

# Social Identity and Criminal Justice Contact

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## Abstract

We use a census of over seven million defendants from the North Carolina judicial system, each person who was arrested from 2013 through 2019 to understand the impact of social and demographic factors on contact with the judicial system. We build a composite index of disadvantage, incorporating information on age, race, and gender as well as information we impute from the individual's home address. Using geocoded residential addresses allows us to map each individual to different neighborhoods defined by common property values or income levels. We develop a five-fold index based on estimated income, age, race, gender, and characteristics of the neighborhood. This index is strongly associated with various measurable outcomes from the criminal justice system: Contact (rates of arrest), charge dismissals, plea deal acceptance, hiring of private legal counsel, and sentencing outcomes. Here, we focus on contact.

Keywords: Criminal Justice, Race and Politics, Identity, Intersectionality, Social Disadvantage

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## **Introduction**

Some people are more likely to be arrested than others. Why? It would be nice to think that being arrested is associated with violating important aspects of the social contract: Criminals and violent outsiders should be arrested, whereas law-abiding citizens should not. It would be disturbing to think patterns of arrest are strongly related to social identities rather than to rates of involvement in criminal behavior. But this is an empirical matter and we treat it as such here.

We use a database consisting of every person arrested in North Carolina from January 1, 2013 through December 31, 2019 to assess these questions. Our database is a copy of the court records maintained by the North Carolina Administrative Office of the Courts (NC-AOC), which makes a five-year extract of the database available for research purposes. We originally obtained the database for 2013 through 2017 and later supplemented records going through 2019, merging them to create a seven-year snapshot of the entire state court system, with over 13 million charges against seven million individuals (North Carolina Administrative Office of the Courts, 2014).

## **Quantifying Disadvantage in the Criminal Legal System**

One conceptual difficulty when describing legal system outcomes in terms of social identity involves the role of intersectionality. In short, “intersectionality is a lens through which you can see where power comes and collides, where it interlocks and intersects” (Crenshaw, 2017). When studying criminal legal system outcomes, this lens provides a way to understand how various social identities come into conflict with state institutions. For example, a young Black man will not experience the criminal legal system the same as an older Black man who will, in turn, not experience the system similarly as an older Black woman. These differences emerge through the charges defendants receive, the legal representation each defendant can afford, and the ability to

contemplate a prosecutor's plea bargain deal. These nuanced differences of experiences, however, do not always translate into our descriptive models on legal system outcomes.

To ensure that our descriptive models do not ignore the role of intersectionality, we develop two quantitative measures that take the complex identities of our defendant sample and maps them to a continuous scale of social disadvantage: The Disadvantage Score, and the Contact Score.

***Disadvantage Score:*** We construct a continuous scale where we use previous works on social identity and disadvantages in the criminal legal system to assign a series of disadvantage points to defendants based on their identity-related characteristics. This measure provides a way to test whether common expectations of social disadvantage translate to poor legal system outcomes. We use age, gender, race, and an estimate of economic status to create this score. Our estimate of economic status derives from the average value of real estate in the neighborhood where the individual lives. Because all of these bits of information are also available through the US Census, we can use the Census as a baseline to calculate rates of contact per 10,000 individuals of a given demographic and economic profile. To our knowledge, this has not been previously estimated for an entire US state.

***Contact Score:*** For each group defined in the previous section, we construct a "contact score" estimating the odds of contact with the criminal justice system. For each 10,000 individuals with that demographic profile, how many are arrested? We can do this for any type of crime (e.g., traffic offenses, wildlife violations, or violent felonies), but here our focus is on the overall trends. Note that these contact scores are not statistical estimates; they are observed values. For any demographic group, we can count how many such people live in the state of North Carolina and the number who are arrested for various crimes. Thus, for any crime, we can

see the demographic profile of what groups of individuals have the greatest or the lowest odds of such an arrest. For this paper, we focus on all arrest combined, but our database allows us to calculate such rates separately for any type of crime that might be of interest.

## **Developing a Scale of Social Disadvantage**

Our first measure distinguishes the socially privileged from the socially disadvantaged. Using reported defendant information on race/ethnicity, gender, age, and residential address, we construct a four point scale that distinguishes, at one extreme, between older white women from high income neighborhoods and younger black men living in the state's poorest neighborhoods. This additive scale attempts to capture the multiple identities of NC-AOC defendants while ordering them along a unidimensional scale of social disadvantage. On this unidimensional scale, defendants who receive a high score are assumed to be at a greater social disadvantage going into the criminal legal system.

The scale is constructed as follows:

- Race: One point for those who are Black, Hispanic, or Native American; zero for White and Asian-Americans.
- Sex: One point for males; zero for females.
- Age: + 1 if 18 to 34; + 0.75 if 35 to 44; + 0.5 if 45 to 54; + 0.25 if 55 to 64; and zero otherwise.
- Economic: +1 if in the lowest 20 percent of neighborhood housing value; +0.75 for the next 20 percent; +.50 for the third group; +0.25 for the fourth group; and zero for those in the highest 20 percent of neighborhood housing value.

