Race, DNA, and Criminal Justice:

Linking Public Opinion to Public Policy

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ABSTRACT:

Genomics research will soon have a deep impact on many aspects of our lives, but its political implications and associations with social forces remain insufficiently understood. In this paper, we explore one piece of the rapidly developing arena: DNA biobanks for law enforcement purposes. All states store genetic information collected from serious offenders (and some from arrestees or certain categories of immigrants); these data are used to investigate both new and previously unsolved crimes. A few states also use DNA databases for partial or familial matches. Racial and ethnic minorities (particularly African Americans) are overrepresented in forensic DNA databanks, and analysts are engaged in an intense debate over whether that disproportionality is likely to harm or benefit minorities and the public at large.

We use a new survey of 4,300 Americans to investigate how the public understands and evaluates forensic DNA databanks. We examine respondents' self-declared knowledge about biobanks, their evaluation of biobanks' relative societal benefits and harms, and their willingness to contribute a DNA sample of their own. The survey items also ask about support for increased governmental funding and regulation, and about trust in government officials' and private companies' contribution to the public good in this arena. We find that members of minority groups -- especially blacks and to a lesser degree non-white Hispanics and Asian Americans -- are no less knowledgeable but hold more negative views about the use of genetic information for law enforcement purposes. Conservatives trust government officials in this arena but resist more funding for DNA biobanks; other demographic, contextual, or attitudinal variables are not strongly associated with views of biobanking. Whether current views remain stable and whether attitudes crystallize along ideological, demographic, or contextual lines -- and whether DNA databanks reinforce or help to offset racial biases in the criminal justice system -- all remain to be seen.

In the mid-1980s, the South Side of Los Angeles was gripped by a serial killer known by police as the "Southside Slayer." The killer targeted young African-American women, most of whom lived alone and worked as escorts or prostitutes. Victims were killed in an identical fashion: sexually assaulted, beaten, and shot with a small-caliber handgun, their bodies later tossed in alleys or dumpsters and found by passersby (Becerra and Gold 2010). Eight women and one man were murdered, and the City of Los Angeles spent extensive resources trying to track down the killer. As abruptly as he came, however, the Slayer retreated and by 1990 the trail had gone cold, leaving behind a grieving community and a puzzled police department.

The 14-year silence was broken in 2002, when the body of Princess Berthomieux was found in South Central Los Angeles. The 15-year old runaway prostitute had been killed using the same *modus operandi* as that of the Southside Slayer: she was beaten and brutally strangled, and her body dumped in an alley. By 2007, two other women were killed in ways that recalled the South Side Slayer, now known to Los Angeles police as the "Grim Sleeper" (Pelisek 2008). At first, the trail seemed as impossible to follow as it had the first time around -- the meticulous and cold-blooded killer left little evidence, and few tips or leads trickled in despite a record $500,000 reward offered by the police department and prominent coverage in outlets such as *America's Most Wanted* and *LA Weekly*[3] (Blankenstein and Rubin 2010). DNA evidence -- a new development since the first round of killings -- was of limited use because the information collected from the crime scenes matched no one in California's offender database.

Based on a new law permitting familial DNA searches, the police department recently changed its strategy; instead of searching the offender database for an exact match, it searched

[3] *LA Weekly* reporter Christine Pelisek won numerous awards for her coverage of the Grim Sleeper slayings; some see her as the first to recognize the link between the recent murders and those from the mid-1980s (Stewart 2009).

for *close* DNA matches. (As we describe below in a bit more detail, thirteen locations on each DNA sample are coded; a close match would be an exact match on, say, eleven or twelve of the thirteen loci.) In 2010, they found an unusually similar sample in the offender database to the DNA sample collected at the crime scene. The sample had been taken from Christopher Franklin, previously arrested and convicted on a felony weapons charge. The police gathered more information about Franklin, including keeping members of his immediate family under surveillance. Several months later, an undercover officer collected discarded pizza crusts left by Franklin's father, Lonnie David Franklin Jr., a 52-year old retired sanitation worker. DNA samples from the pizza perfectly matched the Grim Sleeper's DNA: the police had their man. Lonnie Franklin was arrested and charged with multiple counts of first-degree murder (Dolan and Rubin 2010).

