We then grouped defendants based on the thresholds used by the state sen-

<sup>29</sup>For these defendants, there would also be a comparable period of post-release supervision of nine to twelve months (NC DPS, 2022).

<sup>30</sup>Defendants younger than 16 tend to be charged as juveniles. In the survey sample, 17 percent of cases had defendants 16–19 years old; 26 percent, 20–25 years old; 30 percent, 26–35 years old; 22 percent, 36–50 years old; 5 percent, >50 years old.



tencing laws (0, 1–2, 3–5, 6–9, and 10+ points).<sup>31</sup>

We designed the survey questions to ease prosecutors’ *comparisons* across different groups. We put the questions for every age-group and criminal-record category on one interface (Figure 2). We used sliders from zero to hundred to elicit prosecutors’ beliefs about the percent chance of re-arrest, since prosecutors in our initial pilots found other elicitation methods to be too onerous.

As illustrated in Figure 2, prosecutors tended to anchor toward the center of sliders (at 50 percent). We reduce the influence of this anchoring in two ways: first, we focus on prosecutors’ comparisons across different groups of defendants, and second, we focus on these comparisons in logs rather than in levels. We use logs because mechanically, there is less room for the reported level of violent re-arrest to decline with age among prosecutors who report lower baseline levels of violent re-arrest. Using logs allows for the possibility that prosecutors who report different aggregate levels of re-arrest have similar beliefs about the predictive power of defendant age. We further winsorize prosecutors’ beliefs at the 5th and 95th percentiles to reduce the influence of outliers and handle zero values.<sup>32</sup>

### III.B Describing Prosecutors’ Misperceptions

Prosecutors underestimate the extent of age-out of crime. Figure 3(a) illustrates prosecutors’ beliefs about the percentage change in violent re-arrest as defendants age, relative to the reference group of 16–19 year-old defendants. On average, prosecutors believe that the chances of violent re-arrest decline by 2.4 percent per year as defendants age, which is only half of the true, empirical relationship.<sup>33</sup>

<sup>31</sup>In the survey sample, 56 percent of cases had defendants with no record; 17 percent, with 1–2 points; 12 percent, with 3–5 points; 10 percent, with 6–9 points; 5 percent, with 10+ points.

<sup>32</sup>Section IV.B examines robustness to alternative parameterizations of prosecutors’ beliefs.

<sup>33</sup>We summarise each prosecutor  $p$ ’s beliefs by the weighted linear fits:

$$\text{Log}(\widetilde{\text{Violent Re-arrest}}_{p,a}) = \psi_p + \beta_{p,\text{Age}} \overline{\text{Age}}_a + \epsilon_{p,a}$$

where  $a$  denotes age group;  $\widetilde{\text{Violent Re-arrest}}_{p,a}$ , perceived re-arrest rate; and  $\overline{\text{Age}}_a$ , average age.

Prosecutors overestimate the extent to which past crimes predict future violence. Figure 3(b) illustrates prosecutors' beliefs about the percentage change in violent re-arrest rates as defendants accumulate criminal-record points, compared to defendants with no record. On average, prosecutors believe that the likelihood of violent re-arrest increases by 9.3 percent for every additional criminal-record prior point, which is almost four times the empirical relationship (of 2.4 percent).<sup>34</sup>

Prosecutors vary widely in these misperceptions, as illustrated by the spread of beliefs in Figure 3. Prosecutors' beliefs about defendant age and criminal record are negatively correlated (Pearson correlation = -0.28), but much of the variation in each of these beliefs is independent of the other ( $R^2 = .079$  in the bivariate regression). Prosecutors' beliefs are largely orthogonal to their observable characteristics, including their race, gender, political affiliation, and experience in the system, both as prosecutors and defense attorneys (Figure A.6(a)). This null relationship with experience is consistent with prosecutors' anecdotal accounts that they rarely receive information about the ultimate re-arrest outcomes in their cases.

## IV Incarceration Consequences of Prediction Mistakes

This section evaluates the relationship between prosecutors' misperceptions about future violent crime and the incarceration outcomes in their cases.

### IV.A Empirical Design

We estimate the extent to which a prosecutor who overestimates the rates of violent re-arrest for a particular group (relative to other groups) is also relatively more likely to incarcerate defendants in that group (relative to other prosecutors in her office,  $o$ ). Letting  $i$  index the case,  $p$  index the prosecutor, and  $a$  denote the defendant's age-

<sup>34</sup>We summarise each prosecutor  $p$ 's beliefs by the weighted linear fit:

$$\text{Log}(\widetilde{\text{Violent Re-arrest}}_{p,r}) = \phi_p + \beta_{p,\text{Record}} \overline{\text{Record Points}}_r + v_{p,r}.$$

where  $r$  denotes criminal-record category;  $\widetilde{\text{Violent Re-arrest}}_{p,r}$ , perceived re-arrest rate; and  $\overline{\text{Record Points}}_r$ , average record points.

group, we estimate:

$$\text{Incarceration}_i = \beta_{\text{age}} \text{Log}(\widetilde{\text{Violent Re-Arrest}}_{p(i),a(i)}) + \mu_{p(i)} + \mu_{a(i),o(i)} + \epsilon_i. \quad (2)$$

Including prosecutor fixed effects ( $\mu_{p(i)}$ ) allows us to net out a prosecutor's average belief about re-arrest and focus on comparisons across different age-groups, which was the target of our elicitation method (Figure 2). Including age by office fixed effects ( $\mu_{a(i),o(i)}$ ). These controls allow us to capture average differences in incarceration costs across age-groups in each office ( $\bar{c}_{a,o}$ ), if, for instance, incarceration is seen as more costly for young people's futures (so  $\bar{c}_{\text{young},o} > \bar{c}_{\text{old},o}$ ). These fixed effects also allow us to net out any real differences in violent re-arrest rates across age-groups in each place and instead to focus on variation in prosecutors' misperceptions about the benefits of incapacitation (deviations between  $\kappa\tilde{\pi}$  and  $\kappa\pi$  in Figure 1(a)).

We consider the analogue for defendant criminal record  $r$ :

$$\text{Incarceration}_i = \beta_{\text{record}} \text{Log}(\widetilde{\text{Violent Re-Arrest}}_{p(i),r(i)}) + \mu_{p(i)} + \mu_{r(i),o(i)} + u_i. \quad (3)$$

We finally consider the pooled specification that stacks equations 2 and 3 to jointly estimate how a prosecutor's beliefs about a defendant group  $g$  predicts her incarceration tendencies for that group:

$$\text{Incarceration}_i = \beta \text{Log}(\widetilde{\text{Violent Re-Arrest}}_{p(i),g(i)}) + \mu_{p(i)} + \mu_{g(i),o(i)} + v_i. \quad (4)$$

We cluster the standard errors at the prosecutor level since we elicit beliefs from each prosecutor (Abadie et al., 2022).

**Identifying Assumption.** Our identifying assumption is that, within an office, prosecutors' beliefs about violent re-arrest for a particular group are not correlated with their perceived social costs of incarcerating defendants in that group. This assumption could be violated for a two reasons: prosecutors' re-arrest beliefs were correlated with

their (1) punishment preferences or (2) the types of cases they were assigned.

To understand the threat of correlated preferences, suppose, for example, that prosecutors who believed incarceration was more costly for young defendants were also more likely to underestimate young defendants' re-arrest rates. In this case, prosecutors' beliefs would be correlated with the incarceration outcomes in their cases but changing these beliefs need not have any effect on incarceration. Reassuringly, we find that prosecutors' stated beliefs are not significantly correlated with their politics, gender, or race (Figure A.6(a)) — all of which might be expected to predict prosecutors' perceived costs of incarcerating different groups of defendants. We also show our results are robust to allowing for these prosecutor characteristics to directly influence punishments.

Our second identifying assumption is that prosecutors' beliefs are not correlated with the kinds of cases that they were assigned. Reassuringly, we find that the observable characteristics of a prosecutor's cases for defendants of a given age- or criminal-record group are not systematically related to her re-arrest beliefs about that group (Table 2).<sup>35</sup> We can also validate the link between prosecutors' beliefs about age-out and their incarceration preferences in hypothetical cases where we randomize defendant age.<sup>36</sup>

**Counterfactual Incarceration Rates.** If the estimated link between prosecutors' re-arrest predictions and incarceration outcomes ( $\beta$ ) is causal, then we can use it to assess how correcting prosecutors' misperceptions would impact *who* is incarcerated. Put differently, what are the consequences of setting  $\tilde{\pi} = \pi$  in Figure 1(a)? For illustrative

<sup>35</sup> Row 8 collapses the observable case characteristics into a predicted likelihood of incarceration based on a linear probability model that uses the other observables in Table 2: defendant race, ethnicity, gender, age, criminal-record prior points, arresting charge offense class, and whether the current charge is violent. A doubling of the perceived likelihood of re-arrest — or, equivalently, a one hundred percent increase — is associated with an insignificant 0.14 percentage point increase in the predicted likelihood of incarceration (95% CI = [-0.34, 0.62] in Column 4).

<sup>36</sup>Specifically, we estimate:

$$\text{Incarceration}_i = \gamma_{\text{age}} \text{Log}(\widetilde{\text{Violent Re-Arrest}}_{p(i),a(i)}) + \mu_{p(i)} + \mu_{v(i)} + \mu_{a(i)} + u_i \quad (5)$$

where  $v$  denotes the facts of the case;  $a$ , the defendant's randomly chosen age-group;  $p$ , the prosecutor;  $\widetilde{\text{Violent Re-Arrest}}_{p(i),a(i)}$ , the prosecutor's perceived re-arrest rate for the defendant given his randomly chosen age; and  $\text{Incarceration}_i$ , whether she would press for incarceration in this hypothetical plea deal. Appendix D provides more details on these hypotheticals.

purposes, we hold fixed the incarceration rates of the reference groups — 16–19 year-olds and defendants with no records — and then ask how other groups’ incarceration rates would change if beliefs were corrected. In the first step of this counterfactual, we imagine correcting prosecutors’ beliefs about the relative likelihoods of re-arrest. For the set of defendants  $A$  in age-group  $a$ , we have:

$$\widehat{\Delta \text{Belief}}_a = \text{Log} \left( \frac{\text{Violent Re-Arrest}_a}{\text{Violent Re-Arrest}_{16-19}} \right) - \frac{1}{|A|} \sum_{i \in A} \text{Log} \left( \frac{\widetilde{\text{Violent Re-Arrest}}_{a(i),p(i)}}{\widetilde{\text{Violent Re-Arrest}}_{16-19,p(i)}} \right). \quad (6)$$

In the second step, we scale this correction by the estimated effect of prosecutors’ predictions on incarceration ( $\beta$  from Equation 4):

$$\widehat{\Delta \text{Incarceration}}_a = \hat{\beta} \left( \widehat{\Delta \text{Belief}}_a \right). \quad (7)$$

## IV.B Results

Prosecutors’ incarceration decisions track their beliefs about the predictors of violent re-arrest. Prosecutors who believe that re-arrest declines less with age have higher incarceration rates for older defendants (Column 1 in Table 3); prosecutors who believe that prior records are stronger predictors of future re-arrest have higher incarceration rates for defendants with longer records (Column 2). On average, a prosecutor who believes that a group of defendants is twice as likely to be re-arrested for a violent crime (compared to other groups) is 1.5 percentage points more likely to incarcerate defendants in that group (compared to other prosecutors) (p-value = 0.0034 in Column 3).

We can contextualize these findings using the standard deviation of prosecutors’ beliefs about violent re-arrest rates for a given group of defendants (relative to other groups) in each office. A prosecutor who thinks that a group of defendants is one standard deviation — or 27 percent — more likely to be re-arrested for a violent crime is 0.40 percentage points more likely to incarcerate defendants in that group (Column 3 in Table 3). Relative to the average incarceration rate of 21 percent, this represents a

1.9 percent increase. Our preferred specification in Column 4 produces a comparable estimate of 1.8 percent while increasing the  $R^2$  from 0.1 to 0.25 by controlling for the inputs to the state sentencing guidelines.<sup>37</sup>

Figure 4(a) illustrates the strong residualized relationship between prosecutors' beliefs about the relative likelihood of violent re-arrest for a group of defendants and their incarceration outcomes for that group of defendants. Figure 4(b) shows the even stronger relationship between prosecutors' beliefs and their desired incarceration outcomes in hypothetical cases.<sup>38</sup>

Prosecutors' beliefs about violent re-arrest are also predictive of other dimensions of the sentencing outcomes in their cases. A prosecutor who believes that a defendant is more likely to be re-arrested for a violent crime based on his age or criminal record is more likely to impose a long incarceration sentence, unconditionally in Column 2 of Table A.3 and conditional on imposing some incarceration in Column 3.<sup>39</sup>

**Robustness.** Our results are robust to alternative ways of handling the tails of the belief distribution: we can exclude prosecutors with extreme responses or instead use the inverse hyperbolic sine transformation (Column 2 and 3 of Table A.1). Yet the log transformation of beliefs is important: simply relying on the levels of prosecutors' beliefs yields results of the same sign but that are attenuated and insignificant (Column 4).

The link between prosecutors' beliefs and the incarceration outcomes in their cases is

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<sup>37</sup>There is a persistent relationship between prosecutors' predictions of violent re-arrest by defendant age and their incarceration rates for different age-groups (Table A.4). Similarly, there is a robust relationship between prosecutors' predictions of violent re-arrest by defendant criminal record and their incarceration rates for different criminal-record categories, once we allow for different policies around criminal record across different offices (Table A.5). The relationship between prosecutors' beliefs and incarceration outcomes are also similar for alternative samples that do not exclude murder and rape, driving while under the influence, and drug trafficking (Table A.6).

<sup>38</sup>The stronger relationship in the hypotheticals is consistent with prosecutors not being able to secure their desired sentence in all their real-world cases.

<sup>39</sup>These patterns in incarceration length are directionally similar for the hypothetical cases but not statistically significant (Table A.7). A prosecutor's beliefs about re-arrest are positively but not significantly associated with pre-trial detention time and the likelihood of taking the case to trial.

stable over time (Figure A.5). Prosecutors' beliefs are predictive of their incarceration outcomes in cases sentenced in the final years of our sample. This suggests that reverse causality is not driving our results, since re-arrest outcomes for cases in these later years had not yet been realized at the time of the survey. In addition, we find that prosecutors' reported beliefs are not significantly related to the violent re-arrest rates of the defendants of specific ages or criminal histories in their past cases so are unlikely to have resulted from these past experiences (Table A.2).<sup>40</sup>

Prosecutors' beliefs about violent re-arrest are predictive of the incarceration outcomes in their cases even after controlling for prosecutors' politics and other demographics (Table A.8). We can, for example, allow for the possibility that registered Democrats give more second chances to young defendants (Column 3) or that former defense attorneys find defendants with long criminal records more sympathetic (Column 5) without substantively changing our results.

#### IV.C Counterfactual with Accurate Beliefs

Figure 5(a) illustrates how increasing prosecutors' awareness of age-out of crime would reduce incarceration rates for older defendants relative to younger ones. Holding the incarceration rate of the youngest defendants constant, defendants over fifty years old would be 1.5 percentage points (95% CI = [0.32, 2.8]) less likely to be incarcerated.<sup>41</sup> Compared to the status-quo incarceration rate of defendants over fifty years old of 23 percent, this represents a 6.8 percent reduction in incarceration. Assuming surveyed prosecutors are representative of North Carolina prosecutors, this correction would have resulted in 565 fewer defendants over fifty years old being incarcerated during our sample period. If these 565 older defendants were re-arrested for violent crimes at

<sup>40</sup>Since our survey was conducted in 2020, it would be hard to circumvent this issue by using subsequent cases. Even ignoring pandemic disruptions and prosecutor attrition, such a sample would only be 19 percent as large and would have no information on re-arrest (since calculating re-arrest requires observing multiple years of records after a case is resolved).

<sup>41</sup>Our elicitation method recovers prosecutors' *comparisons* of re-arrest across groups but not the perceived *levels* of re-arrest, which instead anchored near the center of the sliders (Figure 2). Thus, it is unclear how correcting prosecutors' beliefs would impact the *level* of incarceration. For illustrative purposes, we assume that prosecutors' perceptions about the re-arrest rate of the reference groups were initially accurate. Figure A.7 illustrates counterfactuals under alternative assumptions.

the average rate for defendants over fifty when released but not when incarcerated (1.6 percent in the five years after release), then this substantial reduction in incarceration would have led to just nine additional violent crimes.

A fifth of the status-quo incarceration penalty for older defendants can be attributed to prosecutors' prediction mistakes. In the status quo, defendants over fifty years-old are 6.9 percentage points more likely to be incarcerated than defendants under twenty years old as illustrated in Figure 5(a). Under a counterfactual of accurate beliefs, defendants over fifty would be 5.4 percentage points more likely to be incarcerated than defendants under twenty. Therefore, even with accurate beliefs, older defendants would be incarcerated at significantly higher rates than younger defendants. This result indicates that forcing prosecutors to align their sentence offers with re-arrest risk would undermine a competing desire to be lenient in cases with young people. These results are consistent with [Stevenson and Doleac \(2021\)](#), who find that sentencing judges deviated from algorithmic recommendations based on predicted re-arrest to release young defendants at higher rates.

Figure 5(b) illustrates how correcting prosecutors' beliefs about criminal records would reduce incarceration rates for defendants with longer records relative to those with shorter ones. Holding the incarceration rate of defendants with no records constant, defendants in the longest criminal-record category (who average four past felonies) would be 1.9 percentage points less likely to be incarcerated. Compared to the status-quo incarceration rate of defendants in the longest criminal-record category of 58 percent, this represents a 3.3 percent reduction in incarceration. Assuming that surveyed prosecutors are representative of North Carolina prosecutors, this correction would have resulted in 552 fewer defendants in the longest criminal-record category being incarcerated during our sample period.

Despite this significant impact on incarceration, prosecutors' prediction mistakes explain only 4.4 percent of the status-quo positive gradient between incarceration and criminal records. In the status quo, defendants in the longest criminal-record cate-



gory are 45.3 percentage points more likely to be incarcerated than defendants without records. And under a counterfactual of accurate beliefs, defendants in the longest criminal-record category would be 43.8 percentage points more likely to be incarcerated. These persistent differences largely reflect state sentencing laws, which prescribe graduated punishments for those with longer criminal records.

The central role of criminal records under state sentencing laws may *itself* be the product of a prediction mistakes: indeed, the North Carolina Sentencing Commission specifically considered “the defendant’s risk of future criminality” when it crafted penalties for criminal records (Freeman, 2000).<sup>42</sup> If state sentencing commissions overestimate the degree to which past convictions predict future crime, prediction mistakes may have also become embedded in the sentencing law. In this case, our results would understate the potential impact of correcting prediction mistakes on the sentencing penalties for defendants with long criminal records.<sup>43</sup>

## V Accurate vs. Inaccurate Prosecutors

We use prosecutors’ survey responses to measure their prediction (in)accuracy about violent re-arrest. We then compare the case outcomes of more and less accurate prosecutors in order to test whether more accurate prosecutors lie on a better possibility frontier between incarceration and future violence as in Figure 1(b).

### V.A Measuring Inaccuracy

We summarize a prosecutor  $p$ ’s total inaccuracy by the mean squared error (MSE) of her predictions about re-arrest rates across defendant groups. Specifically, we measure each prosecutor’s belief about how the re-arrest rate of each defendant group differs from the average rate of re-arrest in log terms. We then benchmark this comparison to

<sup>42</sup>Similarly, in the federal system, the Federal Guidelines Manual justifies graduated punishments for defendants with longer records because “repeated criminal behavior is an indicator of a limited likelihood of successful rehabilitation” (United States Sentencing Commission, 2021).