In the next sections, we break down the social disadvantage score by its component parts.

We begin with race.

### ***Racial/Ethnic Disadvantage***

We begin by focusing on the role of race/ethnicity and the social disadvantages that are associated with being a member of a specific racial group. Here we expect Blacks, Hispanics (Latino/a/x), and Native Americans to be at the greatest social disadvantage when entering the criminal legal system. First, and foremost, Black Americans have been the direct targets of the carceral state since first being brought to the US as enslaved people. As Bruce Western describes, “We can read the story of mass imprisonment as part of the evolution of African American citizenship. Each piece of this story – pervasive incarceration, unemployment, family instability – shows how mass imprisonment has created a novel social experience for disadvantaged blacks that is wholly outside of the mainstream of social life” (Western 2006, 193).

Similarly, Hispanic Americans have been the target of this nation’s immigration laws. NC counties have seen their Hispanic populations increase over time as the state’s agricultural and migrant worker economy have drawn new members of the community. One consequence of this growing population has been law enforcement’s use of state traffic and vehicle laws to target individuals for immigration enforcement (Baumgartner et al., 2018). Finally, Native Americans make up a disproportionate share of prison and jail populations throughout the United States (Wang, 2021). In North Carolina, Robeson County houses the state’s largest Native group, the Lumbee tribe. This same county has historically suffered from poverty, racial strife, and miscarriages of justice, particularly with respect to the Black and Lumbee populations (Segrest 1988).

Going into the criminal legal system, we can expect many of these outside social disadvantages to translate into institutional disadvantages. Additional factors such as lower educational attainment, income status, and access to quality legal representation all make it

difficult for defendants from these backgrounds to navigate the judiciary. We therefore assign one point (+1) to all NC-AOC defendants who belong to these racial/ethnic groups (e.g., Black, Hispanic, Native American) and assign zero to defendants who do not (e.g., White and Asian-Americans).

### ***Gender Disadvantage***

Next, we focus on the role of gender and how the criminal legal system treats men and women differently. To begin, the criminal legal system is very gendered. Our data make clear that men commit more crimes than women and that they tend to be more violent, but also that they experience a series of institutional disadvantages when inside the criminal legal system. In our database, men make up large shares of the overall population, from a small majority of traffic offenses to over 90 percent of some infraction categories, such as violent crimes. Previous work on gender and legal sentencing have described the gender imbalances of charging and sentencing (Hedderman & Hough, 1994). Specifically, holding fixed the severity of the crime, women tend to receive more lenient sentences from institutional actors, such as judges and prosecutors (Hedderman & Hough, 1994). This is not to say that gender does not matter for there are plenty of legal offense categories where women are placed at a greater disadvantage. The most noticeable example being self-defense laws where prosecutors rarely extend the law's protection to women who kill intimate partners in self-defense (O'Brien, 2020). Based on these expectations surrounding gender, we assign one point (+1) to all male NC-AOC defendants and zero to all female defendants.

### ***Age Disadvantage***

For our third characteristic, we focus on defendant age and the various social disadvantages that come with being young versus old in the criminal legal system. Age plays an outsized role in the

criminal legal system because young individuals (Age < 35) commit more crimes than any other age demographic group. For example, young men are the largest contributors of homicides in the United States (Baumgartner et al., 2017). In our database, this skew towards youth also applies to offense categories, such as sexual assault, property crimes, and drug crimes. In addition to committing more crimes, law enforcement targets young individuals for high-discretion acts, such as traffic stops (Baumgartner et al., 2018). Finally, young individuals often lack access to the same material and legal resources that older defendants might take for granted. This includes access to quality legal counsel, which many young defendants cannot afford without family assistance. Based on these expectations, we assign the following points to defendants based on their age at the time of their offense: + 1 if 18 to 34, + 0.75 if 35 to 44, + 0.5 if 45 to 54, + 0.25 if 55 to 64, and + 0 otherwise. We use U.S. census age cohort categories to facilitate comparisons with published census data.

### ***Economic Disadvantage***

Finally, we focus on the role of economic disadvantage and how it structures a defendant's experience inside the criminal legal system. We approximate the socioeconomic status of defendants by geocoding their residential home addresses. We then map them to a 1x1 square kilometer grid cell layer that estimates the median household income for the entire state of North Carolina. We assign points based on a defendant's geographic location. Defendants located in the first pentile – regions with lowest 20 percent of median household income – receive +1 points while defendants located in the last pentile – regions with highest median household income – receive zero points.