The prosecution's case against Mr. Franklin, currently before a grand jury, was one of the first in the United States to use familial DNA matching, and experts on the use of DNA databanks have responded swiftly and strongly. Although barely twenty years old, genetic forensics and its reliance on DNA collection are now a routine part of major criminal investigations in the United States.[4] All fifty states now collect DNA from convicted criminals and from crime scenes (Department of Justice 2003). Three states (California, Oregon, and, as of March 2011, Virginia) permit these databases to be used for familial DNA matches, such as the one used to apprehend Lonnie Franklin.

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[4] We limit our analysis in this paper to the United States, although the issue is increasing in global salience. In 2007, for example, the European Union countries agreed to share DNA information, thereby creating the world's largest genetic database (Traynor 2007). Familial matching has been used in several other countries for some years. There are excellent surveys on biobanks in the United Kingdom, and a developing academic literature and political discourse (e.g., Sturgis et al 2010; Sturgis et al 2004; Mccartney 2004; Levitt and Tomasini 2006; Levitt 2007; Strucke 2009). We will address these comparative and international issues in future work.

DNA technology has markedly changed the way that crimes are investigated, although experts and advocates disagree on its relative benefits and harms. They disagree even more on how it will affect the ability to avert crimes in the future. Those who endorse expanding reliance on DNA databases argue that -- as President Obama put it after reminding his audience that he is the father of two young girls -- "it's so important to every family across America and there are just too many horror stories that remind us that we're not doing enough…. We insist on justice" (Gerstein 2010). *The Boston Globe* concurred: although familial DNA searches "effectively put[] large numbers of people under surveillance simply because they have a relative in a criminal database[,] if police are zeroing in on a suspected murderer, this seems a small price to pay" (Cook 2011). In May 2011, California's attorney general, Kamala Harris, increased the budget enough to double the number of familial DNA searches for horrendous crimes and to reduce the DNA backlog for other criminal investigations: "California is on the cutting edge of this in many ways. I think we are going to be a model for the country" (Dolan 2011). After all, as the geneticist Frederick Bieber asked, "If the military is using indirect methods to identify Osama bin Laden, then why should it not be used to identify murderers and rapists in Kentucky?" (Dolan 2011). Thus in this view putting more criminals behind bars is a net gain for society, regardless of concerns about possible invasion of privacy and autonomy.

Other analysts challenge the collection and use of DNA samples, and especially familial searches, on constitutional grounds as well as those related to privacy and autonomy. Collection of DNA raises important issues regarding the Fourth Amendment right against unreasonable searches and seizures. For example, DNA may be abandoned, which means that it is collected without subject consent from things like discarded food containers or cigarette butts. (Joh (2006) as an illustration tells of Adolph Lundberg, a California killer tracked down through saliva

left on a discarded coffee cup, and of John Athan, a Seattle murderer who licked the back of a return envelope sent to him by the police.) This kind of evidence is generally not subject to Fourth Amendment protections (per *California v. Greenwood*, 486 U.S. 35 (1999)), increasing substantially the possible reach of DNA collection.

In addition, there are concerns about the indefinite nature of DNA storage. As Rothstein and Talbott (2006) note, there exists no national policy governing sample retention. When it comes to expunging DNA records, "[t]hirty-eight states have statutes describing the process of expungement of DNA information [but t]he majority of states do not provide for automatic expungement upon reversal or dismissal. Instead, thirty-three states require that the offender initiate the procedure for expungement, and only one, Texas, requires that the offender be advised after acquittal of his right to expungement."

New concerns arise as offender databases approach ten million samples: the collection of genetic material is asymmetric across population groups due to racial disproportions in arrests, immigrant detentions, felony convictions, or simply family size. African Americans comprise about two-fifths of those in current law enforcement DNA databases, since about 40 percent of the people convicted of felonies in a given year are African American. Hispanics contribute most of the DNA samples collected from immigrants subject to deportation proceedings, and they have on average larger families than do other groups, thus making them more likely to be found through partial or familial matching procedures. According to one calculation in 2006, assuming that the average person in the database has five living first degree relatives, using partial matches to identify offenders' relevant family members means that about 17 percent of the black population could be under surveillance (Greely et al. 2006). (The disproportion would be even greater if Hispanics were separated from whites, which this calculation did not do, and

it has probably grown in the succeeding years.) To some, this situation conjures a state of "guilt by genetic association" (Forensics News Blog 2010) or even "building Jim Crow's database" (Levine et al. 2008). Eventually, according to one attorney, "what you're gonna end up seeing is nearly the majority of the African American population being under genetic surveillance. If you do the math, that's where you end up" (Schorn 2007; see also Steinhardt 2004; Duster 2004; Scientific Working Group on DNA Analysis Methods, Ad Hoc Committee on Partial Matches 2009).