<sup>43</sup>The broader implications of our paper for sentencing laws should be caveated given the partial-equilibrium nature of our analysis. It is possible that defendants with longer criminal records would pose much greater risks absent the deterrent effects of sentencing penalties — and therefore that the societal belief that longer records indicate a higher risk of violent re-arrest is not mistaken.

the log difference in re-arrest rates observed in the court records. Letting  $a$  index age groups and  $r$  index criminal-record categories, we estimate:

$$\begin{aligned} \text{Age MSE}_p &= \sum_a \frac{N_a}{N} \left[ \text{Log} \left( \frac{\text{Vio. Re-arrest}_{p,a}}{\sum_a \frac{N_a}{N} \text{Vio. Re-arrest}_{p,a}} \right) - \text{Log} \left( \frac{\text{Vio. Re-arrest}_a}{\sum_a \frac{N_a}{N} \text{Vio. Re-arrest}_a} \right) \right]^2 \\ \text{Criminal-Record MSE}_p &= \sum_r \frac{N_r}{N} \left[ \text{Log} \left( \frac{\text{Vio. Re-arrest}_{p,r}}{\sum_r \frac{N_r}{N} \text{Vio. Re-arrest}_{p,r}} \right) - \text{Log} \left( \frac{\text{Vio. Re-arrest}_r}{\sum_r \frac{N_r}{N} \text{Vio. Re-arrest}_r} \right) \right]^2 \\ \text{MSE}_p &= \frac{\text{Age MSE}_p + \text{Criminal-Record MSE}_p}{2}. \end{aligned} \quad (8)$$

We weight the magnitude of the errors by the share of defendants who fall into a particular age-group ( $N_a/N$ ) or criminal-record category ( $N_r/N$ ).<sup>44</sup>

## V.B Empirical Design

We leverage the conditional quasi-random assignment of cases in an office crime-unit to estimate prosecutor  $p$ 's impact on incarceration ( $\psi_{p,\text{Incarceration}}$ ) and her impact on violent re-arrest ( $\psi_{p,\text{Violent Re-Arrest}}$ ). We compare prosecutors of similar seniority who handle cases of similar severity in the same office crime-unit (e.g., Charlotte's drug unit in 2019):

$$\text{Incarceration}_i = \psi_{p,\text{Incarceration}} + \mu_{u(i),s(p(i)),g(i)} + v_i \quad (9)$$

$$\text{Violent Re-Arrest}_i = \psi_{p,\text{Violent Re-Arrest}} + \mu_{u(i),s(p(i)),g(i)} + \zeta_{i,r} \quad (10)$$

where  $u$  captures the office crime-unit, defined by the office, year, and crime-type (drug, property, violent, or other);  $s$  captures the prosecutor's seniority (0-2 years, 3-5 years, 6-14 years, and over 15 years); and  $g$  captures the severity of the case under the state sentencing guidelines. Our preferred measure of severity is whether the sentencing guidelines recommends prison, probation, or the option of prison or probation, which depends on the defendant's lead arresting charge and criminal-record prior points. We also consider specifications that directly control for these inputs to the

<sup>44</sup>The two dimensions of measured inaccuracy — over age and criminal-record — are weakly correlated (Pearson correlation = 0.055). Prosecutors' prediction error is also largely orthogonal to their observable characteristics (Figure A.6(b)).

sentencing guidelines.

We then consider how prosecutors' estimated effects on incarceration and violent re-arrest from Equations 9 and 10 relate to their (in)accuracy:

$$\hat{\psi}_{p,\text{Incarceration}} = \delta + \alpha_{\text{Incarceration}} \text{Prediction Error}_p + u_p \quad (11)$$

$$\hat{\psi}_{p,\text{Violent Re-Arrest}} = \omega + \alpha_{\text{Violent Re-Arrest}} \text{Prediction Error}_p + v_p, \quad (12)$$

where we weight the regressions by prosecutors' caseloads, and block-bootstrap standard errors by prosecutor.

For the  $\alpha$  coefficients to capture the relationships between prosecutors' prediction (in)accuracy and their causal effects on case outcomes, cases must be as-good-as randomly assigned to prosecutors conditional on our controls. Reassuringly, 77 percent of surveyed prosecutors report that cases are assigned to equalize caseloads within their crime-unit. Empirically, we find that the observable characteristics of cases are well-balanced across more and less accurate prosecutors, conditional on our controls (Table 4).<sup>45</sup>

**Estimating the Gains of More Accurate Prosecutors.** Considering either incarceration or future violence in isolation may offer an incomplete picture of the impacts of greater accuracy. If we are interested in how much more accurate prosecutors *could* reduce violent re-arrest at a given incarceration rate, we may need to adjust for differences in incarceration rates between more and less accurate prosecutors. To do this, we estimate the average rate of substitution between incarceration and violent re-arrest ( $\hat{\Phi}$ ). As described below, we find  $\hat{\Phi} < 0$ , consistent with an incapacitation effect of prison. Second, we use this estimated substitution rate to compute each prosecutor's net impact on violent re-arrest after accounting for her expected impact solely due to her

<sup>45</sup>In Rows 7 and 8, we collapse the observable characteristics into the predicted likelihood of incarceration and violent re-arrest using a linear probability models that includes defendant race, ethnicity, gender, age, criminal-record prior points, arresting charge offense class, and whether the current charge is violent. We find that a one standard increase in misperceptions is associated with an insignificant 0.09 percentage point increase in the predicted likelihood of incarceration (95% CI = [-0.10, 0.28] in Column 2 Row 7) and an insignificant 0.06 percentage point increase in the predicted likelihood of violent re-arrest after release (95% CI = [-0.02, 0.15] in Row 8).

incarceration effect:

$$\psi_{\text{Net Violent Re-Arrest},p} = \hat{\psi}_{\text{Violent Re-Arrest},p} - \hat{\Phi}\hat{\psi}_{\text{Incarceration},p}. \quad (13)$$

With this estimate, a prosecutor gets less credit for reducing violent re-arrest if she achieves this at the expense of increasing incarceration. Conversely, a prosecutor gets more credit for reducing violent re-arrest if she also reduces incarceration. Put differently, this net-of-incarceration estimate eliminates the mechanical, incapacitation effect of incarceration on re-arrest.

We then evaluate the relationship between prosecutors' (in)accuracy and their net effects on violent re-arrest from Equation 13:

$$\hat{\psi}_{\text{Net Violent Re-Arrest},p} = \kappa + \alpha_{\text{Net Violent Re-Arrest}} \text{Prediction Error}_p + \nu_p, \quad (14)$$

where  $\hat{\alpha}_{\text{Net Violence}}$  captures the relationship between prosecutors' inaccuracy and their effects on social costs, measured in units of future violent crime. We block-bootstrap the standard errors to account for multiple sources of measurement error.

To estimate the average rate of substitution between incarceration and violent re-arrest ( $\hat{\Phi}$ ), we use two complementary designs, which are described in more detail in Appendix F. First, we replicate [Rose and Shem-Tov \(2021\)](#)'s design, which leverages discontinuities in incarceration rates induced by the state sentencing guidelines. Second, we estimate the extent to which prosecutors with higher incarceration rates tend to have lower violent re-arrest rates in their cases, using a split-sample, instrumental-variable design.<sup>46</sup> These approaches yield similar point estimates. The across-prosecutor design has more power, so it is our preferred approach.

<sup>46</sup>As described in Appendix F, this approach nets out the impact of finite-sample variation in prosecutors' caseloads, which could create spurious correlation in prosecutors' estimated effects on incarceration and re-arrest in a given sample.

**Tradeoffs with Disparities.** Finally, we investigate whether more accurate prosecutors reduce violent re-arrest at the cost of increasing racial disparities using:

$$\begin{aligned} \text{Incarceration}_i = & \alpha_{\text{Racial Disparity}} \text{Prediction Error}_p \times \text{Black}_i \\ & + \omega \text{Prediction Error}_p + \mu_{\text{Black}_i, u(i), s(p(i)), g(i)} + v_i, \end{aligned} \quad (15)$$

which fully interacts our office crime-unit controls with defendant race.

## V.C Results

Less accurate prosecutors have higher rates of violent re-arrest *and* higher rates of incarceration in their cases. Figures 6(a)-(b) shows this. On average, prosecutors who report one standard deviation less accurate predictions about violent re-arrest have 0.54 percentage points higher rates of violent re-arrest in their real-world cases (p-value = 0.018, Column 1 in Table 5(a)).<sup>47</sup> Compared to the average rate of violent re-arrest of 8.6 percent, this represents a 6.2 percent increase in violent re-arrest. Prosecutors who are one standard deviation less accurate also tend to increase incarceration rates by 0.96 percentage points (p-value = 0.051, Column 2). Compared to the average rate of incarceration of 22 percent, this represents a 4.5 percent increase in incarceration. Together, these results suggest that more accurate prosecutors lie on a better production possibility frontier between incarceration and future violent crime (Figure 6(c)).

Less accurate prosecutors would increase violent re-arrest rates by more if they did not also increase incarceration rates. The comparison between the upper grey dot and the green in Figure 6(c) illustrates this idea. On average, a one percentage point increase in a prosecutor's incarceration rate is associated with a 0.080 percentage point reduction in violent re-arrest (Column 3).<sup>48</sup> Thus, a 0.96 percentage point higher incarceration rate would mechanically reduce violent re-arrest by 0.078 percentage points

<sup>47</sup>This relationship is robust to alternative case controls, to controlling for other prosecutor characteristics (Table A.9), and to applying alternative sample restrictions (Table A.10).

<sup>48</sup>Table A.13 presents both stages of the instrumental-variables design. This table also shows that the patterns are qualitatively and quantitatively similar in the full sample and the survey sample, although less precisely estimated for the smaller survey subsample. We also find qualitatively similar estimates when we replicate (Rose and Shem-Tov, 2021)'s discontinuity design (Table A.12).

( $0.078 = 0.080 \times 0.96$ ). If we held incarceration rates constant, prosecutors who were one standard deviation less accurate would increase violent re-arrest rates by 0.61 percentage points (p-value = 0.013, Column 4) or 7.1 percent.<sup>49</sup>

We can also use the estimated rate of substitution between incarceration and re-arrest to assess how much inaccurate prosecutors would have to increase their incarceration rates to obtain the same rate of violent re-arrest as accurate prosecutors. This is illustrated by the comparison between the lower grey dot and the green dot in Figure 6(c). Inverting the estimate in Column 3, we find that prosecutors, on average, have to increase incarceration rates by 12.5 percentage points ( $= 1/0.080$ ) to reduce rates of violent re-arrest by one percentage point. Thus, to offset their 0.54 percentage point higher violent re-arrest rate, prosecutors who are one standard deviation less accurate would need to increase their incarceration rates by 6.8 percentage points ( $= 0.54 \times 11.8$ ) beyond their status-quo 0.96 percentage point difference in incarceration, which would produce a 7.6 percentage point gap (Column 5). Given the average incarceration rate of 22 percent, this amounts a 35 percent increase. This substantial increase in incarceration is necessary because increasing incarceration rates on its own is a blunt tool with which to reduce violent crime.

To make these comparisons more concrete, consider the effects of replacing a prosecutor in the bottom fifth of the accuracy distribution with a prosecutor from the top fifth (illustrated in the far rightmost and leftmost points in Figure 6). Such a substitution would reduce violent re-arrest rates by 8.5 percent (0.73 percentage points off a base of 8.6 percent). It would reduce incarceration rates by 5.4 percent (1.2 percentage points off a base of 22 percent). If incarceration were held fixed, this substitution would reduce violent re-arrest rates by 9.6 percent (or 0.83 percentage points). If we instead held violent rates of re-arrest constant, this substitution would reduce incarceration rates by 10.3 percentage points or 48 percent.

<sup>49</sup>This pattern is similar when accounting for incarceration length: less accurate prosecutors impose marginally longer incarceration sentences. Accounting for this difference suggests that a prosecutor who is one standard deviation less accurate would increase violent re-arrest by 6.8 percent holding incarceration lengths constant (Table A.11(a)).

We find a qualitatively similar although more muted pattern when we consider re-arrests for any new offense (rather than only violent offenses) in Table 5(b) and Figure A.8(b). After accounting for prosecutors' incarceration effects, one standard deviation less accurate prosecutors have 2.4 percent higher re-arrest rates.<sup>50</sup>

Taken together, these results suggest that the case outcomes of more accurate prosecutors lie on a better production possibility frontier between re-arrest and incarceration. More accurate prosecutors appear to selectively incarcerate defendants who would otherwise be more likely to commit violent crimes.

### V.C.1 Impact on Racial Disparities

Less accurate prosecutors increase incarceration rates both for Black and non-Black defendants: indeed, these effects are statistically indistinguishable (Table 6). Therefore, the gains of more accurate prosecutor do not come at the cost of increasing racial disparities in our context. This result holds in specifications using our sparser set of case controls (in the first three columns) and the more detailed set of controls (in the next three columns). These findings indicate that improving prosecutors' prediction skill — through training or recruitment and retention policies — may increase efficiency without necessarily exacerbating racial disparities.<sup>51</sup>

## VI Conclusion

A prosecutor's misperceptions about the predictors of violent re-arrest affect a defendant's sentence and a community's exposure to violent crime. We administer an original survey to directly measure prosecutors' misperceptions. We then link prosecutors' survey responses to their real-world cases to investigate the implications of these mis-

<sup>50</sup>This result is similar after accounting for prosecutors' incarceration lengths rather than their incarceration rates (Column 4 of Table A.11(b)).

<sup>51</sup>The effects of training prosecutors about the predictors of violent re-arrest would likely be context dependent. In our setting, for example, training prosecutors that criminal records are less predictive than many believe would tend to reduce racial disparities since Black defendants have longer criminal records than non-Black defendants. By contrast, training prosecutors about the power of age-out could increase racial disparities since Black defendants tend to be younger.

perceptions for incarceration and violent re-arrest.

In the first part of the paper, we find that prosecutors' misperceptions about violent re-arrest drive 22 percent of the incarceration gap between older and younger defendants and 4 percent of the incarceration gap between defendants with long and short criminal records. These results have two policy implications. First, correcting prosecutors' misperceptions would change the burden of incarceration across groups of defendants. Second, prediction tools that *only* consider defendants' predicted risk fail to account for prosecutors' other, potentially competing objectives at sentencing. Although our findings suggest that perceived risk is an important factor in prosecutors' decisions, we find that other objectives — such as extending second chances to young defendants — also play a substantial role. Black-box prediction tools may make it difficult for decision-makers to assess whether algorithmic recommendations are based on factors like age that directly conflict with other sentencing objectives (Stevenson and Slobogin, 2018).

In the second part of our paper, we find that prosecutors with more accurate beliefs operate on a better frontier between incarceration and violent re-arrest: prosecutors whose beliefs are one standard deviation more accurate than the mean reduce rates of violent re-arrest by 7.1 percent at a given incarceration rate. Our findings suggest that recruiting and retaining more accurate prosecutors could reduce violent crime without increasing either incarceration rates or racial disparities in incarceration.

Our paper analyzes the role of misperceptions about future violence in prosecutors' decision-making. Diagnosing how prosecutors form these beliefs would be a fruitful next step. This may be especially important since mistaken beliefs could be both a cause and effect of institutionalized processes, including sentencing laws.



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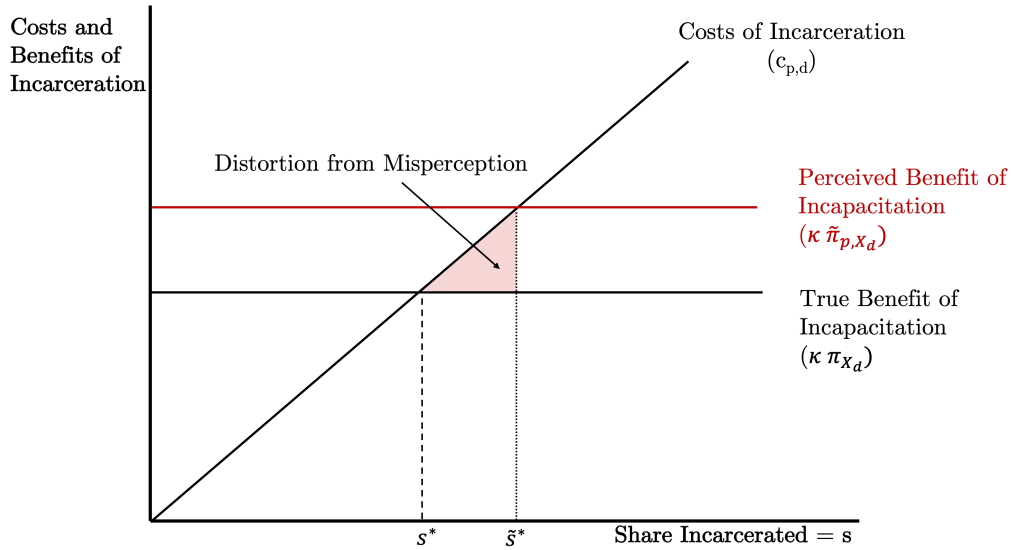
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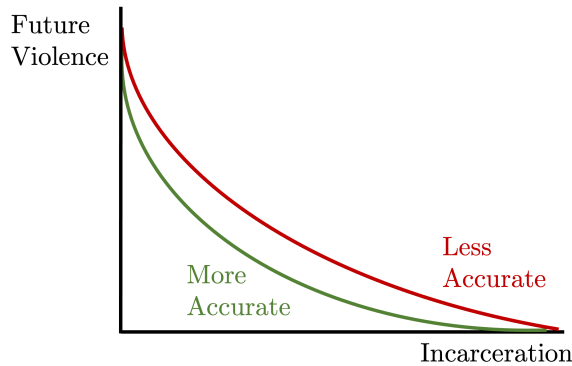
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**Figure 1: Illustrating the Prosecutor’s Decision Problem**

**(a) Distortion from Overestimating a Group’s Likelihood of Future Violence**



**(b) Accuracy Determines Possibility Frontier between Incarceration & Future Violence**

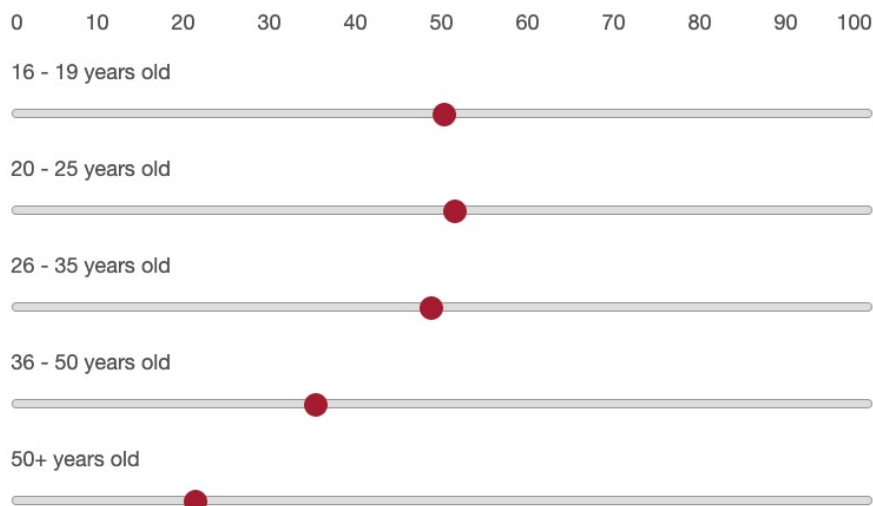


*Notes:* This figure considers the tradeoff between the cost of incarceration and the benefit of incapacitation — i.e., the fact that defendants cannot commit crimes in the community when they are incarcerated. Panel (a) considers the ramifications of misperceiving the likelihood of future violence for a particular group of defendants. The prosecutor incarcerates everyone for whom the costs of incarceration ( $c_{p,d}$ ) are lower than the perceived benefits of incapacitation, which depends on the loss from a violent crime ( $\kappa$ ) and its perceived likelihood for defendants with observables  $X_d$  ( $\tilde{\pi}_{p,X_d}$ ). Overestimating the likelihood of future violence — and thus the benefits of incapacitation — causes the prosecutor to incarcerate defendants whom she would otherwise release, leading to the distortion in incarceration in the red triangle. Panel (b) compares the tradeoffs between incarceration and future violence faced by prosecutors with more or less accurate beliefs. Due to the incapacitation effect, both prosecutors face a tradeoff. However, the more accurate prosecutor would first incarcerate defendants who would be more likely to commit violent crimes if released, leading to a steeper initial decline in future violence. As a result of selectively incarcerating defendants who are more likely to re-offend, the more accurate prosecutor can operate on a better frontier, achieving lower rates of future violence in their cases at any given incarceration rate.