### ***Resulting Index***

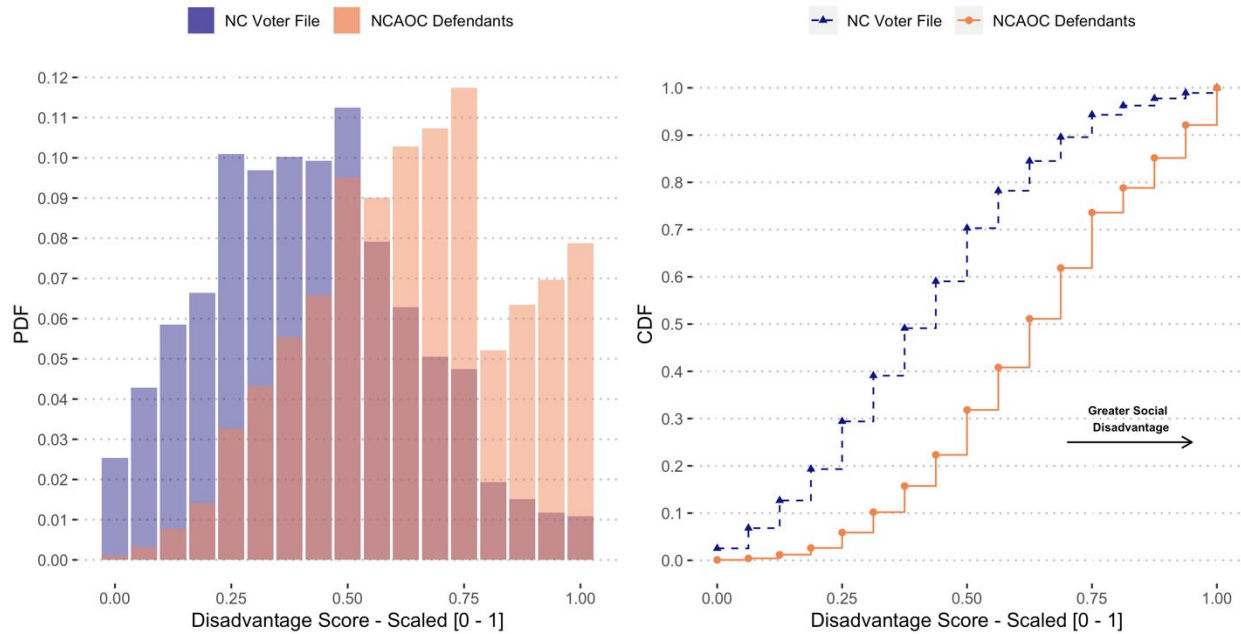
The resulting index of disadvantage would have a score of zero for any individual who was most advantaged on each of the four indicators laid out above: White or Asian; Female; Aged 65 or older; and living in a neighborhood in the top 20 percent of income. By contrast, someone at the opposite end of the distribution (e.g., a young Black / Hispanic / Native American male living in a poor neighborhood) would have a high score on the index. The index is normalized to vary between zero and one with one indicating the maximum degree of disadvantage.

### ***Social Disadvantage of NC-AOC Defendants compared to NC Registered Voters***

North Carolina makes available a public file of all voter registrations, including age, race, gender, and address of the voter (see North Carolina State Board of Elections, 2022). We can therefore apply the same methodology as used above to this data base in order to illustrate the social differences between voters and those charged with criminal charges. (Note that we include traffic infractions in this general overview, but our data can be decomposed to any type of criminal infraction.) Figure 1 illustrates the distribution of our disadvantage score for NC-AOC defendants compared to registered voters.



Figure 1. Social Disadvantage Scores in the NC Voter File compared to NC-AOC Defendants.



The most socially disadvantaged individuals represent approximately eight percent of those in the NC-AOC database, but less than one percent of registered voters. The most advantaged individuals represent approximately 2.5 percent of registered voters, but a vanishingly small share of those with contact with the criminal justice system. The two graphics in Figure 1 clearly show a rightward skew to the NC-AOC population compared to registered voters; the size of that gap represents the degree to which the socially disadvantaged are more likely to be arrested than they are to be registered to vote. For some categories, it is a large gap. For those with a disadvantage score below 0.50, on the other hand, they have a much greater chance of voting than of being arrested.