This paper makes two contributions to this evolving and complex intersection between law and society. First, we develop a third way to view DNA databases for law enforcement purposes: as Obama's and Harris's support hints, genetic forensics have the potential for helping as well as harming disadvantaged groups. After all, African Americans and Hispanics are disproportionately victimized by crime as well as by overpolicing, and women are disproportionately victimized by sex-linked offenses: all of the Grim Sleeper's victims were African American and most were women. In addition, African Americans and Hispanics could benefit from the fact that DNA samples are not themselves racially biased, whereas many components of the conventional criminal justice system – police stops, arrests, eyewitness reports, police treatment and reports, quality of legal counsel, judges' rulings, juries' verdicts, drug laws, drug-free zones – may be. As the National Academy of Sciences report *Strengthening Forensic Science* puts it, "among existing forensic methods, only nuclear DNA analysis has been rigorously shown to have the capacity to consistently, and with a high degree of certainty, demonstrate a connection between an evidentiary sample and a specific individual or source" (Research Council of the National Academies 2009).

A final basis for the view that biobanks can benefit the disadvantaged is the fact that

since 1989, DNA evidence has contributed to overturning convictions of over 250 people. An analysis of the first 144 exonerations found that Hispanic and especially African-American men are "greatly over-represented among those defendants who were falsely convicted of rape and then exonerated, mostly by DNA" (Gross et al. 2004). Based on this and similar evidence, proponents of exoneration efforts conclude that "any plausible guess at the total number of miscarriages of justice in America in the last fifteen years must be in the thousands, perhaps tens of thousands" -- mostly poor black or Hispanic men, often convicted as juveniles (Gross et al. 2004). The Innocence Project argued unsuccessfully in 2009 before the Supreme Court for a prisoner's right to DNA testing, and it has worked to ensure that states preserve biological evidence and guarantee the right of testing to prisoners. Forty-four states do provide access to DNA testing for prisoners, although with a variety of conditions; the Supreme Court ruled in 2011 that convicted prisoners may sue states under a civil rights law to obtain potentially exonerating DNA evidence, rather than being able only to use more restrictive *habeas corpus* suits (*Skinner v. Switzer*, 562 U.S. __ (2011)). Used properly, offender DNA databases could be a substantial part of the solution as well as a contributor to the problem of racial bias in the criminal justice system.

Our second contribution in this paper is to enrich the small stock of knowledge about public opinion with regard to the role of DNA in the criminal justice system. Although such information neither will nor should determine how DNA is used in determining guilt or innocence, it is crucially important in understanding the context of its use. If the public supports biobanks, that will make it easier for politicians and policy-makers to fund their development, loosen regulations, encourage training for police and judges, and move toward permitting familial matching. If the public fears invasions of privacy or excessive police

surveillance, that might inhibit the spread of familial matching, put a lid on funding, and promote more stringent oversight. If the public is indifferent or ignorant, policy makers have more freedom of action; if small but active segments of the public hold strong and well-defined views, policy makers have less freedom of action or more political calculations to make. Most generally, living in a democratic polity means that one must take seriously, even if not follow directly, what citizens want in an arena as substantively important and emotionally fraught as determining guilt or innocence of heinous crimes.

A few surveys have probed Americans' and Britons' views about use of DNA in the criminal justice system, and we explore them below. But they are insufficient to understand opinion on this topic for several reasons. The first is simplest but perhaps most important: views on this topic are surely unstable and changing over time as people come to understand what DNA is, how it can be used in the criminal justice system, and how its forensic use might or might not link with usages elsewhere. In short, this is a new issue with unstable and changing views, so we need up-to-date information.

The second value of a new survey is analytically more important. No previous survey has had a large enough sample of people from different racial and ethnic groups to see whether blacks' and/or Hispanics' views differ systematically from whites' or Asians' views. One might expect greater opposition among the former groups given the disproportionality of black and Latino samples in the offender databases -- unless our argument that DNA databases could act in the interests of disadvantaged groups has moved into public discourse. Similarly, no previous survey has been able to determine whether the view of men differ systematically from women, conservatives from liberals, urbanites from residents of small towns, or parents from non-parents (remember that Obama's comment began by reminding listeners that he was a father of young

girls). More generally, our sample is large enough both in terms of overall size and within racial and ethnic groups to permit analyses with an array of covariates, so that we can see not just what views Americans hold but which kinds of people hold particular views and why.