**Figure 2: Eliciting Prosecutors' Beliefs about Violent Re-Arrest**

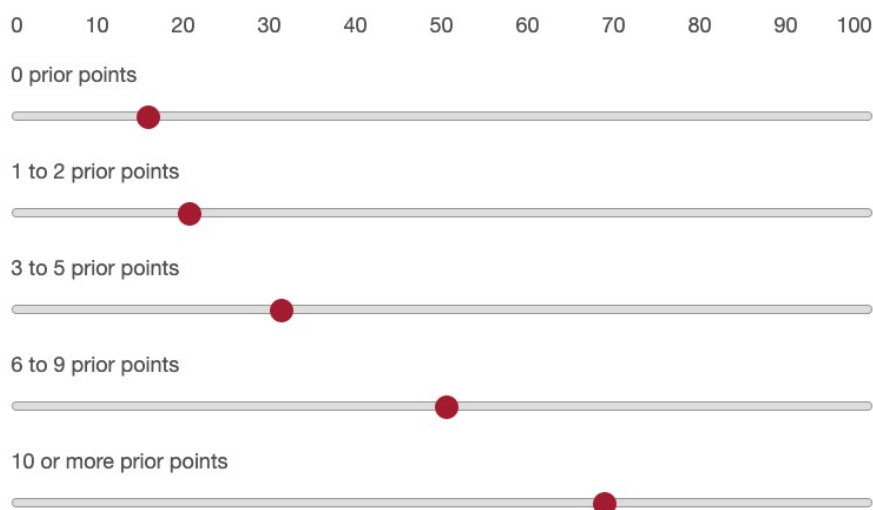
**Panel (a): By Defendant Age**

Suppose a defendant in your district were incarcerated for a year. For each of the following age ranges, what do you think the percent chance is that the defendant would be arrested for a serious offense within 5 years of their release?



**Panel (b): By Defendant Criminal Record**

Suppose a defendant in your district were incarcerated for a year. For each of the following prior point ranges, what do you think the percent chance is that this defendant would be arrested for a serious offense within 5 years of their release?

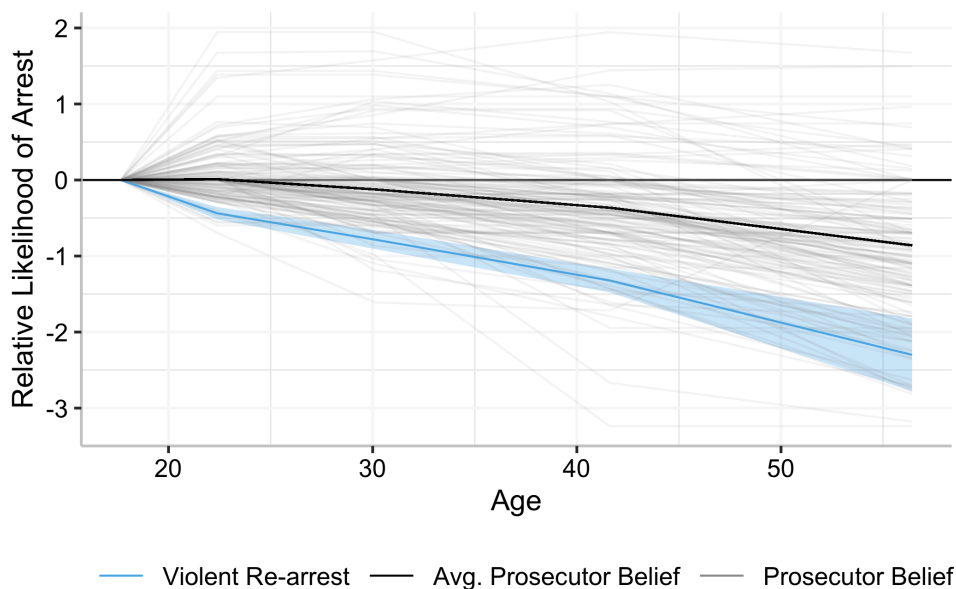


● Median Prosecutor Response

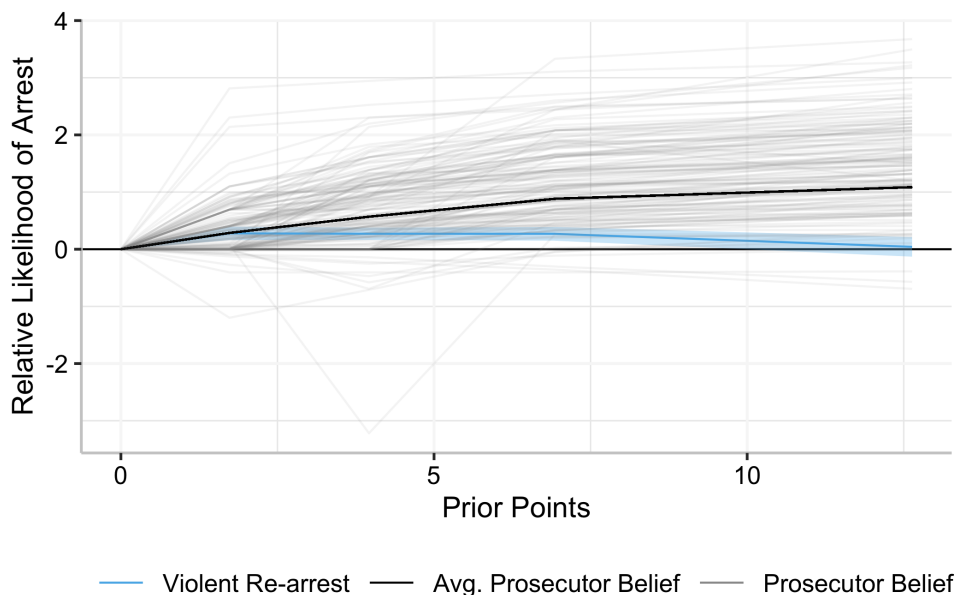
*Notes:* This image shows the interface that prosecutors used to report their beliefs about how rates of violent re-arrest varied with (a) defendant age and (b) prior criminal record. The red sliders display the median prosecutor response for each group. Prior points summarize criminal record according to North Carolina's statutory formula. The groupings are based on the thresholds used by the state sentencing laws.

**Figure 3: Prosecutors' Systematic Prediction Mistakes**

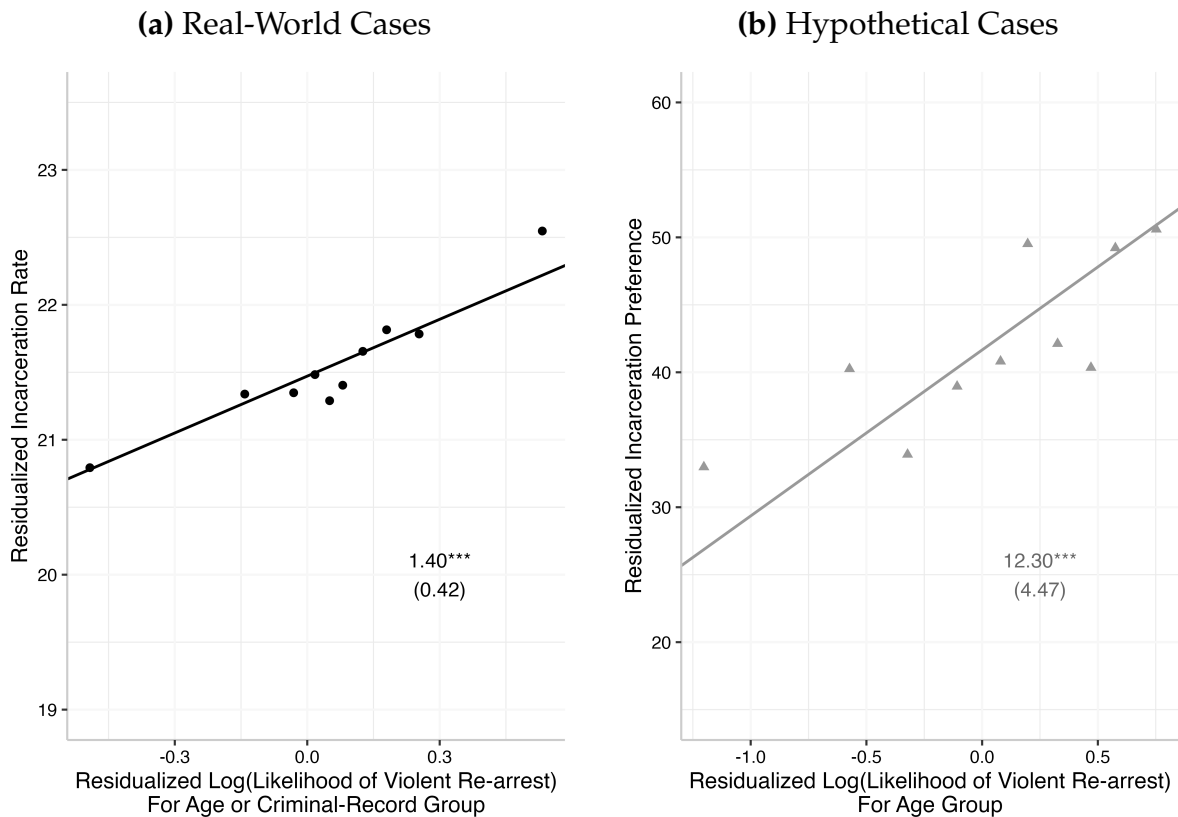
**(a) Beliefs about Age**



**(b) Beliefs about Criminal Record**



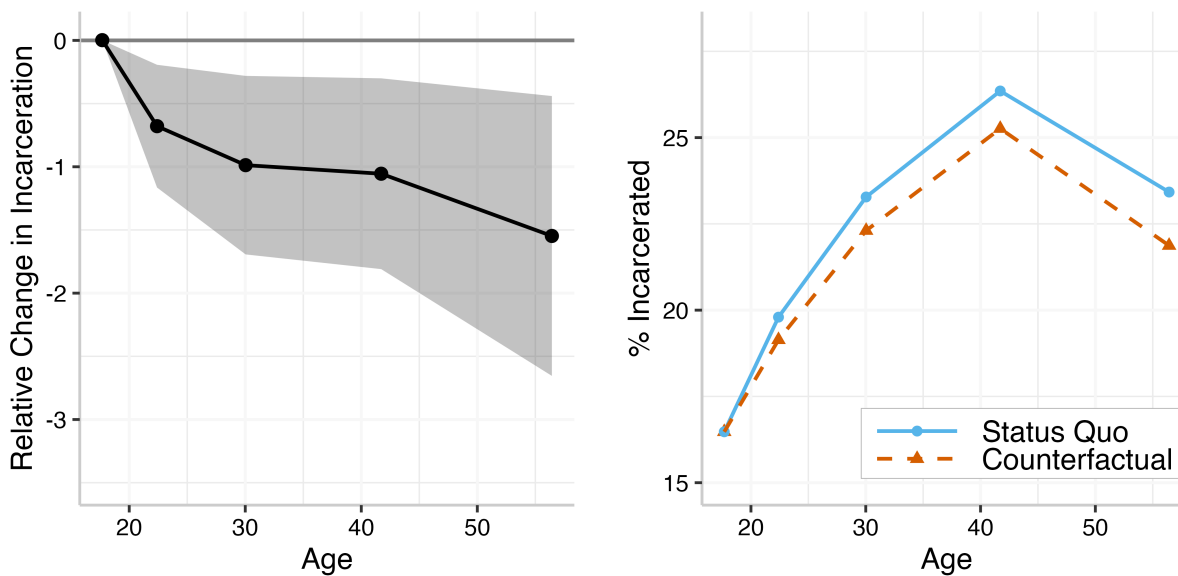
*Notes:* This figure illustrates prosecutors' beliefs about how violent re-arrest varies with defendant age and criminal record. The survey asked prosecutors to predict the rate of violent re-arrest for defendants of different ages — 16–19, 20–25, 26–35, 36–50, and over 50 — and different criminal-record categories — 0, 1–2, 3–5, 6–9, or 10 or more points, where a misdemeanor adds one point and felonies add between two and nine points, depending on their severity. The panels show prosecutors' reported beliefs relative to a baseline reference group – defendants aged 16–19 in panel (a) and defendants with no criminal record in panel (b). Each grey line corresponds to a belief profile from a single prosecutor, with 161 responses for age and 159 responses for criminal record. The black lines summarize the average belief across all prosecutors. The blue lines show the true empirical relationships, with the shaded areas representing 95% confidence intervals.

**Figure 4: Prosecutors' Re-Arrest Beliefs and Incarceration Outcomes**

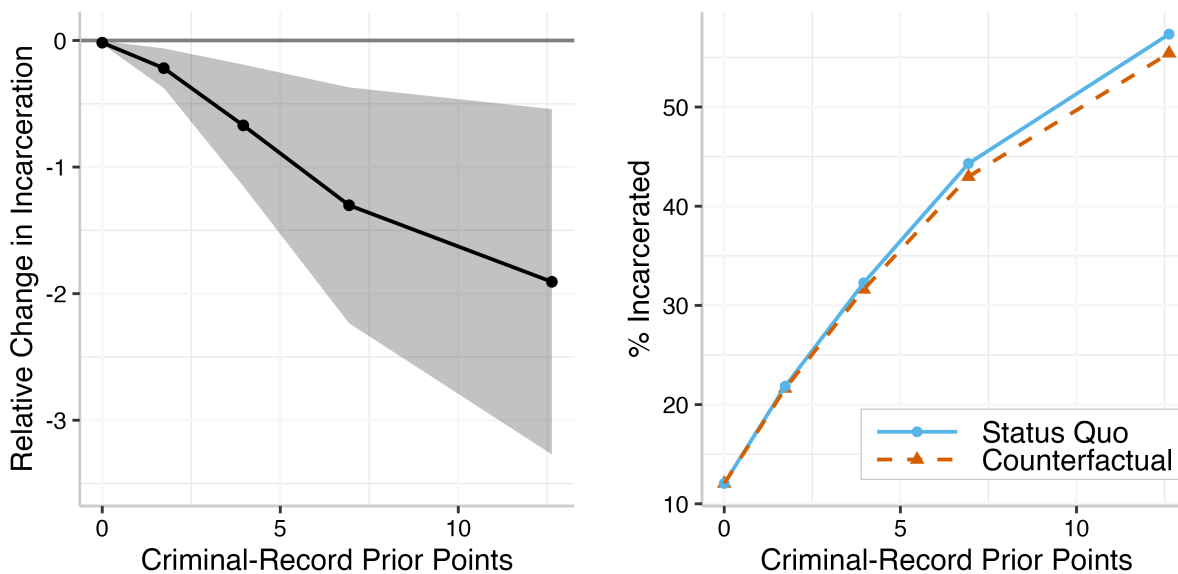
*Notes:* This figure illustrates the relationship between prosecutors' beliefs about re-arrest and the incarceration outcomes in their cases. Panel (a) considers each prosecutor's real-world court cases. Panel (b) considers the hypothetical cases in the survey. In Panel (a), the binscatter residualizes by prosecutor, group-by-office fixed effects, and sentencing guideline controls (Column 4 in Table 3). The x-axis represents the prosecutor's beliefs about the log likelihood of violent re-arrest for defendants in a given age- or criminal-record group relative to other groups. The y-axis represents the incarceration rate for that group of defendants in the prosecutor's caseload. The fit line and annotated coefficient come from estimating Equation 4. This plot is based on 162 prosecutors who handled 104,039 felony cases in our sample between 1995 and 2019. In Panel (b), the binscatter residualizes by prosecutor, vignette, and age fixed effects (Column 1 in Table A.7). The y-axis represents the residualized rate at which prosecutors say that they would press for an incarceration sentence in their plea deal in a hypothetical case. This plot is based on 183 prosecutors who responded to 725 hypothetical assault cases: results are similar when limiting to prosecutors who linked to the court records (Column 2 in Table A.7). The means are added back to the residuals for ease of interpretation. Standard errors are clustered by prosecutor. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

**Figure 5: Counterfactual Incarceration Profiles Under Accurate Beliefs**

**Panel (a): Defendant Age**



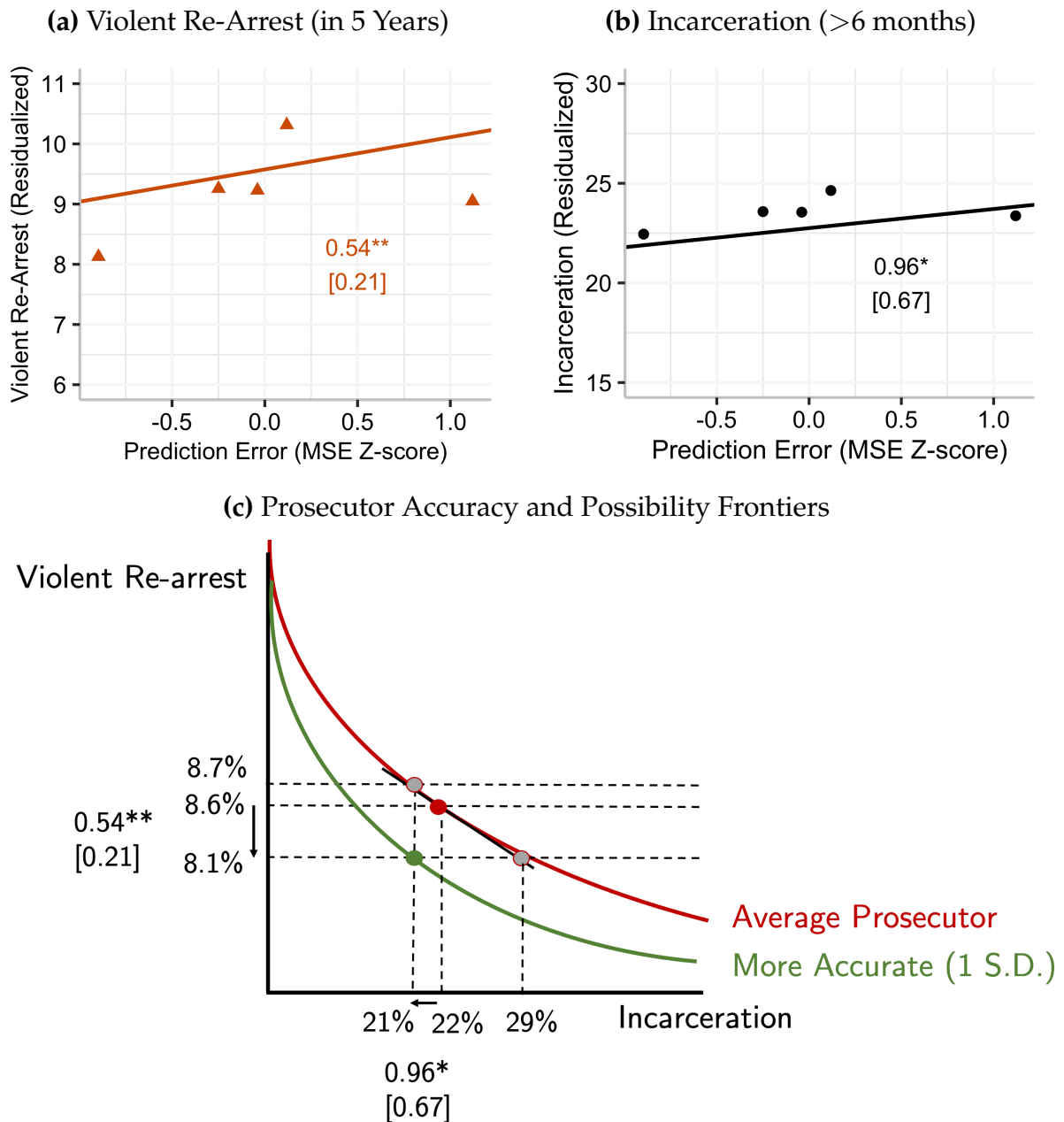
**Panel (b): Criminal-Record Prior Points**



*Notes:* This figure plots the effects of correcting prosecutors' misperceptions on incarceration rates for different groups of defendants. Panel (a) considers defendant age; Panel (b), criminal record. In each panel, the left plot considers the change in incarceration rates relative to the reference group of 16–19 year-olds or defendants with no criminal records. The right plot considers the status quo and counterfactual incarceration profiles assuming incarceration rates of the reference group remain fixed (Figure A.7 illustrates counterfactuals under alternative assumptions). The 95 percent confidence intervals in the left plots reflect the uncertainty in estimating the link between prosecutors' beliefs about re-arrest and their incarceration choices, with standard errors clustered by prosecutor.