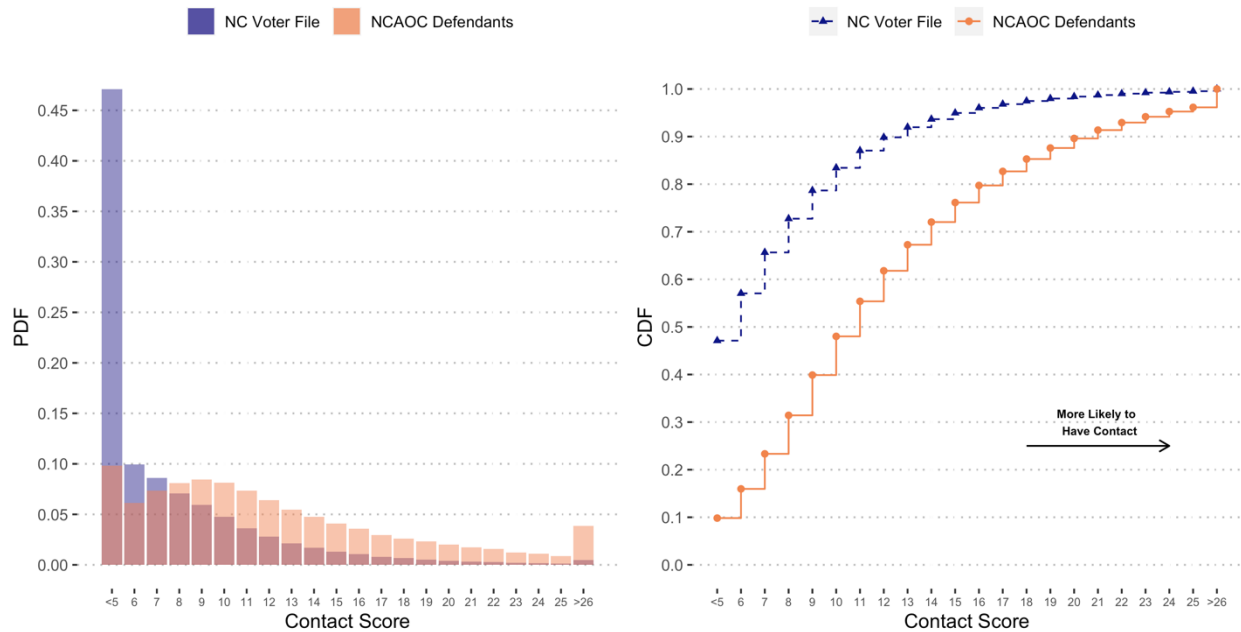
### **Social Disadvantage and Contact with the Criminal Justice System**

Once we have in place an index of disadvantage and can assign each individual a score, it is a simple matter to assess how many of each group have contact with the criminal justice system.

Of course, we have to consider that there may be different numbers of such individuals in the community; the social disadvantage score is not balanced with equal numbers in each group. Therefore, we calculate rates of criminal justice contact as a share of the total population. For each 10,000 individuals in the population (measured using the US Census), how many are arrested?

Figure 2 illustrates the distribution of our contact scores for NC-AOC defendants. Again, we contextualize these scores by comparing the distribution of our defendants with the distribution of contact scores for registered voters in the NC Voter File. The remainder of this section describes how we construct contact scores for each NC demographic subgroup. In addition, using the posterior distributions for each demographic subgroup, we describe contact for superordinate classifications, such as Black, White, and individuals of different age groups. These scores allow us to assess the relative frequency of contact for each demographic subgroup with the criminal legal system.

Figure 2. Relative Degree of Contact with the Criminal Justice System, NC Registered Voters and NC-AOC Defendants Compared.



The median registered voter in North Carolina has almost no contact with the criminal justice system, but the median NC-AOC defendant (who by definition has at least some contact) has significant contact. Almost five percent of those in the NC-AOC database have very high levels of contact, but well fewer than one percent of registered voters have contact levels falling even in the highest one-quarter of the distributions shown in Figure 2. In sum, the NC-AOC database is highly distinct from the more general registered voter file. There should be no surprise in this difference, but the construction of the index of contact as well as the index of social disadvantage allows us significant empirical leverage, which we explain in the next sections.

### **Constructing Contact Scores for NC Demographic Groups**

In order to assess the relation between social disadvantage and contact with the criminal justice system, we begin by identifying all demographic subgroups. We achieve this by permuting U.S. Census categories on race (Asian, Black, Hispanic (Latino/a/x), Native, and White), gender (Male and Female), age cohort (18 to 24, 25 to 34, 35 to 44, 45 to 54, 55 to 64, and 65 and over), and geography, using thousands of U.S. Census place designations for North Carolina. In doing so, we identify 50,341 unique demographic subgroups and use these subgroups as building blocks for more aggregate demographic categories.

Next, we generate numerator values – number of individuals who had contact with the criminal legal system – by identifying all unique NC-AOC cases for each calendar year between 2013 and 2019. We geocode the residential addresses of defendants and match them to appropriate U.S. Census place designations. We then count the number of defendants for each demographic subgroup by tabulating across reported race, gender, age, and US census place designation. Finally, we generate denominator values by calculating population totals for each

subgroup using 2018 5-year ACS estimates. To remove the issue of zero-estimate subgroups<sup>1</sup> and proportions greater than 100 percent<sup>2</sup>, we use the upper estimates of the 95 percent confidence interval as the population total (ACS + 95 MOE) as the population total for each subgroup. Table 1 provides a sample of the demographic subgroup permutations along with their ACS estimates and upper estimates.