Finally, the full survey covers an array of uses of genomic science -- testing and treatment for genetic disease, conducting basic research, and determining ancestry -- as well as being involved in the criminal justice system. The survey asks about scientific literacy, moral and religious views, policy preferences, and personal use. Thus eventually we can link people's views and behaviors with regard to a lot of facets of genomics to their views about the particular issue of using DNA in the criminal justice system.

This paper begins that larger project. Through Knowledge Network's Internet sample, we surveyed approximately 4,200 adults in the United States. Questions probed five issues: (1) how much the public knows about the use of DNA for law enforcement purposes, (2) how the public balances the social benefits and harms of using DNA for law enforcement purposes, (3) whether individuals would themselves be willing to contribute DNA to a law enforcement database, (4) whether respondents support or oppose increased funding and/or regulation, and (5) whether respondents trust or distrust government officials and/or private companies to act in the public interest in developing the use of DNA for law enforcement purposes.

The analysis proceeds as follows. First, we provide a brief overview of how DNA evidence is used in the criminal justice system. We then examine the politics surrounding the issue, including results from earlier surveys. We next turn our attention away from elite and advocacy opinion toward the views of the public at large by analyzing the results of our own new survey. Finally, we conclude by linking the survey results back into the elite debates, and pointing to the many unanswered questions that this analysis raises.

The Use of DNA Databases for Law Enforcement Purposes

A brief overview of current state and federal practices provides some useful context. Each state maintains an Offender Index and a Forensic Index. The Offender Index holds DNA profiles[5] from criminal defendants convicted of major felonies (or all felonies in some states). Almost half of the states collect DNA samples of defendants arrested for some serious crimes, and some states obtain samples from immigrants subject to deportation. Laws and regulations about storing, using, and destroying DNA evidence also vary substantially across states, as do the transparency and formality of these rules (Rothstein and Talbott 2006). The Forensic Index holds samples from crime scenes with unknown contributors. In addition to seeking intra-state matches for crime scene samples in the Offender Index, states may send a Forensic Index DNA profile to the National DNA Index System, which enables the FBI to determine if an exact match is found outside the state or in cooperating countries via its Combined DNA Index System (CODIS) (http://fbi.gov/about-us/lab/codis). The FBI can also use the sample from the Forensic Index to search for links to previously unconnected crimes across state lines or national borders. The DNA profiles are kept confidential, and the states or other governments choose whether to follow up on information sent by the FBI.

The FBI can take a further step by notifying states of partial matches, or a state may follow up on partial matches within its own indices -- as was done in the apprehension of Lonnie

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[5] DNA samples are compared and stored using short-tandem repeat (STR) technology. Briefly, a portion of the DNA sequence is examined and the permutation of the four building blocs of DNA (adenine, thymine, guanine, and cytosine) is recorded. This is repeated for at least thirteen "core" loci (plus identification of the sample's sex.) The result is a unique STR profile for each individual that can then be compared across DNA samples (Butler 2005). The samples are stored with an identifier number but no personal information such as name or social security number.

Franklin Jr. As of November 2009, at least fifteen states permit analysts to tell law enforcement officials of such partial matches, though in most cases the partial match must be discovered accidentally to be legally used. Three states permit familial searches. We expect the number of states permitting familial DNA searches to expand, although costs of and political controversy around the technique are likely to limit its use.

The accuracy of matches through DNA testing is subject to debate. This issue is centrally important to the question of whether the new technology is more likely to help or harm blacks and Latinos, but is no more settled than the respective normative claims of privacy and justice. Even exact matches are not foolproof. "A match does not mean that the two samples must absolutely have come from the same source; all that can be said is that, so far as the test was able to determine, the two profiles were identical, but it is possible for more than one person to have the same profile across several loci. At any given locus, the percentage of people having DNA fragments of a given length, in terms of base pairs, is small but not zero" (Devlin 2006).

Probably a greater problem than the possibility of false positives with two identical samples is the less rarefied issue of human error. The tests that did not reveal any DNA of the Duke University students accused of raping Crystal Mangum in the notorious 2006 lacrosse case *did* reveal DNA of the owner of the private laboratory that conducted the tests -- that is, the sample was contaminated. Laboratories and police departments may mishandle DNA samples; samples can be mixed up or lost; expert witnesses may, intentionally or not, convey misleading information. Like all human endeavors, in short, the science of DNA matching is replete with uncertainty and opportunities for error (Lynch et al. 2008; Garrett and Neufeld 2009; Aronson and Cole 2009).