**Figure 6: Prosecutors' Prediction Error & Possibility Frontiers**



Notes: This figure presents the relationships between a prosecutor's prediction error on the survey and the (a) violent re-arrest and (b) incarceration outcomes in her court cases. In Panels (a)-(b), the x-axis plots the normalized, mean squared error (MSE) of prosecutors' beliefs about how the likelihoods of violent re-arrest varies by defendant age and prior criminal-record category (Equation 8). The y-axis plots prosecutors' estimated effects on case outcomes, conditional on prosecutors' office crime-unit, tenure, and the sentencing guideline's recommended punishment (Equation 10). The linear fit and annotated coefficients come from Equation 12. Panel (c) plots these results on a production possibility frontier that compares the average prosecutor to a prosecutor who is one standard deviation more accurate, using Equation 13 to approximate the average gradient between incarceration and violent re-arrest. The sample is limited to cases disposed before 2015 to allow for five years of post-disposition data to observe re-arrest. Standard errors are block-bootstrapped by prosecutor. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

## VII Tables

**Table 1: Summary Statistics: Survey Representativeness**

	All Years (1995-2019)			Most Recent Year (2019)		
	(1)	(2)	(3)	(4)	(5)	(6)
<b>Prosecutor Demographics</b>						
% Registered Democrat	37.4	42.5	43.8	28.6	33.8	35.1
% Black Prosecutor	9.2	10.7	6.5	8.8	11.7	9.0
% Female Prosecutor	37.6	34.2	29.5	44.5	43.8	40.7
Prosecutor Age (in Years)	39.3	38.2	37.1	41.9	41.3	41.7
Prosecutor Tenure (in Years)	7.6	7.7	9.6	10.6	10.8	11.0
<b>Jurisdiction Characteristics</b>						
% Elected Prosecutor Democrat	67.5	81.1	79.3	53.9	76.6	75.9
% County Voters Reg. Democrat	37.8	41.2	41.3	36.4	40.0	40.2
% Urban (2010 Census)	55.6	62.3	63.4	53.5	59.9	61.8
<b>Sentencing Outcomes</b>						
% Incarcerated (> 6mo)	23.9	24.0	21.4	20.3	19.5	18.6
Incarceration Months	6.9	6.9	5.8	5.8	5.3	5.1
Incar. Months   Any Incar.	16.1	15.9	14.1	15.4	15.2	14.9
Pre-Trial Detention Months	1.5	1.5	1.5	1.8	1.7	1.5
% Trial	2.4	2.5	2.1	2.0	2.0	2.1
<b>Re-Arrest Outcomes</b>						
% Any Re-Arrest in 5 Years	31.0	32.0	33.2	–	–	–
% Violent Re-Arrest in 5 Years	7.7	8.3	8.6	–	–	–
<b>Case Characteristics</b>						
% Black Defendant	54.4	62.5	62.3	47.6	57.1	57.9
% Hispanic Defendant	5.5	5.6	6.0	6.6	7.1	7.7
% Female Defendant	17.4	16.5	17.3	20.8	19.1	19.2
Defendant Age (in Years)	29.9	29.7	30.0	32.5	31.9	31.8
Criminal-Record Prior Points	1.8	1.8	2.1	2.7	2.8	2.8
Offense Class (I = 1 to C = 7)	2.6	2.7	2.6	2.7	2.7	2.7
% Violent Arresting Charge	20.3	21.1	20.6	20.7	22.7	21.6
# Cases	744,560	397,681	104,039	35,900	18,249	9,087
# Prosecutors	2,375	855	162	846	437	145
# Offices	39	16	20	39	16	19
<b>Participating Offices</b>		✓			✓	
<b>Participating Prosecutors</b>			✓			✓

*Notes:* This table describes our sample. Column 1 includes all cases in North Carolina between 1995 and 2019, except murder, rape, driving while under the influence, and drug trafficking offenses. Column 2 includes cases handled by one of the sixteen offices that participated in our 2020 survey of North Carolina prosecutors. Column 3 includes the cases handled by surveyed prosecutors, who worked in a participating office in 2020 but may have previously worked in a different office. Columns 4–6 repeat these statistics limiting to cases in 2019.

**Table 2:** Balance in Case Characteristics by Re-Arrest Beliefs

	Mean	Log(Likelihood of Violent Re-arrest)		
		By Age	By Record	Stacked
% Black	62.27	1.70** (0.83)	0.52 (0.73)	1.03* (0.57)
% Hispanic	6.03	0.11 (0.32)	0.36 (0.34)	0.25 (0.23)
% Female	17.26	-0.48 (0.44)	0.27 (0.34)	-0.05 (0.30)
Age (Years)	29.99	–	-0.13 (0.19)	-0.08 (0.11)
% Violent Arrest	20.60	-0.85 (0.89)	0.30 (0.77)	-0.20 (0.61)
Criminal Record Prior Points	2.11	0.11 (0.09)	–	0.05 (0.04)
Offense Class (I=1 to C=7)	6.62	-0.02 (0.03)	0.02 (0.03)	0.01 (0.02)
100 · Pr(Incarcerated >6mo   X)	25.80	0.23 (0.45)	0.07 (0.24)	0.14 (0.25)
100 · Pr(Violent Re-arrest   X)	10.20	0.07 (0.09)	0.03 (0.13)	0.05 (0.08)
# Observations	104,039	103,167	103,349	206,516
# Prosecutors	162	161	159	162

*Notes:* This table tests the balance of defendant characteristics across prosecutors with different beliefs about the relative likelihood of violent re-arrest for defendants in that group. Column 1 presents means for all cases handled by surveyed prosecutors. Column 2 considers the relationship between prosecutors' beliefs about re-arrest in an age-group and the case's observable characteristics. Each coefficient comes from a separate regression of the dependent variable on prosecutors' beliefs, conditional on prosecutor and age-by-office fixed effects (Equation 2). The third column considers the analogue for criminal-record categories (Equation 3). The fourth column stacks these specifications (Equation 4). Standard errors are clustered by prosecutor. Offense class summarises the severity of the arresting charge for sentencing under the state sentencing guidelines. The final two rows collapse the observable characteristics into the predicted likelihood of incarceration and violent re-arrest using linear probability models that include the other observables in the table. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

**Table 3: Prosecutors' Re-Arrest Beliefs and the Incarceration Outcomes in their Cases**

	% Incarcerated ( $\geq 6$ mo)					
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Likelihood of Re-arrest by Age)	0.99* (0.56)					
Log(Likelihood of Re-arrest by Criminal Record)		1.85** (0.83)				
Log(Likelihood of Violent Re-arrest)			1.48*** (0.50)	1.40*** (0.42)	1.41*** (0.42)	1.43*** (0.42)
Dependent Mean	21.46	21.48	21.47	21.47	21.47	21.47
Percentage Effect	4.60% (2.60)	8.63% (3.86)	6.91% (2.33)	6.54% (1.97)	6.55% (1.96)	6.67% (1.95)
Std. in Beliefs	0.25	0.29	0.27	0.27	0.27	0.27
Percentage Effect of Std. Change in Beliefs	1.14% (0.65)	2.48% (1.11)	1.86% (0.63)	1.76% (0.53)	1.76% (0.53)	1.79% (0.52)
Prosecutor FE	✓	✓	✓	✓	✓	✓
Office x Group FE	✓	✓	✓	✓	✓	✓
Sentencing Guidelines FE				✓	✓	✓
Demographics					✓	✓
Charge FE						✓
# Observations	103,167	103,349	206,516	206,516	206,516	206,516
# Cases	103,167	103,349	104,039	104,039	104,039	104,039
# Prosecutors	161	159	162	162	162	162
R <sup>2</sup>	0.05	0.15	0.10	0.25	0.26	0.28
Adjusted R <sup>2</sup>	0.04	0.14	0.09	0.24	0.24	0.26

*Notes:* This table shows the relationship between prosecutors' beliefs about re-arrest and the incarceration outcomes of their cases between 1995 and 2019 in North Carolina Superior Court. Column 1 considers the relationship between a prosecutor's belief about the re-arrest likelihood of defendants in a given age-group and the incarceration outcomes of defendants in that age-group in the prosecutor's cases (as in Equation 2). Column 2 considers the analogue for criminal-record categories (Equation 3). Column 3 stacks these specifications (Equation 4). Column 4 introduces fixed effects for where defendants started in the state's sentencing guidelines based on the severity of their criminal records (summarised by criminal-record prior points) and of their arresting charge (summarised by offense class). Column 5 introduces demographic controls (for defendant race, gender, and age). Column 6 includes fixed effects for the defendant's lead arresting charge (with the highest offense class or, if there are ties, the highest incarceration rate). The standard deviation of each belief residualizes by prosecutor and office-by-group effects to consider the conditional variation in beliefs. Standard errors are clustered by prosecutor. Tables A.4 and A.5 separately show robustness for beliefs about age-groups and criminal-record categories. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

**Table 4:** Balance in Case Characteristics by Prediction Error

	Mean	Prediction Mistakes (MSE)	
% Black	61.88	0.28 (0.32)	0.20 (0.36)
% Hispanic	6.11	-0.11 (0.15)	-0.059 (0.14)
% Female	17.19	-0.32 (0.24)	-0.33 (0.26)
Age (Years)	30.04	-0.01 (0.10)	-0.02 (0.08)
Criminal Record Prior Points	2.11	0.029 (0.031)	–
Offense Class (I=1 to C=7)	6.64	-0.012 (0.008)	–
100 · Pr(Incarcerated >6mo   X)	NA	0.089 (0.098)	0.030 (0.037)
100 · Pr(Violent Re-arrest   X)	NA	0.063 (0.044)	0.033 (0.042)
Detailed Severity Controls			✓
# Observations	102,477	102,477	102,477
# Prosecutors	158	158	158

*Notes:* This table tests the balance of defendant characteristics across prosecutors who differed in the mean-squared error of their predictions on the survey (Equation 8). Column 1 presents dependent means. Each coefficient in Columns 2 and 3 comes from a separate regression of the dependent variable on prosecutors' prediction error, conditional on the office crime-unit, prosecutor seniority, and case severity. Column 2 summarizes the severity of the case using the recommended guidelines punishment (probation, prison, or either one). Column 3 uses more detailed controls for the defendant's arresting charge offense class and criminal-record prior points under the guidelines. Standard errors are clustered by prosecutor. The final two rows collapse the observable characteristics into the predicted likelihood of incarceration and violent re-arrest using linear probability models that include the other observables in the table. This table includes all the cases of prosecutors who answered the two survey questions about re-arrest by defendant age and by defendant criminal history. Results are similar if we limit the cases to those where re-arrest outcomes can be observed (excluding those in the last three of five years of the sample). \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

**Table 5: Prosecutors' Prediction Error and Re-Arrest Outcomes**

Panel (a): Violent Re-Arrest					
	Violent Re-Arrest	% Incarcerated (≥6mo)	Violent Re-Arrest	Net Violent Re-Arrest	Incarcerated Holding Fixed Violent Re-Arrest
Prosecutor Prediction Error (MSE Z-Score)	0.54** [0.037, 0.87] [0.21] (0.15)	0.96* [-0.26, 2.39] [0.67] (0.48)		0.61** [0.10, 0.99] [0.22]	7.64** [1.51, 14.47] [3.28]
Instrumented Incarceration, $\tilde{\psi}_{p, \text{Incarceration}}$			-0.080*** [-0.12, -0.051] [0.017]		
Dependent Mean	8.62	21.55	7.70	8.62	21.55
Percentage Effect	6.22% [2.38]	4.45% [3.10]	-1.04% [0.22]	7.11% [2.53]	35.45% [15.20]
Panel (b): Any Re-Arrest					
	Any Re-Arrest	% Incarcerated (≥6mo)	Any Re-Arrest	Net Any Re-Arrest	Incarcerated Holding Fixed Any Re-Arrest
Prosecutor Prediction Error (MSE Z-Score)	0.65 [-0.50, 2.22] [0.68] (0.41)	0.96* [-0.26, 2.39] [0.67] (0.48)		0.80* [-0.34, 2.49] [0.70]	4.89* [-1.91, 17.14] [4.59]
Instrumented Incarceration, $\tilde{\psi}_{p, \text{Incarceration}}$			-0.16*** [-0.24, -0.100] [0.036]		
Dependent Mean	33.18	21.55	31.01	33.18	21.55
Percentage Effect	1.95% [2.04]	4.45% [3.10]	-0.53% [0.12]	2.43% [2.11]	20.49% [19.24]
# Prosecutors	110	110	2,129	110	110
# Cases	65,995	65,995	744,560	65,995	65,995

*Notes:* This table analyzes the relationship between a prosecutor's prediction error on the survey (using Equation 8) and her effects on re-arrest in her real-world cases. Panel (a) considers violent re-arrest (felony assault, murder, manslaughter, serious sex offenses, robbery, burglary, kidnapping, and arson). Panel (b) considers any arrest for new felonies. Re-arrest is measured in the five years after disposition, so the sample is limited to cases disposed before 2015 to allow for five full years of post-disposition data to observe re-arrest. Column 1 shows the relationship between a prosecutor's prediction error and her total impact on re-arrest (Equation 12): these estimated re-arrest effects condition on the office crime-unit, the prosecutor's seniority, and the case's severity (using the arresting charge's offense class and the defendant's criminal-record prior points). Column 2 shows the analogue for incarceration (Equation 11). Column 3 and 4 aim to evaluate a prosecutor's re-arrest effect net of her impact on incarceration. Column 3 presents the average relationship between a prosecutor's incarceration and re-arrest effect estimated in independent samples (Equation 17). Similar results are obtained replicating [Rose and Shem-Tov \(2021\)](#)'s discontinuity design (see Appendix F). Column 4 uses the estimate in Column 3 to evaluate the relationship between a prosecutor's prediction error and her effect on re-arrest net of her effect on incarceration (Equation 14). Column 5 instead uses this estimate to evaluate how much less accurate prosecutors would have to increase their incarceration rates to hold re-arrest rates constant. The bracketed ranges represent 95% confidence intervals from the 1,000 bootstrap replications. Block-bootstrapped standard errors that sample by prosecutors are also in brackets. Analytical standard errors that cluster by prosecutors are in parentheses. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

**Table 6:** Prosecutors' Prediction Error and Impact on Racial Disparities in Incarceration

	(1)	(2)	(3)	(4)	(5)	(6)
	<b>Percent Incarcerated (<math>\geq</math> 6mos)</b>					
	Black	Non-Black	All	Black	Non-Black	All
Prosecutor Prediction Error (Z)	1.06** (0.51)	0.80 (0.57)	0.80 (0.56)	0.90* (0.53)	1.09** (0.53)	1.09** (0.52)
Prosecutor Prediction Error (Z) x Black			0.26 (0.43)			-0.19 (0.50)
Dependent Mean	23.44	18.43	21.55	23.44	18.43	21.55
Prediction Error in Percentage Terms	4.51% (2.17)	4.33% (3.10)	3.71% (2.59)	3.85% (2.28)	5.91% (2.88)	5.06% (2.41)
Prediction Error x Black in Percentage Terms	- -	- -	1.20% (2.01)	- -	- -	-0.87% (2.30)
Detailed Case Controls				✓	✓	✓
# Prosecutors	158	158	158	158	158	158
# Cases	63,856	38,621	102,477	63,856	38,621	102,477
R <sup>2</sup>	0.30	0.36	0.32	0.50	0.57	0.53
Adjusted R <sup>2</sup>	0.19	0.20	0.19	0.30	0.36	0.32

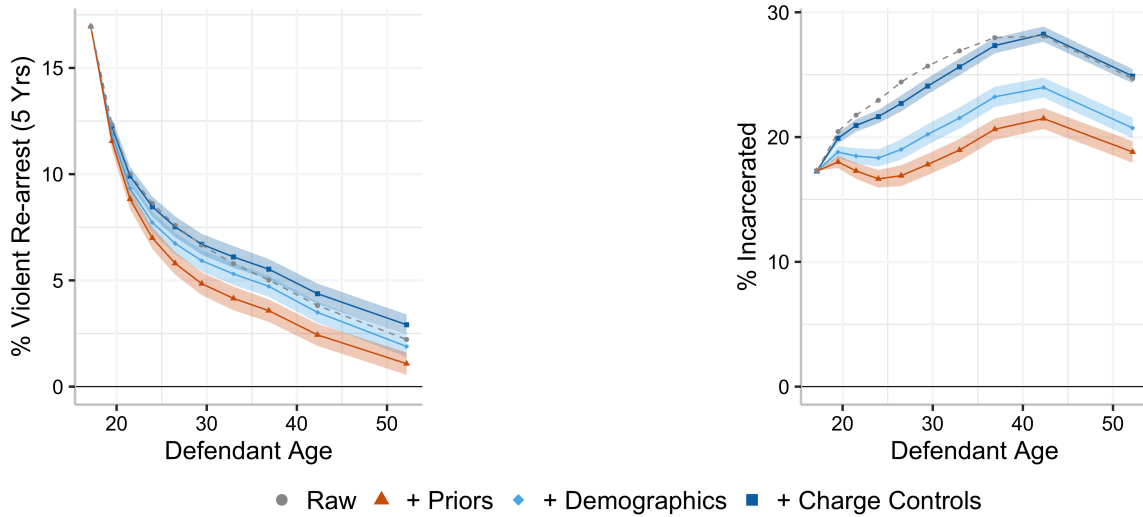
*Notes:* This table investigates how prosecutors' prediction (in)accuracy translates into incarceration rates for Black and non-Black defendants. Each column estimates Equation 15, controlling for office crime-unit, prosecutor seniority, and case-severity controls. The first three columns include case-severity controls for whether the sentencing guidelines prescribe probation, prison, or either. The next three columns control for the ingredients of the sentencing guidelines: prior criminal record points and arresting charge offense class. Standard errors are clustered by prosecutor. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