Table 1. Selected Location, Race, Gender, Age, and Census Population Estimates

Location	Place GEOID	Race	Gender	Age Cohort	ACS Estimate	ACS Estimate (+ 95 MOE)
Greensboro	3728000	Latino/a	Women	45 to 54	1,061	1,257
Raleigh	3755000	Black	Women	Over 65	6,519	7,381
Wilmington	3774440	White	Men	45 to 54	5,064	5,440
Winston-Salem	3775000	Native	Men	45 to 54	71	126
Charlotte	3712000	Latino/a	Men	55 to 64	3,209	3,392
Greensboro	3728000	White	Men	45 to 54	8,072	8,673
Charlotte	3712000	Latino/a	Men	45 to 54	6,673	6,927
Fayetteville	3722920	Black	Women	25 to 34	7,657	8,108
Raleigh	3755000	Asian	Men	35 to 44	1,669	1,979
Greensboro	3728000	Black	Women	25 to 34	10,666	11,525

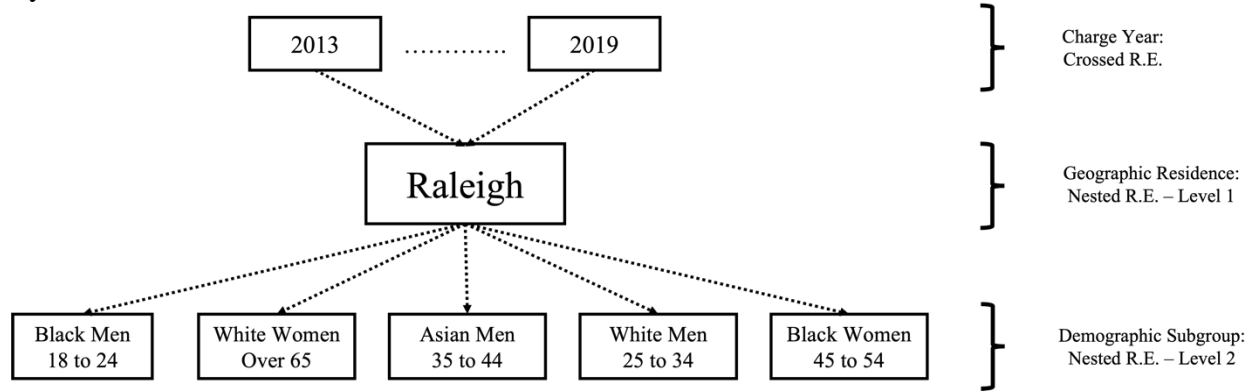
Source: US Census, American Community Survey, 2018.

Using the numerator and denominator estimates for each demographic subgroup, we calculate measures of contact with the criminal legal system for each demographic subgroup as well as uncertainty measures. We achieve this by specifying a random intercept binomial model where the number of trials equals a demographic group’s population (ACS estimate + 95 MOE) and the number of successes as the number of unique individuals who had contact with the criminal legal system in a given year. Figure 3 illustrates the experimental design for the random intercept model, which includes both crossed random effects (Year) and nested random effects (race, gender, age cohort subgroup nested inside geographic location).

<sup>1</sup> Subgroups where the 5-year ACS estimate equals zero. This issue commonly occurs for minority group members in rural locations.

<sup>2</sup> Approximately 20 percent of demographic subgroups fall into this category when using ACS estimates.

Figure 3. A Random Intercept Model for Estimating Rates of Contact with the Criminal Justice System



In using this experimental design, we can estimate the proportion of individuals who have contact for each demographic subgroup and year. In addition, we can difference out year-to-year random effects to better understand the degree of consistency in contact with the criminal legal system for various subgroups over time. One benefit of random intercept models over simple ratios involves the shrinkage of random effect estimates towards the mean of the distribution. This increases the precision of estimates of demographic groups with low numbers of documented contacts.

To estimate this random intercept binomial model, we adopt a Bayesian modelling approach based on INLA estimation strategy (Martino & Riebler, 2019). With this Bayesian approach, we can provide a range of plausible estimates by summarizing the posterior distribution for each demographic subgroup. In addition, we can use the variance of the posterior distributions as a proxy for contact uncertainty. To estimate the proportion of individuals who have contact, we use a Binomial likelihood (Equation 1). In this equation,  $y$  is the number of individuals who had contact,  $n$  is the population total for a demographic subgroup, and  $p$  is the proportion of individuals who have contact, which is latent.

Equation 1.

$$y_i \sim \text{binomial}(n_i, p_i)$$

$$p = \binom{n}{y} p^y (1 - p)^{n-y}$$

When estimating contact rates, we draw inferences about  $p$  using the random intercept experimental design. Equation 2 summarizes our model specification for the random intercept model along with chosen priors.<sup>3</sup> In this equation,  $B$  is the grand intercept of the model,  $\Psi$  represents yearly cross random effects, and  $\Phi$  represents the nested random effects between geography, gender, age, and race. In this model specification, we can provide a range of plausible estimates of contact rates for each demographic subgroup. In addition, we can marginalize out the yearly cross random effects  $\Psi$  to generate average contact rates between 2013 and 2019.

Equation 2.

$$\text{logit}(p_{ij}) = B + \Psi_i + \Phi_j$$

$$\Psi \sim \text{Normal}(0, \tau^{-1})$$

$$\Phi \sim \text{Normal}(0, \tau^{-1})$$

$$\tau \sim \text{pc.prior}(3 * \sigma_r, 0.01)$$

## **Describing Contact with the NC Criminal Legal System**

Using the posterior distributions, we can construct contact rates and uncertainty measures for superordinate classifications, such as Black, White, and 18 to 24 year-olds. We calculate these scores by treating the posterior distributions as base elements of a weighted mixture. For example, the proportion of Black individuals in North Carolina who have contact with the criminal legal system is equal to the sum of contact scores for each demographic subgroup with

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<sup>3</sup> We assume  $\Psi$  and  $\Phi$  are drawn from a normal distribution with mean of 0 and standard deviation of  $\tau^{-1}$ . We assign a non-informative penalized complexity prior to  $\tau$ , which allows the chosen likelihood to dominate the posterior distribution rather than our chosen prior. This penalized complexity prior makes probabilistic inferences about the precision term  $\tau - p(\tau > d) = \alpha$ . Here we assume that the probability  $\tau$  is greater than  $3 * \sigma_r$  is less than 1 percent, where  $\sigma_r$  is the standard deviation of the residuals from a non-hierarchical intercept model (i.e.,  $y \sim 1$ ).

that racial category (i.e., 18 to 24 Black men from Charlotte, 55 to 64 Black women from Raleigh, etc.). Unlike simple ratio estimates, this weighted mixture estimate can control for subgroup variation<sup>4</sup>. This subgroup variation poses a problem for skewed offense categories, such as drug and sexual crimes, as certain demographic subgroups do not commonly commit such offenses (i.e., over 65 Black women charged with sexual assault). The remainder of this subsection describes the mean estimate for several superordinate classifications.

Figure 4. Overall Yearly Rates of Contact.



Note: each figure represents one percent of the population.

<sup>4</sup> We include all demographic subgroups in our weighted mixture estimates even if no individual appears in the NC-AOC database. We assign these subgroups a contact score with small mean and high variance – contact less than 1 per 100,000 people.

Between 2013 and 2019, very few individuals had contact with the criminal legal system. As Figure 4 illustrates, approximately two in 100 individuals had contact with the state’s system each year. This includes all offense categories, such traffic, vehicle, property, drug, violent, and sexual crimes. This low contact for the state’s entire population does not extend to all racial and ethnic groups, however. As Figure 5 illustrates, Black individuals are twice as likely to have contact with the criminal legal system as the statewide average. This is followed by members of the Lumbee tribe – Native Americans who reside in Hoke, Scotland, and Robeson counties – and White individuals. By contrast, Latinx individuals, Asian-Americans, and Native Americans outside of the Lumbee tribe were much less likely to have such contact.

Figure 5. Estimated Contact Rates across Racial and Ethnic Groups.

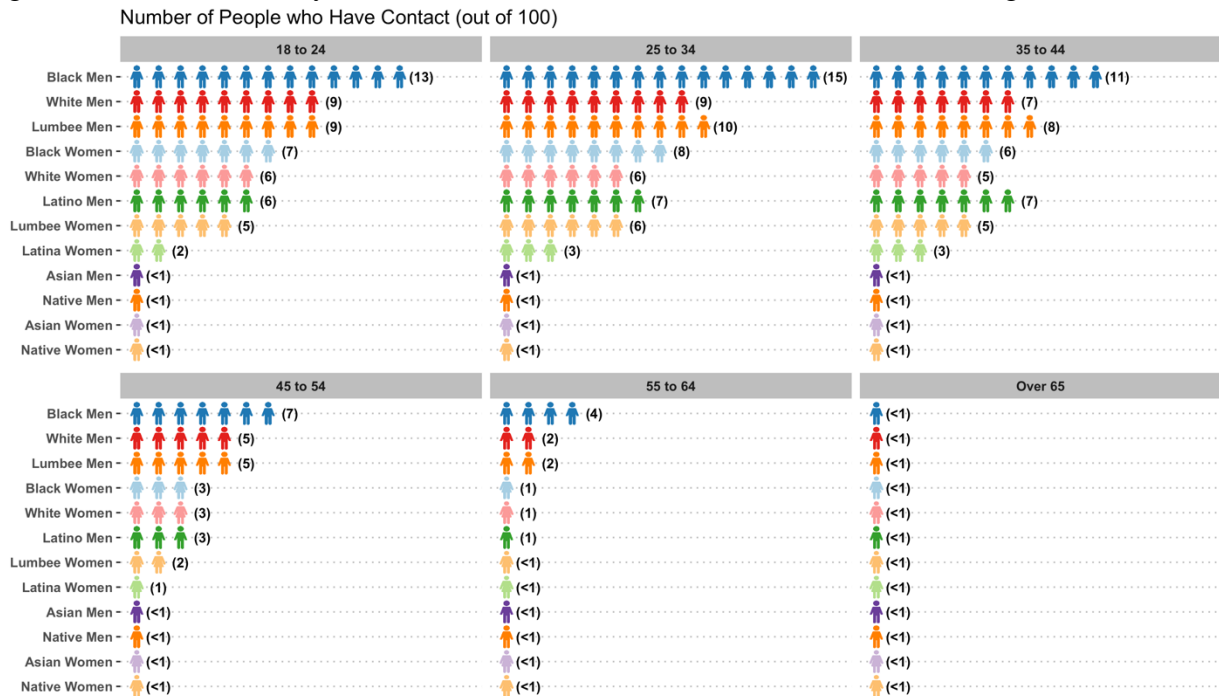


When we introduce gender and age, the racial differences from Figure 5 become more pronounced. As Figure 6 illustrates, these racial differences are driven, in part, by intragroup age