## Appendices

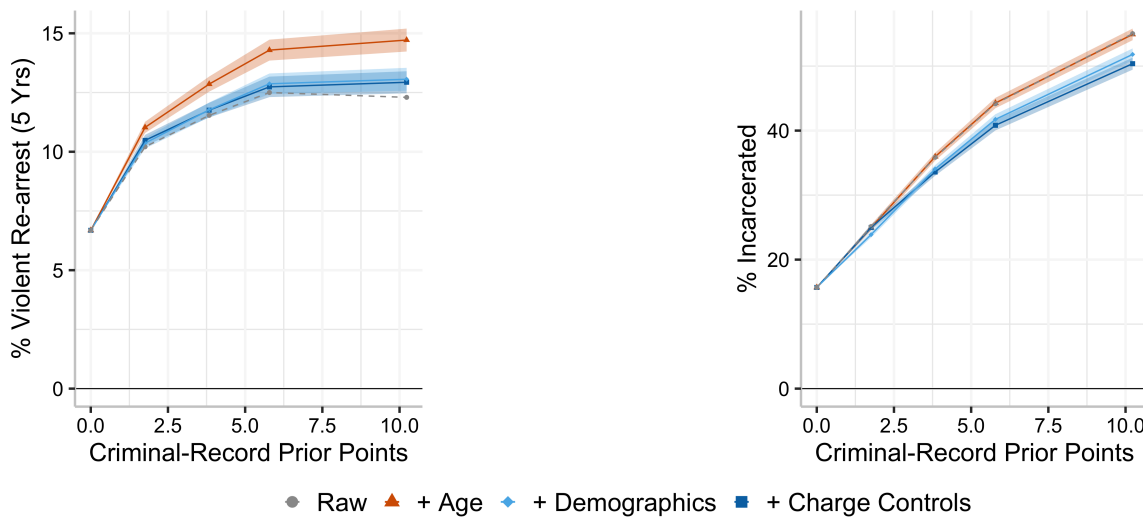
### A Supplementary Figures

**Figure A.1:** Predictors of Violent Re-Arrest and Incarceration Conditional on Defendant and Case Characteristics

**Panel (a):** Defendant Age

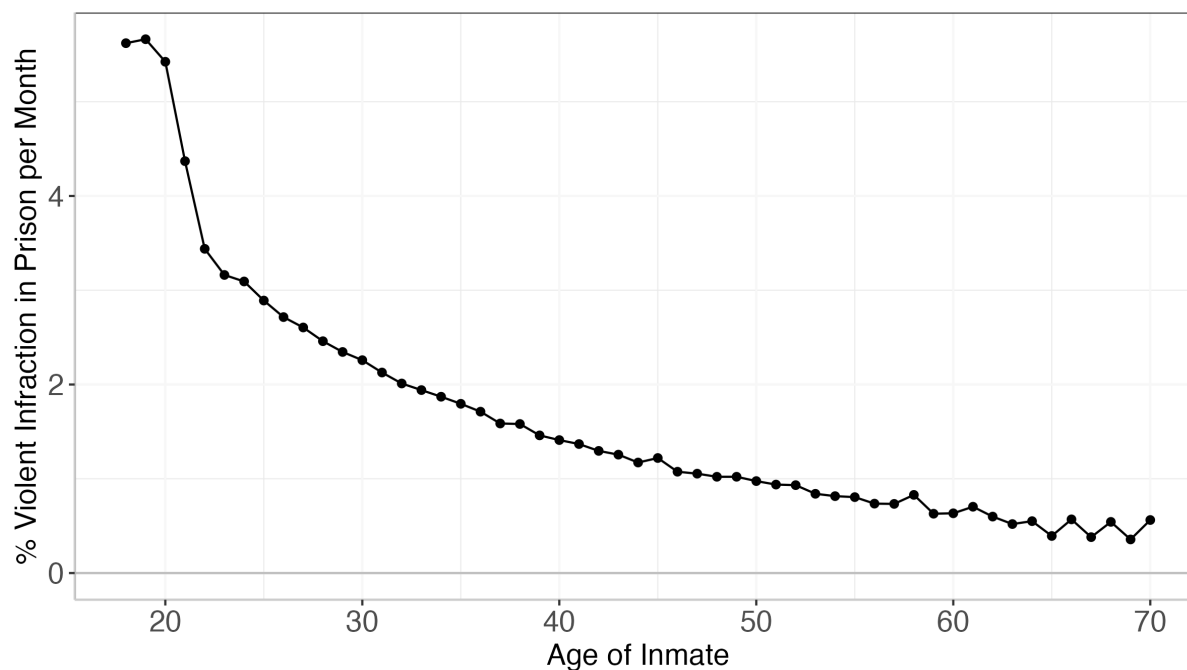


**Panel (b):** Criminal-Record Prior Points

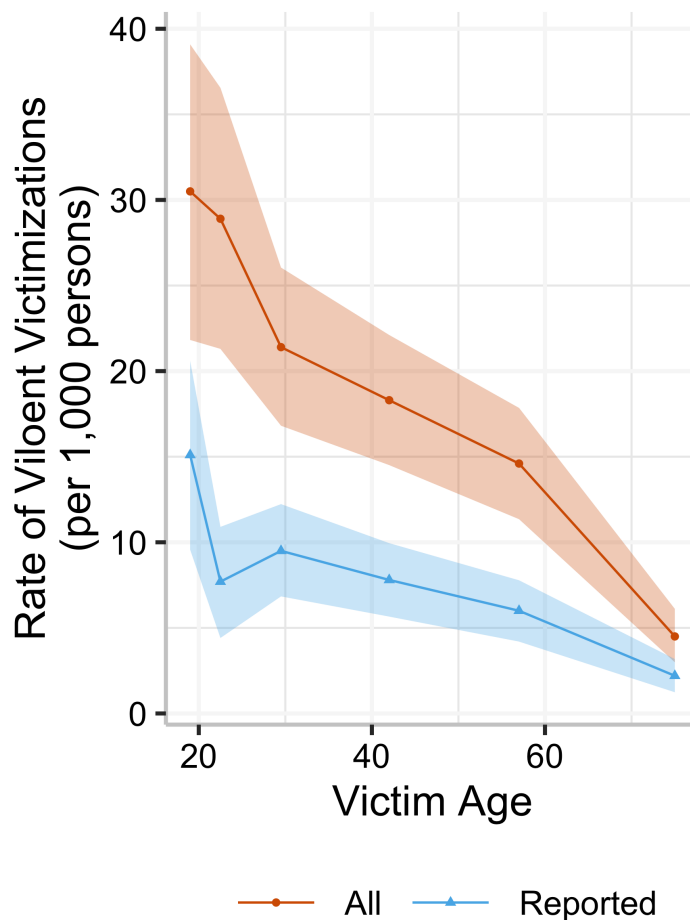


*Notes:* This figure plots violent re-arrest and incarceration rates by (a) age and (b) criminal record. Demographics include gender, race, and ethnicity. Charge refers to the lead arresting charge. Each set of controls is cumulatively added to the preceding controls. All relationships are normalized to the average value observed in the raw data for defendants in the lowest decile of age (Panel a) or criminal-record prior points (Panel b). The shaded areas represent 95% confidence intervals for comparing to the normalized baseline. Standard errors are clustered by prosecutor.



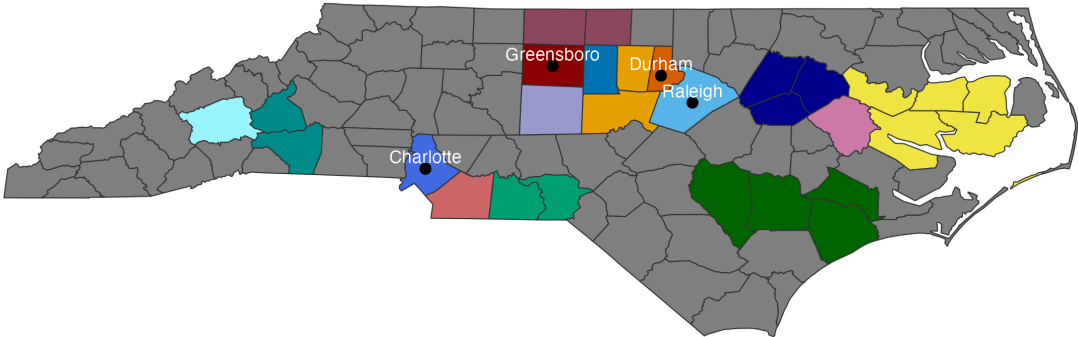
**Figure A.2: Violent Disciplinary Infractions in Prison**

*Notes:* This figure plots violent disciplinary infraction in prison by inmate age. The data comes from the North Carolina Department of Corrections. The percent of violent infractions committed by each age group in a typical month between 1995 to 2019 is shown. Violent infractions are defined as cases of sexual acts, assaults, threats, fighting, or possessing/using a weapon.

**Figure A.3: Violent Victimization and Victim Age**

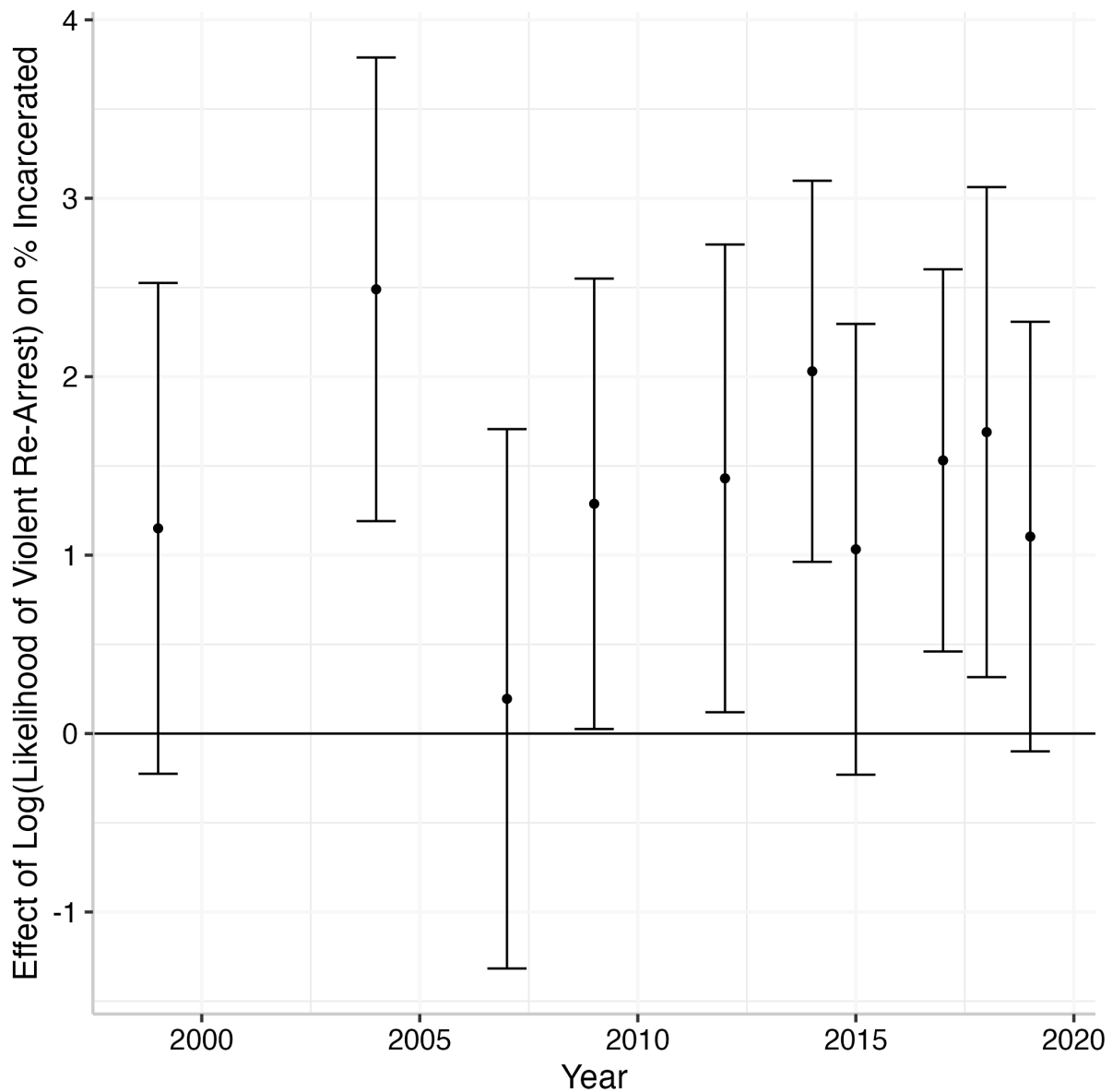
*Notes:* This figure plots violent victimization rates by victim age. The data comes from the 2020 National Crime Victimization Survey (Bureau of Justice Statistics, 2020). Rates are shown for all victimization incidents (red) and for those that were reported to police (blue). Violent victimization is defined as cases of rape/sexual assault, robbery, aggravated assault, and simple assault. The shaded areas represent 95% confidence intervals.

**Figure A.4:** Map of Participating Offices



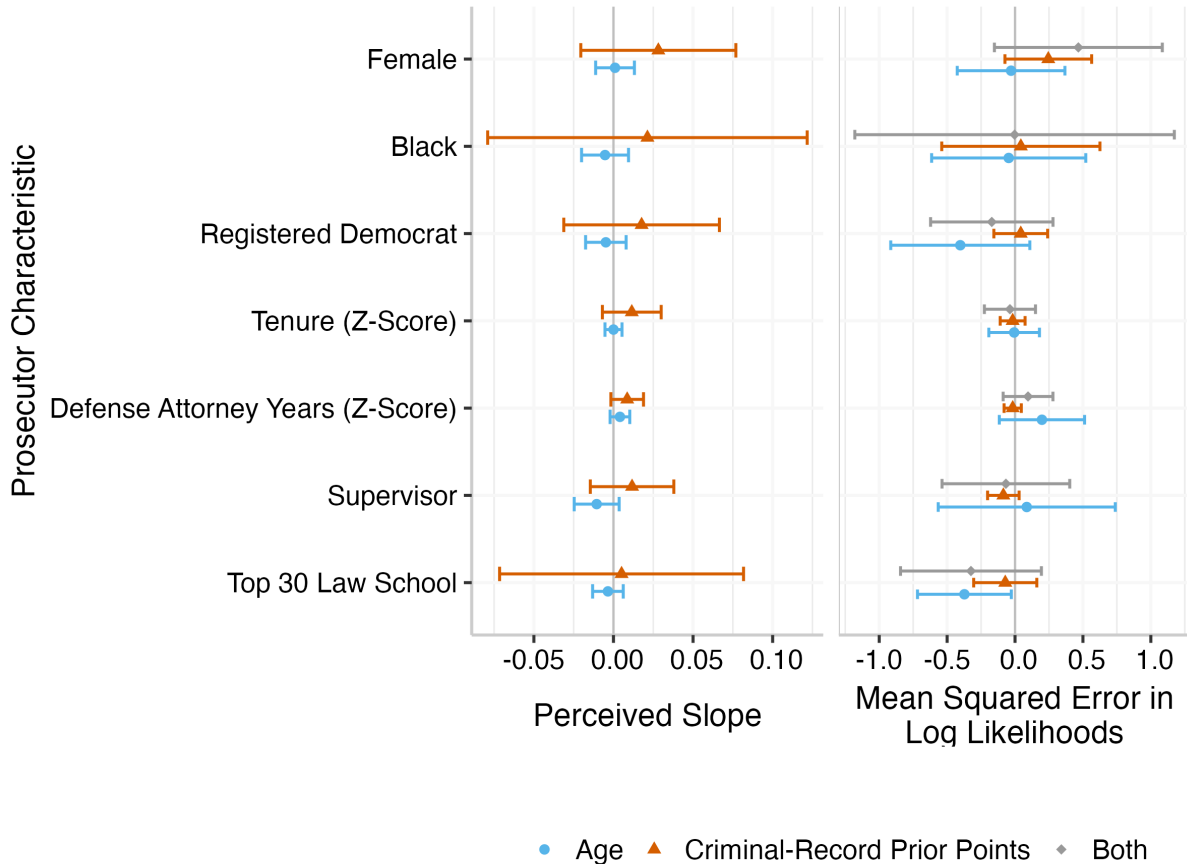
*Notes:* This map illustrates the North Carolina prosecutor offices that participated in our survey. Each color represents a different prosecutor office, some of which span multiple counties. The four largest cities — Charlotte, Raleigh, Greensboro, and Durham — are highlighted.

**Figure A.5:** Prosecutors' Beliefs about Predictors of Re-Arrest and the Incarceration Outcomes in their Cases Over Time



*Notes:* This figure shows the relationship between prosecutors' beliefs about re-arrest and the incarceration outcomes of their cases over time. The x-axis represents the year in which the case was disposed. The y-axis plots the estimated link between incarceration and the prosecutor's perceived log likelihood that the defendant will be re-arrested for a violent crime (given his age-group or criminal-record category) as in Equation 4. Each time-period (or decile of cases) is allowed to have a different link between prosecutors' beliefs and incarceration. The error bars represent 95 percent confidence intervals, with standard errors clustered by prosecutor.

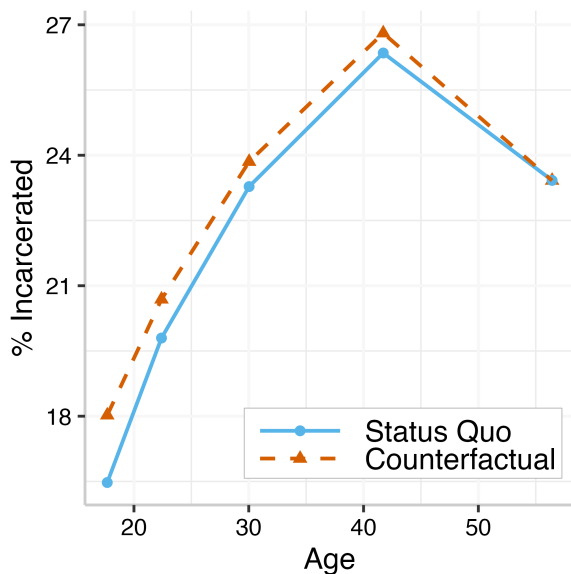
**Figure A.6: Correlates of Prosecutors’ Re-Arrest Predictions**



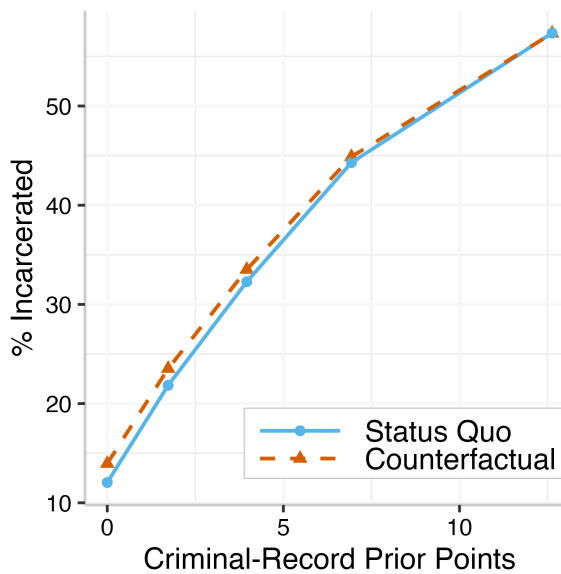
*Notes:* This figure summarizes the correlates of prosecutors’ beliefs about how violent re-arrest varies across defendant age-groups and criminal-record categories. The left plot summarizes prosecutors’ beliefs as a linear slope: i.e., percentage change in the likelihood of violent re-arrest for each additional year of age (or each additional criminal-record prior point). The right plot summarizes the mean squared error of prosecutors’ beliefs (Equation 8). Each point comes from a separate regression of the belief measure on the prosecutor characteristic with office fixed effects to characterize the correlates of beliefs within office. The error bars represent 95 percent confidence intervals with standard errors clustered by prosecutor. The survey records prosecutors’ self-identified gender, race, age, prosecutorial tenure, previous experience as a defense attorney, supervisory role (as elected District Attorney or appointed chief prosecutor), and matriculating law school (see Appendix E for the questions). Whether a prosecutor is a registered Democrat comes from linking North Carolina Voter Records, with missing values imputed from the survey question about political ideology. One prosecutor does not have any political affiliation information.