and gender differences. Specifically, young and male-based cohorts have increased contact with the criminal legal system than older cohorts. For example, 15 out of 100 Black men between 25 and 34 have contact with the criminal legal system in a given year compared with less than 1 out of 100 Black men over the age of 65.

Figure 6. Estimated Yearly Contact Rates Across Racial, Ethnic, Gender, and Age Cohorts



Note: Estimates rounded to the nearest whole number

Clearly, we gain a lot by looking at age groups as well as by breaking down the demographic groups by race and gender. All racial and gender groups lose contact with the criminal justice system when they enter their retirement years. Among younger individuals, however, we see great differences by race and gender, with Black men consistently seeing the highest rates of contact.

Finally, we can look across the various geographic regions of the state to assess the power of geography as well. Figure 7 looks at rates of contact overall, then separately for Black, Latinx, and White individuals.

Figure 7. Estimated Contact Across Racial and Geographic Residence  
 Number of Contacts per 100,000

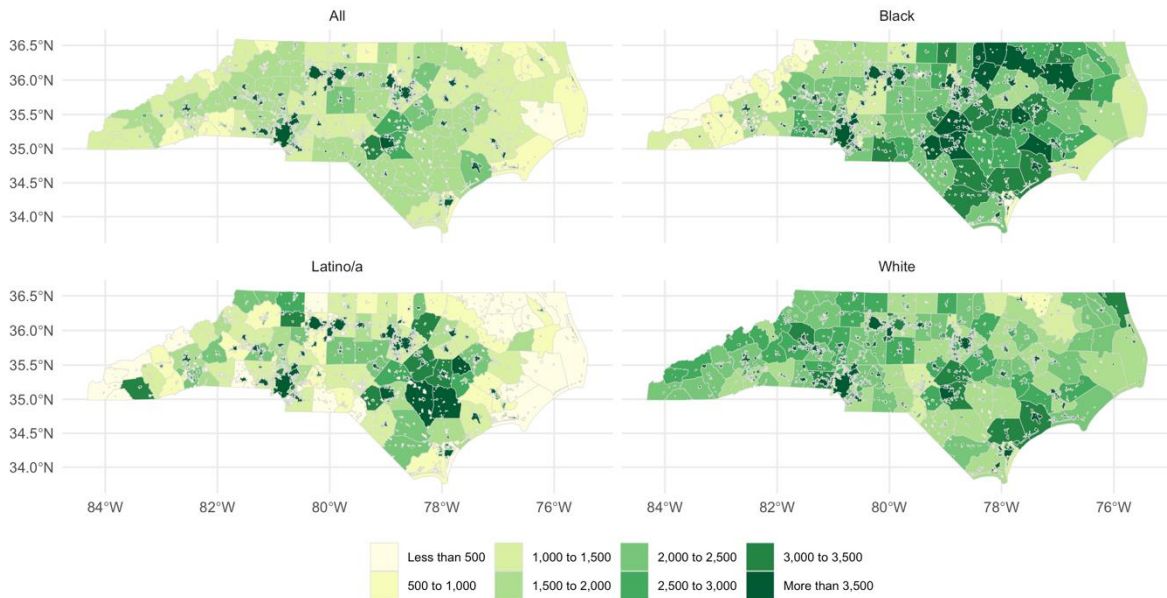
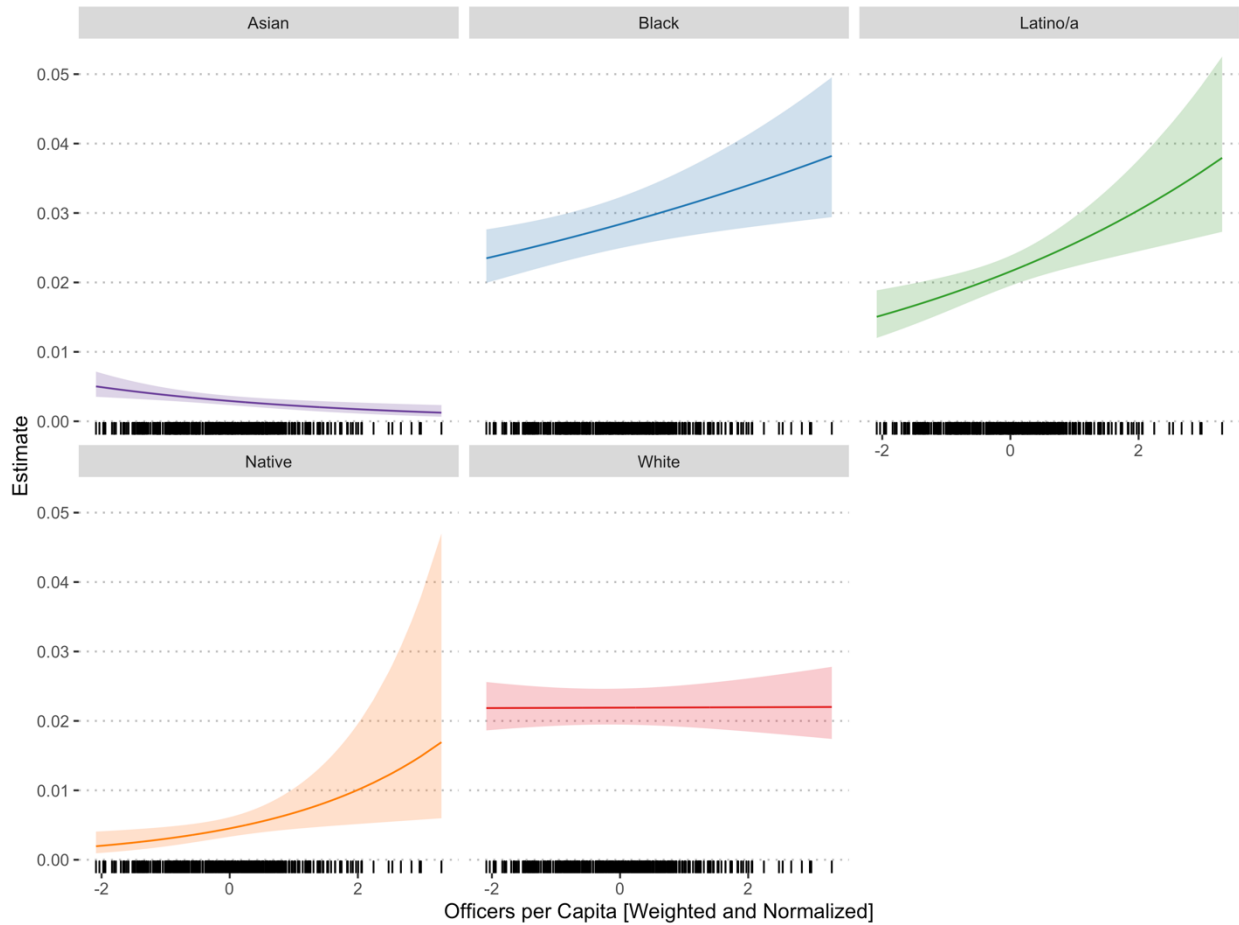