**Figure A.7: Alternative Counterfactuals**

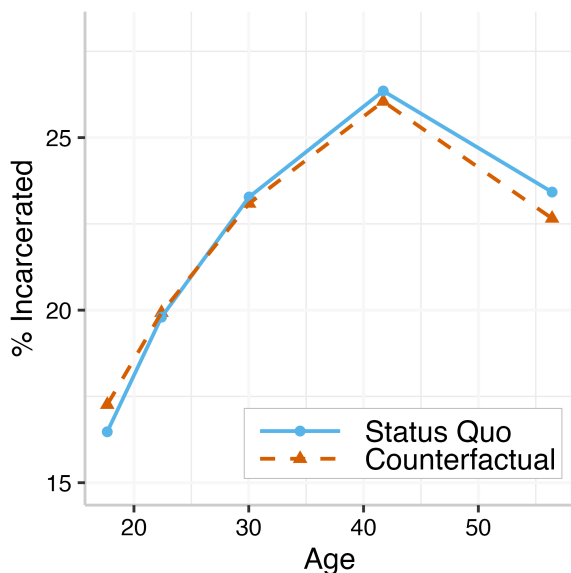
**(a) Accurate for > 50 Defendants**



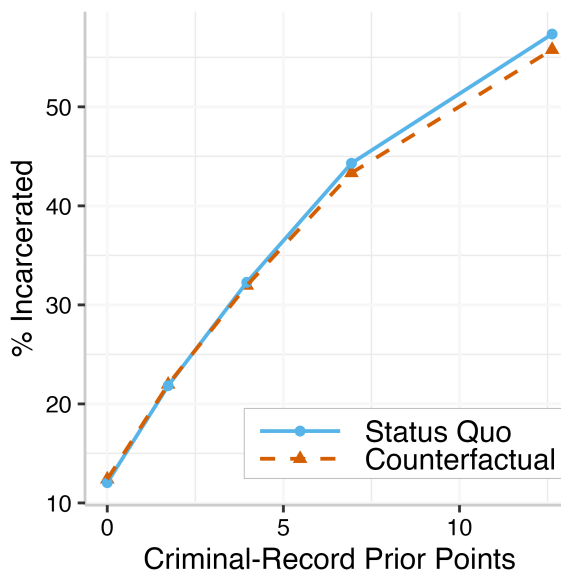
**(b) Accurate for Longest Records**



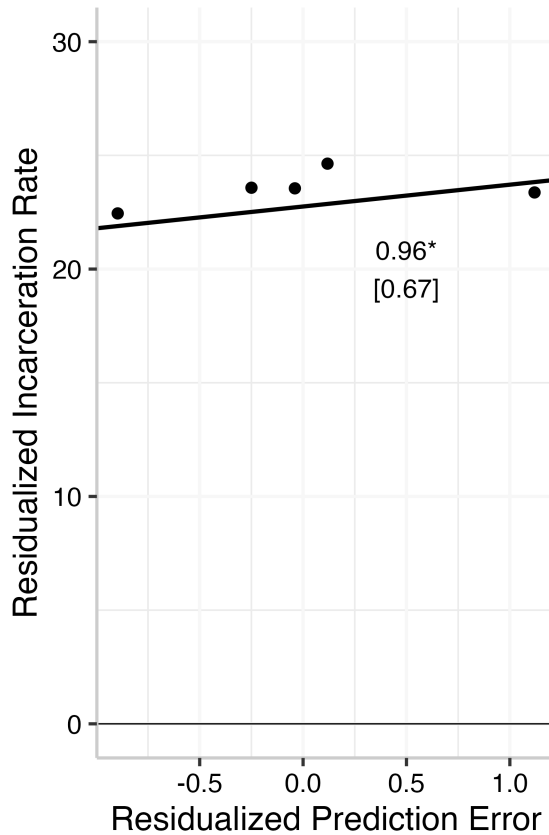
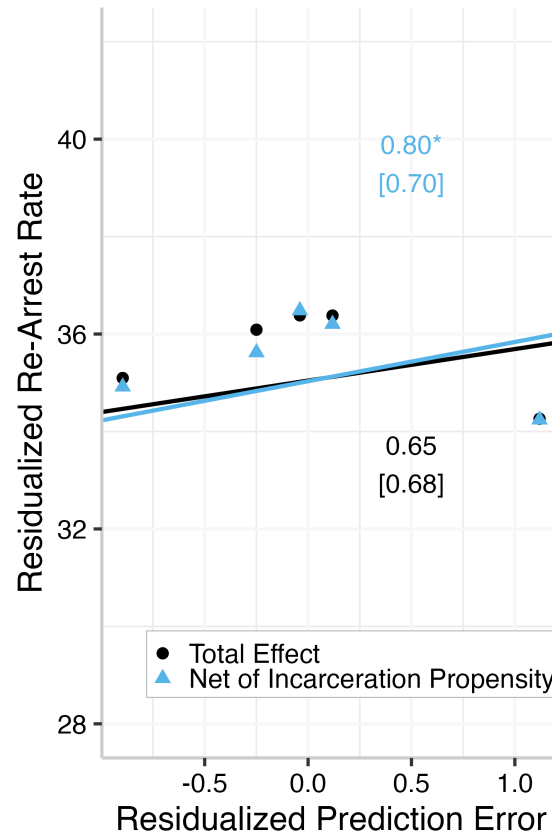
**(c) Accurate on Average**



**(d) Accurate on Average**



Notes: This figure illustrates the effects of correcting prosecutors' re-arrest beliefs under different assumptions about the baseline *levels* of prosecutors' beliefs. Panel (a) assumes that prosecutors' beliefs about the oldest group of defendants were initially accurate rather than the youngest group in Figure 5(a). Panel (b) assumes that prosecutors' beliefs about the group of defendants with the longest records were initially accurate rather than those with no records in Figure 5(b). Panels (c) and (d) assumes that prosecutors' beliefs were accurate on average.

**Figure A.8: Prosecutors' Prediction Error & Case Outcomes****(a) Incarceration (>6 months)****(b) Any Re-Arrest (in 5 Years)**

*Notes:* This figure presents the relationships between a prosecutor's prediction error and the incarceration and re-arrest outcomes in her cases. Panel (a) considers incarceration. Panel (b) considers re-arrest for any new offense. Each point reflects a different fifth of prosecutors, classified by the mean squared error (MSE) of their predictions about how the likelihoods of violent re-arrest varies by defendant age and prior criminal-record category (Equation 8). The estimated total effects condition on prosecutors' office crime-unit, tenure, and the sentencing guideline's recommended punishment (Equation 10). The estimated net effects in Panel (b) adjust for differences in incarceration rates across prosecutors (Equation 13). The linear fit and annotated coefficients come from Equations 12 for the total effect and 14 for the net effect. The sample is limited to cases disposed before 2015 to allow for five years of post-disposition data to observe re-arrest. This restriction results in a sample of 65,995 cases handled by 110 prosecutors. Standard errors are block-bootstrapped by prosecutor. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

## B Supplementary Tables

**Table A.1: Beliefs to Incarceration: Alternative Parameterizations**

	% Incarcerated ( $\geq 6$ mo)			
	(1)	(2)	(3)	(4)
Log(Likelihood of Violent Re-arrest)	1.40*** (0.42)			
Log(Likelihood of Violent Re-arrest, Unwinsorized)		1.39*** (0.41)		
Inverse Hyperbolic Sine(Likelihood of Violent Re-arrest, Unwinsorized)			1.02*** (0.35)	
Likelihood of Violent Re-arrest				2.48 (1.79)
Dependent Mean	21.47	21.61	21.47	21.47
Percentage Effect	6.54% (1.97)	6.45% (1.91)	4.75% (1.63)	11.54% (8.32)
Std. in Beliefs	0.27	0.27	0.27	0.07
Percentage Effect of Std. Change in Beliefs	1.76% (0.53)	1.77% (0.52)	1.29% (0.44)	0.79% (0.57)
Prosecutor FE	✓	✓	✓	✓
Office x Group FE	✓	✓	✓	✓
Sentencing Guidelines FE	✓	✓	✓	✓
# Observations	206,516	191,419	206,516	206,516
# Cases	104,039	103,130	104,039	104,039
# Prosecutors	162	160	162	162
R <sup>2</sup>	0.25	0.26	0.25	0.25
Adjusted R <sup>2</sup>	0.24	0.24	0.24	0.24

*Notes:* This table shows the relationship between prosecutors' re-arrest beliefs and the incarceration outcomes for specific groups of defendants. Column 1 is our preferred parameterization, with winsorizing at the 5th and 95th percentiles. Column 2 excludes prosecutors' response if they state that any group had either a zero or one hundred percent chance of re-arrest. Column 3 uses the inverse hyperbolic sine transformation. Column 4 uses the level of prosecutors' beliefs, with winsorizing at the 5th and 95th percentiles. The standard deviation of each belief residualizes by prosecutor and office-by-group effects. Standard errors are clustered by prosecutor. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.



**Table A.2:** Prosecutors' Re-Arrest Beliefs and the Re-Arrest Outcomes in their Cases

	% Re-arrested for a Violent Crime in 5 Years					
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Likelihood of Re-arrest for Age Group)	-0.36 (0.52)					
Log(Likelihood of Re-arrest for Criminal-Record Group)		0.65 (0.82)				
Log(Likelihood of Violent Re-arrest)			0.20 (0.50)	0.24 (0.46)	0.09 (0.44)	0.12 (0.41)
Dependent Mean	8.90	8.89	8.89	8.89	8.89	8.89
Percentage Effect	-4.00% (5.82)	7.36% (9.18)	2.30% (5.64)	2.69% (5.18)	0.99% (4.98)	1.31% (4.63)
Std. in Beliefs	0.25	0.29	0.27	0.27	0.27	0.27
Percentage Effect of Std. Change	-0.99% (1.44)	2.12% (2.64)	0.62% (1.51)	0.72% (1.39)	0.27% (1.34)	0.35% (1.24)
Prosecutor FE	✓	✓	✓	✓	✓	✓
Office x Group FE	✓	✓	✓	✓	✓	✓
Sentencing Guidelines FE				✓	✓	✓
Demographics					✓	✓
Charge FE						✓
# Observations	64,097	63,837	127,934	127,934	127,934	127,934
# Cases	64,097	63,837	64,321	64,321	64,321	64,321
# Prosecutors	111	110	112	112	112	112
R <sup>2</sup>	0.05	0.02	0.03	0.07	0.09	0.10
Adjusted R <sup>2</sup>	0.03	0.01	0.02	0.05	0.07	0.08

*Notes:* This table shows the relationship between prosecutors' beliefs about re-arrest and the re-arrest outcomes of their cases. Column 1 considers the relationship between a prosecutor's belief about the re-arrest likelihood of defendants in a given age-group and the re-arrest outcomes of defendants in that age-group in the prosecutors' cases (as in Equation 2). Column 2 considers the analogue for criminal-record categories (Equation 3). Column 3 stacks these specifications (Equation 4). Column 3 introduces fixed effects for where defendants started in the state's sentencing guidelines based on the severity of their criminal records (summarised by criminal-record prior points) and of their arresting charge (summarised by offense class). Column 4 introduces demographic controls (for race, gender, and age). Column 5 includes fixed effects for the defendant's lead arresting charge (with the highest offense class or, if there are ties, the highest incarceration rate). Standard errors are clustered by prosecutor. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

**Table A.3: Prosecutors' Beliefs about Violent Re-Arrest and the Sentencing Outcomes in their Cases**

	% Incarcerated (≥6mo) (1)	Incarceration Months (2)	Incarceration Months   Any Incar. (3)	Pre-Trial Detention Months (4)	% Trial (5)
Log(Likelihood of Violent Re-arrest)	1.40*** (0.42)	0.42** (0.18)	0.57* (0.33)	0.03 (0.03)	0.12 (0.10)
Dependent Mean	21.47	5.85	14.16	1.50	2.09
Percentage Effect	6.54% (1.97)	7.12% (3.14)	4.00% (2.34)	1.79% (2.28)	5.94% (4.77)
Std. in Beliefs	0.27	0.27	0.27	0.27	0.27
Percentage Effect of Std.	1.76% (0.53)	1.91% (0.85)	1.07% (0.63)	0.48% (0.61)	1.60% (1.28)
Prosecutor FE	✓	✓	✓	✓	✓
Jurisdiction x Group FE	✓	✓	✓	✓	✓
Sentencing Guidelines FE	✓	✓	✓	✓	✓
# Observations	206,516	206,516	85,337	206,516	206,516
# Cases	104,039	104,039	42,928	104,039	104,039
# Prosecutors	162	162	162	162	162
R <sup>2</sup>	0.25	0.28	0.34	0.17	0.08
Adjusted R <sup>2</sup>	0.24	0.26	0.31	0.15	0.06

*Notes:* This table shows the relationship between prosecutors' beliefs about re-arrest and the sentencing outcomes of their cases. Each column estimates Equation 4. Column 1 considers our primary sentencing outcome of incarceration for at least six months, which is typically served in state prison rather than county jail. Column 2 considers the number of months of incarceration. Column 3 considers the number of months of incarceration conditional on any incarceration time. Column 4 considers months served pre-trial. Column 5 considers the percent of cases that go to trial. The standard deviation of beliefs residualizes by prosecutor and office-by-group effects to consider the conditional variation in beliefs. Standard errors are clustered by prosecutor. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

**Table A.4:** Prosecutors' Beliefs about the Relationship between Defendant Age and Re-Arrest and the Incarceration Outcomes in their Cases

	% Incarcerated ( $\geq 6$ mo)					
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Likelihood of Re-arrest by Age)	1.55** (0.63)	1.60** (0.63)	0.99* (0.56)	0.75 (0.50)	0.73 (0.50)	0.72 (0.51)
Age 20-25 (vs. 16-19)	3.06*** (0.48)					
Age 26-35 (vs. 16-19)	6.54*** (0.52)					
Age 36-50 (vs. 16-19)	10.01*** (0.71)					
Age >50 (vs. 16-19)	8.17*** (1.10)					
Dependent Mean	21.46	21.46	21.46	21.46	21.46	21.46
Percentage Effect	7.21% (2.94)	7.46% (2.96)	4.60% (2.60)	3.52% (2.35)	3.38% (2.32)	3.37% (2.39)
Std. in Beliefs	0.25	0.25	0.25	0.25	0.25	0.25
Percentage Effect of Std. Change in Beliefs	1.79% (0.73)	1.85% (0.73)	1.14% (0.65)	0.87% (0.58)	0.84% (0.58)	0.84% (0.59)
Prosecutor FE	✓	✓	✓	✓	✓	✓
Age FE		✓	✓	✓	✓	✓
Office x Age FE			✓	✓	✓	✓
Sentencing Guidelines FE				✓	✓	✓
Demographics					✓	✓
Charge FE						✓
# Observations	103,167	103,167	103,167	103,167	103,167	103,167
# Cases	103,167	103,167	103,167	103,167	103,167	103,167
# Prosecutors	161	161	161	161	161	161
R <sup>2</sup>	0.04	0.04	0.05	0.26	0.26	0.28
Adjusted R <sup>2</sup>	0.03	0.04	0.04	0.23	0.23	0.25

*Notes:* This table shows the relationship between prosecutors' beliefs about the relationship between age and re-arrest and the incarceration outcomes of their cases. Each column estimates Equation 2. Column 4 introduces fixed effects for where defendants started in the state's sentencing guidelines based on the severity of their criminal records (summarised by criminal-record prior points) and of their arresting charge (summarised by offense class). Column 5 introduces demographic controls (for race, gender, and age). Column 6 includes fixed effects for the defendant's lead arresting charge (with the highest offense class or, if there are ties, the highest incarceration rate). The standard deviation of beliefs residualizes by prosecutor and office-by-group effects to consider the conditional variation in beliefs. Standard errors are clustered by prosecutor. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

**Table A.5: Prosecutors' Beliefs about the Relationship between Criminal Records and Re-Arrest and Incarceration Outcomes in their Cases**

	% Incarcerated ( $\geq 6$ mo)					
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Likelihood of Re-arrest by Criminal Record)	0.04 (0.97)	0.19 (0.96)	1.85** (0.83)	1.95*** (0.70)	1.98*** (0.69)	2.05*** (0.68)
1-2 Points (vs. No Record)	9.90*** (0.73)					
3-5 Points (vs. No Record)	20.29*** (1.05)					
6-9 Points (vs. No Record)	32.27*** (1.60)					
$\geq 10$ Points (vs. No Record)	45.25*** (1.88)					
Dependent Mean	21.48	21.48	21.48	21.48	21.48	21.48
Percentage Effect	0.18% (4.51)	0.90% (4.46)	8.63% (3.86)	9.10% (3.26)	9.21% (3.23)	9.53% (3.17)
Std. in Beliefs	0.29	0.29	0.29	0.29	0.29	0.29
Percentage Effect of Std. Change in Beliefs	0.05% (1.30)	0.26% (1.28)	2.48% (1.11)	2.62% (0.94)	2.65% (0.93)	2.74% (0.91)
Prosecutor FE	✓	✓	✓	✓	✓	✓
Prior Point FE		✓	✓	✓	✓	✓
Office x Prior Point FE			✓	✓	✓	✓
Sentencing Guidelines FE				✓	✓	✓
Demographics					✓	✓
Charge FE						✓
# Observations	103,349	103,349	103,349	103,349	103,349	103,349
# Cases	103,349	103,349	103,349	103,349	103,349	103,349
# Prosecutors	159	159	159	159	159	159
R <sup>2</sup>	0.14	0.14	0.15	0.25	0.26	0.28
Adjusted R <sup>2</sup>	0.13	0.14	0.14	0.23	0.23	0.25

*Notes:* This table shows the relationship between prosecutors' beliefs about the relationship between criminal records and re-arrest and the incarceration outcomes of their cases. Each column estimates Equation 3. Defendants' criminal records are summarized using the prior-points formula under North Carolina state law, where, for example, a conviction for a misdemeanor (e.g., possession of drug paraphernalia) adds one point while a mid-level felony (e.g., cocaine sales) adds four points. Column 4 introduces fixed effects for where defendants started in the state's sentencing guidelines based on their criminal-record prior points and the severity of their arresting charge (summarised by offense class). Column 5 introduces demographic controls (for race, gender, and age). Column 6 includes fixed effects for the defendant's lead arresting charge (with the highest offense class or, if there are ties, the highest incarceration rate). The standard deviation of beliefs residualizes by prosecutor and office-by-group effects to consider the conditional variation in beliefs. Standard errors are clustered by prosecutor. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

**Table A.6: Prosecutors' Re-Arrest Beliefs and the Incarceration Outcomes: Robustness to Alternative Sample Selections**

	% Incarcerated ( $\geq 6$ mo)				
	(1)	(2)	(3)	(4)	(5)
Log(Likelihood of Violent Re-arrest)	1.30*** (0.40)	1.32*** (0.40)	1.34*** (0.39)	1.45*** (0.43)	1.41*** (0.42)
Dependent Mean	24.40	23.47	22.78	22.43	21.47
Percentage Effect	5.35% (1.62)	5.62% (1.70)	5.89% (1.70)	6.46% (1.91)	6.55% (1.97)
Std. in Beliefs	0.27	0.27	0.27	0.27	0.27
Percentage Effect of Std.	1.43% (0.44)	1.50% (0.45)	1.58% (0.46)	1.73% (0.51)	1.76% (0.53)
Excluding Murder Cases		✓	✓	✓	✓
Excluding Rape Cases			✓	✓	✓
Excluding DUI Cases				✓	✓
Excluding Drug Trafficking					✓
Prosecutor FE	✓	✓	✓	✓	✓
Jurisdiction x Group FE	✓	✓	✓	✓	✓
Sentencing Guidelines FE	✓	✓	✓	✓	✓
# Observations	230,341	225,737	221,284	219,771	206,569
# Cases	116,006	113,691	111,460	110,703	104,067
# Prosecutors	162	162	162	162	162
R <sup>2</sup>	0.27	0.25	0.25	0.25	0.25
Adjusted R <sup>2</sup>	0.26	0.24	0.23	0.23	0.24

*Notes:* This table shows the relationship between prosecutors' beliefs about re-arrest and the incarceration outcomes of their cases for different samples. Each column estimates Equation 4. The first column includes the full set of new felony cases handled by surveyed prosecutors in North Carolina between 1995 and 2019. The second column excludes murder cases. The third column excludes rape. The fourth column excludes driving while under the influence cases that are often handled in lower misdemeanor court. The fifth column excludes drug trafficking cases that are often handled by the federal system. Standard errors are clustered by prosecutor. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

**Table A.7:** Prosecutors' Beliefs about Age-Out and their Sentencing Preferences in Hypothetical Cases with Defendants of Different Ages

	% Incarcerated		Incarceration Months		Incarceration Months   Any Incar.	
	(1)	(2)	(3)	(4)	(5)	(6)
Log(Likelihood of Violent Re-arrest)	12.30*** (4.47)	12.02** (4.76)	0.05 (0.51)	0.08 (0.55)	0.40 (1.06)	0.003 (1.10)
Dependent Mean	41.66	2.93	44.23	3.00	6.10	6.04
Percentage Effect	29.53% (10.72)	27.18% (10.75)	1.68% (17.44)	2.77% (18.23)	6.58% (17.35)	0.06% (18.22)
Std. in Beliefs	0.32	0.32	0.32	0.32	0.32	0.32
Percentage Effect of Std.	9.51% (3.45)	8.72% (3.45)	0.54% (5.62)	0.89% (5.85)	2.12% (5.59)	0.02% (5.85)
Limited to Merged Prosecutors		✓		✓		✓
Prosecutor FE	✓	✓	✓	✓	✓	✓
Vignette FE	✓	✓	✓	✓	✓	✓
Age FE	✓	✓	✓	✓	✓	✓
# Observations	725	633	720	630	346	313
# Prosecutors	183	160	183	160	136	122
R <sup>2</sup>	0.59	0.59	0.50	0.52	0.68	0.68
Adjusted R <sup>2</sup>	0.45	0.44	0.33	0.35	0.45	0.45

*Notes:* This table shows the relationship between prosecutors' beliefs about violent re-arrest and their sentencing preferences in hypothetical cases. Each column considers the relationship between a prosecutor's belief about the re-arrest likelihood of defendants in a given age-group and the preferred punishment in the hypothetical case (as in Equation 5). The odd columns include all prosecutors who completed the survey; the even columns limit to the sample of Superior Court prosecutors who merged to the court records and responded to the hypothetical cases. Columns 1–2 consider the prosecutor's response about whether she would press for incarceration in a plea deal in the hypothetical case. Columns 3–4 consider the prosecutor's preferred incarceration length. Columns 5–6 consider the prosecutor's preferred incarceration length conditional on pressing for an incarceration sentence. The text of hypotheticals can be found in Appendix D. Standard errors are clustered by prosecutor. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

**Table A.8: Prosecutors' Re-Arrest Beliefs and the Incarceration Outcomes in their Cases, Conditional on Other Prosecutor Traits**

	% Incarcerated ( $\geq 6$ mo)						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Log(Likelihood of Violent Re-arrest)	1.63*** (0.39)	1.72*** (0.42)	1.32*** (0.38)	1.51*** (0.41)	1.89*** (0.51)	1.53*** (0.42)	1.36*** (0.43)
Dependent Mean	21.47	21.48	21.47	21.47	21.48	21.47	21.48
Percentage Effect	7.57% (1.81)	8.01% (1.97)	6.16% (1.76)	7.03% (1.89)	8.78% (2.35)	7.11% (1.95)	6.31% (2.02)
Prosecutor Trait	Female	Black	Democrat	Tenure	Def. Att. Yrs	Supervisor	Top 30 Law
Prosecutor FE	✓	✓	✓	✓	✓	✓	✓
Trait x Jurisdiction x Group FE	✓	✓	✓	✓	✓	✓	✓
Sentencing Guidelines FE	✓	✓	✓	✓	✓	✓	✓
# Observations	206,516	206,309	206,506	206,516	206,309	206,516	206,309
# Cases	104,039	103,832	104,034	104,039	103,832	104,039	103,832
# Prosecutors	162	160	161	162	160	162	160
R <sup>2</sup>	0.26	0.26	0.26	0.34	0.26	0.26	0.26
Adjusted R <sup>2</sup>	0.24	0.24	0.24	0.26	0.24	0.24	0.24

*Notes:* This table shows the relationship between prosecutors' beliefs about re-arrest and the incarceration outcomes of their cases conditional on other prosecutor traits. Each column estimates Equation 4, with fixed effects for where defendants started in the state's sentencing guidelines based on the severity of their criminal records (summarised by criminal-record prior points) and of their arresting charge (summarised by offense class). Each column allows prosecutors with different observable characteristics to have different incarceration tendencies for defendants in different age-groups and prior criminal-record categories. The survey collected prosecutors' self-reported gender, race, age, prosecutorial tenure, previous experience as a defense attorney, and matriculating law school, as well as whether they were in a supervisory role (either as the elected District Attorney or the appointed chief prosecutor). Whether a prosecutor is a registered Democrat comes from linking North Carolina Voter Records, with missing values imputed from the survey question about political ideology. Standard errors are clustered by prosecutor. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

**Table A.9: Prosecutors' Inaccuracy and Re-Arrest Outcomes**

	(1)	(2)	(3)	(4)	(5)	(6)
	<b>Percent Re-Arrested for Violent Offense (in 5Years)</b>					
Prosecutor Prediction Error (MSE Z-Score)	0.35** (0.16)	0.54*** (0.15)	0.42** (0.20)	0.42** (0.20)	0.42** (0.21)	0.69*** (0.20)
R <sup>2</sup>	0.04	0.12	0.28	0.28	0.29	0.29
Adjusted R <sup>2</sup>	0.01	0.01	0.07	0.07	0.08	0.08
Dependent Mean	8.62	8.62	8.62	8.62	8.62	8.62
Percentage Effect	4.02% (1.83)	6.22% (1.71)	4.90% (2.34)	4.90% (2.34)	4.92% (2.39)	7.95% (2.34)
	<b>Percent Re-Arrested for Any Offense (in 5Years)</b>					
Prosecutor Prediction Error (MSE Z-Score)	-0.47 (0.79)	-0.33 (0.64)	-0.45 (0.71)	-0.49 (0.68)	-0.37 (0.51)	
R <sup>2</sup>	0.05	0.16	0.28	0.31	0.20	
Adjusted R <sup>2</sup>	0.02	0.06	0.07	0.11	0.11	
Dependent Mean	34.99	34.99	34.99	34.99	33.92	
Percentage Effect	-1.34% (2.27)	-0.95% (1.82)	-1.29% (2.03)	-1.40% (1.93)	-1.10% (1.52)	
# Prosecutors	110	110	110	110	110	
# Cases	65,995	65,995	65,995	65,995	65,995	
Office Crime-Unit	✓	✓	✓	✓	✓	
Prosecutor Seniority		✓	✓	✓	✓	
Case Severity		✓				
Detailed Case Severity			✓	✓	✓	
Defendant Demographics				✓	✓	
Prosecutor Characteristics					✓	

*Notes:* This table considers the robustness of the relationship between a prosecutor's prediction mistakes and the re-arrest outcomes in her cases. Column 3 replicates Column 1 of Table 5: the other columns include alternative controls. Column 1 does not include case severity controls. In Column 2, case severity is summarised by the sentencing guidelines' recommendation: probation, incarceration, or either. In Columns 3–6, detailed case severity uses both the defendant's criminal-record category and his arresting charge offense class. Defendant demographics include race, gender, and age. Charge fixed effects capture the defendant's lead arresting charge (with the highest offense class or, if there are ties, the highest incarceration rate). Prosecutor characteristics are gender, race, political affiliation, tenure, past defense-attorney experience, supervisory status, and matriculation from a top 30 law school. Standard errors are clustered by prosecutor. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.



**Table A.10: Prosecutors' Prediction Mistakes and Re-Arrest Outcomes: Robustness to Alternative Sample Selections**

	(1)	(2)	(3)	(4)	(5)
	<b>% Violent Re-Arrest (5 Years)</b>				
Prosecutor Prediction Error (MSE Z-Score)	0.44*** (0.13)	0.49*** (0.12)	0.49*** (0.14)	0.52*** (0.14)	0.50*** (0.15)
Dependent Mean	8.06	8.11	8.17	8.21	8.54
Percentage Effect	5.40% (1.56)	6.03% (1.49)	6.04% (1.70)	6.39% (1.69)	5.83% (1.70)
R <sup>2</sup>	0.11	0.12	0.12	0.12	0.12
Adjusted R <sup>2</sup>	0.02	0.02	0.02	0.02	0.01
	<b>% Re-Arrest (5 Year)</b>				
Prosecutor Prediction Error (MSE Z-Score)	-0.31 (0.65)	-0.21 (0.67)	-0.20 (0.61)	-0.21 (0.62)	-0.41 (0.64)
Dependent Mean	32.88	33.23	33.61	33.73	34.64
Percentage Effect	-0.93% (1.97)	-0.64% (2.01)	-0.61% (1.82)	-0.62% (1.83)	-1.18% (1.84)
Excluding Murder Cases		✓	✓	✓	✓
Excluding Rape Cases			✓	✓	✓
Excluding DUI Cases				✓	✓
Excluding Drug Trafficking					✓
# Cases	74,290	72,907	71,494	70,924	66,955
# Prosecutors	111	110	110	110	110
R <sup>2</sup>	0.16	0.16	0.16	0.16	0.16
Adjusted R <sup>2</sup>	0.06	0.06	0.06	0.06	0.06

*Notes:* This table considers the relationship between a prosecutor's prediction mistakes and the re-arrest outcomes in her cases for alternative sample selections. Each column replicates the design in Column 1 of Table 5 in alternative samples. The first column includes the full set of new felony cases handled by surveyed prosecutors in North Carolina between 1995 and 2014. The second column excludes murder cases. The third column excludes rape. The fourth column excludes driving while under the influence cases that are often handled in lower misdemeanor court. The fifth column excludes drug trafficking cases that are often handled by the federal system. Violent re-arrest in the top panel includes re-arrests for felony assault, murder, manslaughter, serious sex offenses, robbery, burglary, kidnapping, or arson. Re-arrest in the bottom panel includes arrests for new felonies or for probation violations severe enough to lead to prison time. Standard errors are clustered by prosecutor. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

**Table A.11: Prosecutors' Prediction Mistakes and Re-Arrest Outcomes**

<b>Panel (a): Violent Re-Arrest</b>				
	Violent Re-Arrest	Incarceration Years	Violent Re-Arrest	Net Violent Re-Arrest
Prosecutor Prediction Error (MSE Z-Score)	0.54** [0.21] (0.15)	4.56 [4.61] (3.53)		0.58** [0.20]
Instrumented Incarceration Length, $\tilde{\psi}_{p, \text{Incarceration}}$			-0.010*** [0.002]	
Dependent Mean	8.62	143.49	7.70	8.62
Percentage Effect	6.22% [2.38]	3.18% [3.21]	-0.13% [0.02]	6.75% [2.38]
<b>Panel (b): Any Re-Arrest</b>				
	Any Re-Arrest	Incarceration Years	Any Re-Arrest	Net Any Re-Arrest
Prosecutor Prediction Error (MSE Z-Score)	0.65 [0.68] (0.41)	4.56 [4.61] (3.53)		0.76* [0.68]
Instrumented Incarceration Length, $\tilde{\psi}_{p, \text{Incarceration}}$			-0.024*** [0.004]	
Dependent Mean	33.18	143.49	31.01	33.18
Percentage Effect	1.95% [2.04]	3.18% [3.21]	-0.08% [0.01]	2.28% [2.06]
# Prosecutors	110	110	2,129	110
# Cases	65,995	65,995	744,560	65,995

*Notes:* This table analyzes the relationship between a prosecutor's prediction mistakes on the survey and her effects of re-arrest in her real-world cases, net of her effect on incarceration lengths — measured in the three years after disposition. This table replicates Table 5 but accounts for differences in incarceration length rather than incarceration rates across prosecutors. Block-bootstrapped errors that sample by prosecutors are in brackets. Analytical clustered standard errors are in parentheses. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

## C Constructing Prosecutor and Case Identifiers

In the North Carolina court records, there are two features of the raw data that might confound analyses of prosecutorial discretion. First, the data typically records the prosecutor assigned to the case but lacks a consistent identifier for each prosecutor. Second, the unit of observation — the "docket" — does not always reflect the unit at which decisions are made because multiple dockets are often handled together in a single "case".<sup>52</sup> Identifying the "case" helps us better identify the sequence of discretionary choices, as we can track the most serious charge on the case at each juncture of the process and how this charging choice interacts with the mandates of North Carolina's sentencing guidelines.

### C.1 Constructing Prosecutor Identifiers

The court records start with a set of strings that inconsistently identify prosecutors. For example, Emma K. Harrington might also be recorded as Attorney E Harrington or EKH. We first strip off generic designators (like attorney) and parsed names into first, middle, and last names or initials based on the punctuation of the name. Second, within jurisdictions, we create all possible pairs of names and use string distance algorithms to link together distinct names that we believe reflect the same prosecutors. This generates a refined set of prosecutor names.<sup>53</sup> Third, we link prosecutor identifiers that only have initials to the refined prosecutor names. Fourth, we link prosecutors with similar names across jurisdictions by hand, looking up prosecutors with common matching names or similar but not identical names in different offices to see if they likely were the same individual. We also looked up by hand all women with the same first name to see if there was evidence of a marriage that resulted in a name change.

### C.2 Constructing Case Identifiers

We use two rules to determine whether dockets are consolidated into cases: (1) we combine dockets that are flagged in the court records as "consolidated for judgment" for sentencing and (2) we combine dockets when the timing of the dockets are proximate or overlapping. Specifically, we consolidate dockets when the charging or disposition dates occur in the same week or the charges in the later docket occur before those in the earlier docket were resolved. If either of these timing conditions are met

<sup>52</sup>For some defendants, multiple charges are brought at the same time but filed under different docket numbers. For other defendants, multiple charges enter the court system separately but are resolved together in a final judgment.

<sup>53</sup>To classify the last name as matching, we require both last names to be populated and then either (i) a near perfect match on the last names, (ii) a high-quality match on the last names with the first letter of the first name matching, (iii) a high-quality match on the last name and a near perfect match on the non-missing first names, or (iv) a good match on the last names with the first letter of the first name matching and a near perfect match on the first names. After applying these rules we then further require that there is some way that the first letter of the first-name matches, either based on the names or the initials (since some people go by their middle names, the first and middle names sometimes didn't line up in predictable ways).

and the same prosecutor handles both dockets, we join the dockets into a single case. We always consider dockets handled by two different prosecutors as separate cases, even if the dates are proximate or the date ranges are overlapping.

**Consolidated for judgment:** We use the "consolidated for judgment" fields to join dockets that have been combined at sentencing for a single judgment. Of all offenses in the court records, 15% are consolidated with another offense at sentencing, and 37% of initial dockets have at least one consolidated offense.

**Overlapping date ranges:** When docket date ranges are proximate or overlapping, we join dockets with the same defendant that are handled by a single prosecutor. We consolidate 19.1% of all cases using common disposition weeks across dockets. We consolidate an additional 10.8% of cases using the case filing week. We consolidate an additional 2.14% of cases using the week the case was charged.

Organizing dockets into cases allows us to more accurately assess the time-line of cases and the decisions of prosecutors. In each case, the most severe lead charge determines the punishment under the state sentencing guidelines. The lead charge at arrest determines where defendants start in the sentencing guidelines and the lead charge at conviction determines where defendants land in the sentencing guidelines after the prosecutor has exercised her discretion. Organizing dockets into cases allows us to identify the lead charge at each stage and, thus, more accurately assess the time-line for each case and the prosecutor's decisions about whether or not to reduce the lead charge. Finally, since the punishments are served concurrently unless noted otherwise, organizing dockets into cases allows us to more accurately assess the punishment on each case.

**A Note about Records of Probation Violations:** In the North Carolina court records, violations of probation are typically recorded on the docket of the initial offense that led to the probation sentence. We split these probation violations into their own cases based on the first date that a probation violation appears on the docket. These violations amount to 11.8% of all charges. Probation violations are excluded from our analyses since prosecutors are rarely involved in these cases in North Carolina. Breaking off these probation violations from the initial offense is necessary to correctly date the case according to when it was first resolved. This is also essential for accurately assessing the initial punishment rather than the ultimate punishment that might be triggered by a probation violation.

### C.3 Linking to Voter Records

We uniquely match the prosecutor to a voter record file in 88 percent of cases. We find a strong concordance with the survey information. Among prosecutors who identify as liberal on the survey, only 2 percent are registered Republicans. Similarly, only two prosecutors (1.5 percent) reported a different racial identity on the survey than in the voter records.

For the match of prosecutor identifiers to the North Carolina voter records, we require an exact match on the last name and first letter of the first name. We then use the rest of the first name, the middle initial/name, the suffix (if applicable), and the county to try to identify unique, high-quality matches. Finally, we use the voter's age and the prosecutor's years working in the voter records to identify unique, high-quality matches who would be active as prosecutors between the ages of 24 (after plausible law school graduation) and 64 (before retirement). Using this information, we identify a unique, high-quality match in 88 percent of cases and 93 percent of cases with a named prosecutor.

## D Hypothetical Vignettes

Prosecutors responded to full hypothetical cases or "vignettes" in which we randomized the defendant's age to be 36 instead of a randomly chosen baseline of 19, 20, or 21.<sup>54</sup> In each vignette, we mimicked the information that prosecutors would receive in their initial case files, including a mock police report and details on the defendant's criminal record. We randomized the pairing of the defendant age's to the vignettes and the order in which prosecutors saw the vignettes. For each vignette, we asked prosecutors to report their preferred type of sentence (prison, probation, or neither) and the duration of the preferred sentence in months.

**Priming:** Prosecutors' beliefs about re-arrest were elicited after they responded to the hypothetical cases, raising concerns that priming could cause reverse causality. However, we find that randomly pairing more serious vignettes with older defendants had no detectable impact on prosecutors' stated beliefs about the relative likelihood of violent re-arrest among older defendants at the end of the survey.<sup>55</sup>

**Vignette 1:** Officer Keating responded to a call from a woman on the corner of Chestnut and Main Street. She was bleeding from her left hand and from a cut on her neck. The victim informed Officer that 15 minutes earlier, she had argued with her boyfriend about whether to go over to his place that night. According to the victim, the verbal argument escalated when the suspect grabbed a beer bottle off the street, broke it against a street light, and then slashed her neck and hand. Victim was able to break free and run down the street. Victim states that suspect ran after her with the bottle in hand and shouted, "you are going to regret this," but cut chase after she entered a corner store.

<sup>54</sup>There were a total of eight hypothetical cases — four drug-related and four assault cases — with six treatment arms. This paper focuses on the assault vignettes where age was randomly varied. The other randomizations were about procedural rules and police behavior, not relevant to this paper. We randomized the baseline defendant age across the vignettes so that it would seem more natural that defendant age was not identical across them.

<sup>55</sup>For the hypothetical vignettes, there was wide variation in perceived seriousness, with the percent of prosecutors preferring prison sentences ranging from 26 percent to 70 percent. A one standard deviation increase in the relative seriousness of the vignette shown for older defendants was associated with an insignificant 3.0 percent increase in a prosecutor's stated likelihood of re-arrest for older defendants compared to younger ones (p-value = 0.58).

Suspect, a {Random Age}-year old male, is charged with assault with a deadly weapon with intent to kill or inflict serious injury.