Figure 7 illustrates that contact with the criminal legal system is concentrated in certain jurisdictions, such as the state’s large urban centers (i.e., Charlotte, Greensboro, Raleigh, etc.). Because the figure shows rates of contact per 100,000 members of the population, this is not a simple artifact of population size. Rather, these geographic differences approximate the state’s economic divisions where urban regions possess large enclaves of low-income neighborhoods.

### **Policing Intensity and Criminal Justice Contact**

Different communities have different levels of policing. North Carolina’s 400+ municipalities operate local police departments which range in size based on the population of the community, but also in terms of the number of officers on the force per 1,000 members in the local population. What happens when a community is relatively under- and relatively over-policed, compared to average? That is, when there are more police officers, are there more arrests? Figure 8 shows that the answer is yes, but not for White individuals.

Figure 8. Police Officers per Capita and Contact Rates by Race



We measure police officers per capita by dividing the number of residents (using the Census) by the number of sworn officers (from Uniform Crime Reporting (UCR) data source; see US DOJ, FBI 2019).<sup>5</sup> In the case of Black, Latinx, and Native-American residents, more officers means more arrests. For Asians and Whites, however, there is no such relationship. Several possibilities exist as to why such a relation might exist. On the one hand, communities with high rates of minority crime might hire more police officers. On the other hand, having more police officers per capita may allow those departments with excess capacity to generate

<sup>5</sup> To correct for vacation jurisdictions – large proportion of residents do not reside year round (i.e., mountain and beach communities), we multiply this ratio by the proportion of non-seasonal residents. We then normalize this measure using an arctan transformation. We control for jurisdiction population and the proportion of residents who commit violent crimes (racial/ethnic group specific)

more high-discretion arrests for low-level crimes while targeting minority communities for increased surveillance. Exploring these trends will be an important goal as we continue in our research.

## **Discussion**

We have focused here on describing the development of a new database and series of indicators of rates of criminal justice contact. We expect to use these data and estimates to analyze the dynamics of the criminal justice system in North Carolina in ways that will have important consequences in other states as well.

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