Victim was transported to a nearby hospital but was released once doctors stitched up the cut on her hand and verified that her neck injury was not severe.

Criminal History: Suspect has no prior criminal history.

**Vignette 2:** Officer Clay responded to a call at 8:20pm on 6/2/2017 arriving at Wabash Park. Officer found a victim sitting on a bench, cradling her wrist. She had smears of dirt on her face and a bloody nose. She told the officer that when she had told her boyfriend that their relationship was over, he said, "Bitch, you're over." He grabbed her wrist and threw her to the ground. He then hit her multiple times in the arm and head with his tool-bag. She told the Officer that her wrist, and maybe her nose, felt broken.

The victim described the suspect as a tall {Random Age}-year-old with a shaved head. Victim was taken to hospital at her request. Her wrist and nose were not broken, but her wrist was splinted. The suspect was arrested the following day at 4:10pm at the victim and suspect's joint residence.

He was charged with assault with a deadly weapon with intent to kill or inflict serious injury.

Criminal History: Suspect has no prior criminal history.

**Vignette 3:** At approximately 11:30pm on 12/12/2018, Officer DeLoitte arrived at the Motel 6 in response to a radio call. Officer found the door to the victim's room ajar and the victim laying on the carpet and murmuring "he's gonna kill me." Officer asked the victim whether she could sit up and describe the perpetrator. She sat up with difficulty and told the Officer that the suspect was her boyfriend, a man of medium-build with a small birthmark on the left side of his neck. The suspect, {Random Age} years old, was taken into custody by Officer Bukowski.

Victim told the officer that an argument with her boyfriend had turned physical when he accused her of cheating. Suspect hit the victim and then grabbed the lamp standing next to the door and hit her in the chest. At that point, suspect ran from the motel room.

Victim was transported to the hospital. Although there was no major trauma, victim sustained severe bruising to her chest.

Suspect has been charged with assault with a deadly weapon with intent to kill or inflict serious injury.

Criminal History: Suspect has no prior criminal history.

**Vignette 4:** At 11:40pm on May 18 2018, Officer Delaney responded to a radio call, reporting a domestic disturbance at 1037 Dimick. Delaney found the victim standing outside her apartment. Victim sustained a black eye and was bleeding from a cut on her lip.

The victim said that she and her boyfriend got into an argument after dinner. He had grabbed her wrist and thrown her to the ground. While she was on the ground, he began kicking her abdomen. Victim reported he was wearing work boots while kicking her. She said he left after she started screaming for help.

The victim initially declined to provide information about her boyfriend. After a few minutes of speaking with the Officer, the victim provided the name of her boyfriend. She also stated that he is 5'10, heavy-set, with short hair.

The suspect is {**Random Age**} years old. He was arrested at 1:00 am on May 19th at a nearby park where the victim had said he might be. He has been charged with assault with a deadly weapon with intent to kill or inflict serious injury.

Criminal History: Suspect has no prior criminal history.

## E Survey Questions

**Gender:** *What is your gender? [Male; Female, Other]*

**Race:** *How would you describe your ethnicity? [White; Black or African American; Asian; Hispanic; Other]*

**Political Ideology:** *Generally speaking, how would you describe your political views? [Slider: -50 (Liberal) to +50 (Conservative)]*

**Tenure:** *How many years total have you practiced as a prosecutor?*

**Defense Attorney:** *Have you ever practiced as a criminal defense attorney? [Yes. If so, for how many years?; No]*

**Law School:** *From what law school did you receive your JD? [Drop-down list of law schools in NC; "Out-of-state law school. Please, specify:"]*

**Beliefs about Age and Violent Re-Arrest:** *Suppose a defendant in your district were incarcerated for a year. For each of the following age ranges, what do you think the percent chance is that the defendant would be arrested for a serious offense within 5 years of their release? Note: serious offense is defined as felony assault, murder, manslaughter, serious sex offenses, robbery, burglary, kidnapping, or arson. [Five sliders for 16-19 years old, 20-25 years old, 26-35 years old, 36-50 years old, 50+ years old: 0 to 100]*

**Beliefs about Criminal Record and Violent Re-arrest:** *Suppose a defendant in your dis-*

trict were incarcerated for a year. For each of the following prior point ranges, what do you think the percent chance is that this defendant would be arrested for a serious offense within 5 years of their release? Note: serious offense is defined as felony assault, murder, manslaughter, serious sex offenses, robbery, burglary, kidnapping, or arson. [Five sliders for 0 prior points, 1 to 2 prior points, 3 to 5 prior points, 6 to 9 prior points, 10 or more prior points: 0 to 100]

## F Measuring the Rate of Substitution between Incarceration and Re-Arrest

This section describes the two ways that we estimate the substitution rate between incarceration and violent re-arrest. Section F.1 describes our replication of [Rose and Shem-Tov \(2021\)](#)'s design, which uses discontinuities in incarceration rates induced by the state sentencing guidelines to estimate the causal effect of incarceration on violent re-arrest. Section F.2 explains how we estimate the average relationship between prosecutors' incarceration propensities and the rates of violent re-arrest in their cases.

### F.1 Replicating [Rose and Shem-Tov \(2021\)](#)'s Discontinuity Design

The North Carolina sentencing guidelines create discontinuities in the likelihood of incarceration for defendants with marginally different criminal records, among those with certain charges and records. Figure A.9(a) illustrates the North Carolina sentencing guidelines, which are organized in a grid. The defendant's charge determines the row, with more severe charges in higher rows.<sup>56</sup> The defendant's criminal record determines the column. The defendant's record is summarized by a statutory formula that summarizes the length and severity of his record: each prior record level groups multiple prior point scores together.<sup>57</sup> Each cell of the grid specifies the allowable sentence length and the recommended type of punishment, where "A" denotes incarceration (and "I" and "C" denote the type of probation). At certain cutoffs — highlighted in black — the recommended type of punishment shifts for defendants with an additional criminal-record prior point: either incarceration becomes possible (as in row I) or mandatory (in rows E, F, G, and H). Around these thresholds, there is a sharp uptick in the likelihood of incarceration as illustrated in Figure A.9(b).

We use the following two-stage specification to estimate how incarceration changes the likelihood of violent re-arrest:

$$\begin{aligned}
 \text{1st Stage: Incarceration}_i &= \phi_{\text{1st stage}} \text{Above a Threshold}_i + \mu_o + \mu_r + X_i' \kappa_{\text{1st stage}} + u_i \\
 \text{2nd Stage: Violent Rearrest}_i &= \Phi_{\text{Discontinuity}} \tilde{\text{Incarceration}}_i + X_i' \kappa_{\text{2nd stage}} + \mu_o + \mu_r + \epsilon_i
 \end{aligned}
 \tag{16}$$

where  $\mu_o$  denotes fixed effects for the offense class of the arresting charge,  $\mu_r$  denotes fixed effects for the defendant's prior record points, and  $\text{Above a Threshold}_i$  is an indi-

<sup>56</sup>For example, cocaine sales is in row G, while cocaine possession is in row I.

<sup>57</sup>For example, a conviction for a misdemeanor like shoplifting adds one point while a mid-level felony like robbery adds four points.



cator for being above one of the focal thresholds in the guidelines (illustrated in Figure A.9). We estimate this within a four-point bandwidth of the thresholds. We include additional controls in  $X_i$  that mimic those in [Rose and Shem-Tov \(2021\)](#) within our data: defendant gender, race, ethnicity, age, charge code, county of conviction, year of offense, and number of previous convictions.

**Table A.12: Incarceration and Re-Arrest**

	% Violent Re-Arrest (5 Years)		% Any New Offense (5 Years)	
	(1)	(2)	(3)	(4)
Instrumented Incarceration	-0.109** (0.053)	-0.127** (0.057)	-0.290*** (0.090)	-0.282*** (0.094)
Additional Controls		✓		✓
Dependent Mean	8.1	8.1	36.4	36.4
F-stat (excluded instruments)	162.4	109.1	162.4	109.1
# Cases	55,837	55,837	55,837	55,837
# Defendants	47,171	47,171	47,171	47,171

*Notes:* This table presents the two-stage least squares estimates of the effect of incarceration on re-arrest, using the discontinuities in incarceration rates induced by the North Carolina Sentencing Guidelines (shown in Figure A.9). Each column estimates Equation 16 in a four-point bandwidth around the thresholds in the guidelines. The first two columns consider violent re-arrest (felony assault, murder, manslaughter, serious sex offenses, robbery, burglary, kidnapping, and arson). The next two columns consider any arrest for new felonies. Re-arrest is measured in the five years after disposition, so the sample is limited to cases disposed between 1995 and 2015 to allow for five full years of post-disposition data to observe re-arrest. Additional controls are defendant gender, race, ethnicity, age, charge code, county of conviction, year of offense, and number of previous convictions. Standard errors are clustered by defendant. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.

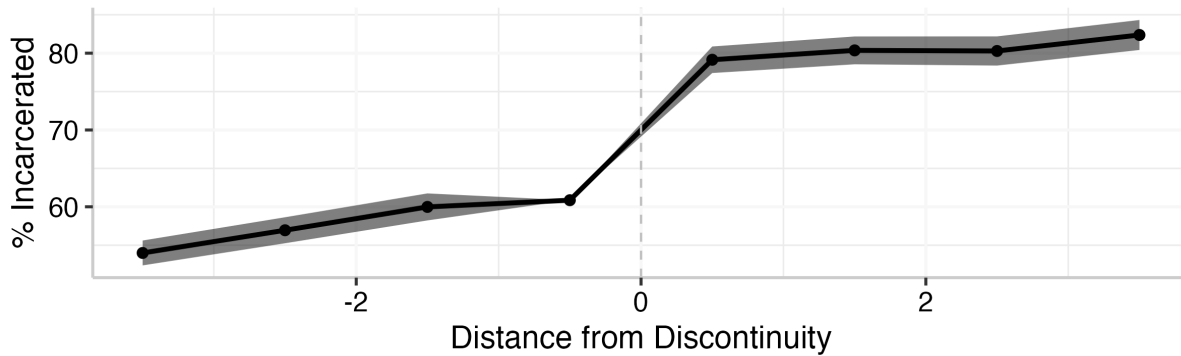
**Figure A.9: Incarceration Discontinuities in North Carolina Sentencing Guidelines**

**Panel (a): Illustrating the Guidelines Since 2013**

		PRIOR RECORD LEVEL					
		I 0-1 Pt	II 2-5 Pts	III 6-9 Pts	IV 10-13 Pts	V 14-17 Pts	VI 18+ Pts
OFFENSE CLASS	E	I/A 25 - 31	I/A 29 - 36	A 33 - 41	A 38 - 48	A 44 - 55	A 50 - 63
		<b>20 - 25</b>	<b>23 - 29</b>	<b>26 - 33</b>	<b>30 - 38</b>	<b>35 - 44</b>	<b>40 - 50</b>
		15 - 20	17 - 23	20 - 26	23 - 30	26 - 35	30 - 40
	F	I/A 16 - 20	I/A 19 - 23	I/A 21 - 27	A 25 - 31	A 28 - 36	A 33 - 41
		<b>13 - 16</b>	<b>15 - 19</b>	<b>17 - 21</b>	<b>20 - 25</b>	<b>23 - 28</b>	<b>26 - 33</b>
		10 - 13	11 - 15	13 - 17	15 - 20	17 - 23	20 - 26
	G	I/A 13 - 16	I/A 14 - 18	I/A 17 - 21	I/A 19 - 24	A 22 - 27	A 25 - 31
		<b>10 - 13</b>	<b>12 - 14</b>	<b>13 - 17</b>	<b>15 - 19</b>	<b>17 - 22</b>	<b>20 - 25</b>
		8 - 10	9 - 12	10 - 13	11 - 15	13 - 17	15 - 20
	H	C/I/A 6 - 8	I/A 8 - 10	I/A 10 - 12	I/A 11 - 14	I/A 15 - 19	A 20 - 25
		<b>5 - 6</b>	<b>6 - 8</b>	<b>8 - 10</b>	<b>9 - 11</b>	<b>12 - 15</b>	<b>16 - 20</b>
		4 - 5	4 - 6	6 - 8	7 - 9	9 - 12	12 - 16
	I	C 6 - 8	C/I 6 - 8	I 6 - 8	I/A 8 - 10	I/A 9 - 11	I/A 10 - 12
		<b>4 - 6</b>	<b>4 - 6</b>	<b>5 - 6</b>	<b>6 - 8</b>	<b>7 - 9</b>	<b>8 - 10</b>
		3 - 4	3 - 4	4 - 5	4 - 6	5 - 7	6 - 8

DISPOSITION	
Aggravated Range	
PRESUMPTIVE RANGE	
Mitigated Range	

**Panel (b): Changes in Incarceration**



Notes: This figure illustrates the discontinuities in incarceration induced by the North Carolina Sentencing Guidelines. Panel (a) illustrates the guidelines or “grid,” used since 2013. A similar set of guidelines were used between 1995 and 2012. The defendant’s charge determines the row, with more severe charges in higher rows. The defendant’s criminal record determines the column, based on a statutory formula that summarizes the length and severity of his record. The prior record level groups multiple prior points together. Each cell of the grid specifies the allowable types of punishments — “A” denotes incarceration and “I” and “C” denote the type of probation – as well as the range of acceptance sentence lengths in months (for aggravated, presumptive, and mitigated sentences). The black lines highlight where the recommended sentence type changes and incarceration becomes possible (in row I) or mandatory (in rows E, F, G, and H). Panel (b) illustrates the discontinuous shift in incarceration rates around these thresholds, pooling across all of these thresholds using our data from 1995 to 2019.

## F.2 Across-Prosecutor Design

Our second design compares the violent re-arrest rates across prosecutors with different incarceration propensities. This design utilizes the fact that much of the variation in prosecutors' incarceration rates is unrelated to their (in)accuracy and instead, reflects, for example, the relative weights that prosecutors place on the social costs of incarceration versus future crime.<sup>58</sup>

To estimate the relationship between a prosecutor's incarceration tendency and the violent re-arrest rate in her cases, it would be natural to relate prosecutors' estimated re-arrest and incarceration effects from Equations 9 and 10, as in:

$$\hat{\psi}_{\text{Violent Re-arrest},p} = \gamma + \Phi \hat{\psi}_{\text{Incarceration},p} + \epsilon_p.$$

Yet, in a finite sample, variation in the unobservable characteristics of a prosecutor's caseload could affect both her estimated effect on incarceration and on re-arrest ( $\frac{1}{N_p} \sum_{i=1}^{N_p} v_i \neq \frac{1}{N_p} \sum_{i=1}^{N_p} \zeta_i$  from Equations 9 and 10). For example, a prosecutor might randomly receive a set of cases where defendants were more likely to be re-arrested for reasons that the prosecutor can observe but the researcher cannot. These unobservable differences might increase the prosecutor's apparent effect on both incarceration and re-arrest ( $\frac{1}{N_p} \sum_{i \in P} v_i > 0$  and  $\frac{1}{N_p} \sum_{i \in P} \zeta_i > 0$ ), thereby biasing  $\Phi$  upward and causing us to understate the extent to which higher rates of incarceration reduce re-arrest.

To overcome this challenge, we randomly split each prosecutor's caseload in half and instrument the prosecutor's estimated incarceration effect in one split,  $x$ , with her estimated incarceration effect in the other independent split,  $x'$ , according to the following two-stage design:

$$\begin{aligned} \text{First Stage:} & \quad \hat{\psi}_{\text{Incarceration},p,x'} = \Phi_{\text{1st Stage}} \hat{\psi}_{\text{Incarceration},p,x} + u_{p,x'} \\ \text{Second Stage:} & \quad \hat{\psi}_{\text{Violent Re-arrest},p,x'} = \Phi_{\text{IV}} \tilde{\psi}_{\text{Incarceration},p,x} + v_{p,x'}, \end{aligned} \quad (17)$$

where  $\tilde{\psi}_{\text{Incarceration},p,x}$  denotes the predicted values from the first stage. Under random assignment, the prosecutor's two sets of cases will have independent idiosyncracies: the instrumental-variables approach will then capture the effect of the prosecutor's systematic incarceration tendency and net out the effect of idiosyncracies in any given

<sup>58</sup>We find that prosecutors' inaccuracy explains a third of the variation in the systematic component of their incarceration rates that replicates across random splits of their cases. To the extent to which the variation in prosecutors' incarceration rates is driven by their (in)accuracy, this strategy will lead a conservative assessment of more accurate prosecutor's impact on social value. To see this, suppose more accurate prosecutors have lower incarceration rates. In this case, we will *understate* how much increasing incarceration would reduce violent re-arrest and consequently underestimate how much accurate prosecutors could reduce violent re-arrest if they did not also reduce incarceration. Now, suppose, instead, that more accurate prosecutors have higher incarceration rates. In this case, we will *overstate* how much increasing incarceration would reduce violent re-arrest and ascribe too much of accurate prosecutors' lower violent re-arrest rates to their higher incarceration rates.

set of cases. We use our full sample of cases to estimate this relationship but arrive at similar estimates when limiting to surveyed prosecutors (Table A.13).

**Table A.13: Estimating the Average Relationship Between Prosecutors’ Incarceration and Re-Arrest Outcomes**

	Panel (a): Violent Re-Arrest					
	Full Sample			Survey Sample		
	Incarceration Sample $x'$	Violent Re-Arrest Sample $x'$		Incarceration Sample $x'$	Violent Re-Arrest Sample $x'$	
	(1)	(2)	(3)	(4)	(5)	(6)
Incarceration in Sample $x$	0.76*** [0.029]	-0.061*** [0.011]		0.83*** [0.076]	-0.089* [0.044]	
Predicted Incarceration in $x'$ ( $\tilde{\psi}_{p,Incar,x'}$ )			-0.080*** [0.017]			-0.11* [0.067]
Dependent Mean	23.87	7.70	7.70	21.55	8.62	8.62
	Panel (b): Any Re-Arrest					
	Full Sample			Survey Sample		
	Incarceration Sample $x'$	Any Re-Arrest Sample $x'$		Incarceration Sample $x'$	Any Re-Arrest Sample $x'$	
	(1)	(2)	(3)	(4)	(5)	(6)
Incarceration in Sample $x$	0.76*** [0.029]	-0.12*** [0.024]		0.83*** [0.076]	-0.12 [0.093]	
Predicted Incarceration in $x'$ ( $\tilde{\psi}_{p,Incar,x'}$ )			-0.16*** [0.036]			-0.14 [0.14]
Dependent Mean	23.87	31.01	31.01	21.55	33.18	33.18
# Prosecutors	2,129	2,129	2,129	110	110	110
# Cases	744,560	744,560	744,560	65,995	65,995	65,995

Notes: This table estimates the average relationship between a prosecutor’s impact on incarceration and her impact on (a) violent re-arrest and (b) any re-arrest, using our split-sample, instrumental-variables design (Equation 17). Columns 1–3 consider the full sample and Columns 4–6 limit to the survey sample. Each prosecutor’s cases are randomly divided into two equally sized samples,  $x$  and  $x'$ . Columns 1 and 3 show the first stage relationship between prosecutor’s estimated incarceration effects (Equation 9) across the two samples. Columns 2 and 4 show the reduced-form relationship between a prosecutor’s estimated incarceration effect in one sample (Equation 9) and her re-arrest effect in the other (Equation 10). Columns 3 and 6 rescale the reduced-form coefficient by the first-stage to account for measurement error. Re-arrest is measured in the three years after disposition. The sample is limited to cases disposed before 2016 to allow for three full years of post-disposition data to observe re-arrest (since 90 percent of cases make it from arrest into the Superior Court data system within a year, felony arrest data is reliable through 2018). Block-bootstrapped errors that sample by prosecutors are in brackets. \*\*\*Significant at the 1% level; \*\*significant at the 5% level; \*significant at the 10% level.