Nevertheless, courts must beware of permitting the best to be the enemy of the good; no

other police or judicial procedure is clean of factual errors or human mistakes and incompetence. Judges permit challenges to improper handling and storage procedures. DNA samples from arrestees who are acquitted or never charged, and from felons whose convictions are overturned, must (or may, depending on the state) be expunged from official databases. (It is unclear if this happens routinely, or ever.) The legal system has well-established practices for responding to misleading experts. Courts have consistently found the use of convicts' and crime scene DNA samples to be constitutionally permissible under Fourth Amendment provisions for search and seizure (Joh 2006).[6] And the National Academy of Sciences' observation quoted earlier, that DNA testing is considerably superior to any other kind of forensic science, must be taken seriously.

As a disproportionate and perhaps growing share of offender databases are comprised of African Americans and Latinos, the issue of the relative accuracy of DNA samples compared with other types of evidence becomes ever more central to whether genomic science worsens or reduces any racial bias in the criminal justice system. We have no new evidence on that point, however; our contribution lies in the political response to the forensic use of DNA.

The Politics of Forensic DNA Testing

Two main conclusions emerge from examining the politics around forensic DNA testing: the public knows little about it, and the public supports it. In 2004, voters in California approved Proposition 69, the "DNA Fingerprint, Unsolved Crime and Innocence Protection Act" (http://ag.ca.gov/bfs/pdf/sec_state_full_version_prop69.pdf) by a vote of 62 to 38 percent. There was, however, little public discussion of the proposition and so far as we can tell, no polling to

[6]At this writing, courts have reached contradictory results with regard to the constitutionality of compulsory collection of DNA samples from arrestees (Cass 2010).

determine people's views or major effort to shape those views. For example, in a Lexis-Nexis search, the keyword "Proposition 69" appeared only 64 times, setting aside duplications, in California newspapers between January 1 and November 2, 2004. That is the smallest count out of twelve propositions in the same year searched through the same process; all but two others received at least twice as many hits on Lexis-Nexis, and three received well over 200 hits. The California Field Poll surveyed Californians on most other propositions on the ballot that year at least once, but conducted no polls about Proposition 69. Nor did the *Los Angeles Times*.

A few polls have asked about views of forensic use of genomics, and in general they show strong support. In 1998, seven-tenths of respondents approved of the FBI "collecting DNA information from suspected criminals and crime scenes throughout the country" (*Time*/CNN, Dec. 17-18, 1998). Three years later, four-fifths of respondents in another poll agreed that genomics will be used to "track and identify people accused of crimes" (Harris Interactive 2001).[7] In 2006, two-thirds endorsed a proposal for a law requiring a DNA sample from all adults "to help with the prevention and detection of crime"; half would approve the same law for children aged 5 to 18; and a third would approve for everyone, including babies. Almost nine-tenths approved use of genetic information to "identify criminals in rape, murder or other crimes" -- a greater proportion than approved its use for any other purpose, including establishing paternity, conducting scientific research, testing for disease, or determining therapy (Harris Interactive 2006; Harris Interactive 2009 obtained the same result). Although the

[7] Also in 2001, the British Human Genetics Commission, in the first of a series of polls about attitudes toward genomics, asked if it is appropriate for the police to take DNA samples from people accused of various crimes. Almost all said yes for murder and sexual offenses, two thirds concurred for burglary, half for drunk driving, and over a third each for fraud and shoplifting (Sturgis 2010).

evidence is thin, this is a strong, uniform record of public support for forensic DNA biobanks and their use in determining guilt or innocence.

A few other survey questions suggest nuance in these views. In 2006 the same overwhelming proportion -- 88 percent -- endorsed a federal requirement that states "permit DNA testing in all cases where it might prove a person's guilt or innocence," so the public supports its use for exoneration as well as for conviction (Harris Interactive 2006). Some surveys show less support for collecting DNA samples from arrestees than from convicted felons; again in the 2006 Harris poll, between a quarter and two-fifths approved of "DNA profiles being taken and stored" from arrestees, with variation depending on the severity of the crime with which they were charged. In another set of questions, although three-quarters endorsed a police DNA database, half thought it should include information only from those convicted rather than those arrested. Fully 90 percent want "a law that covers the use of profile information" -- although the question does not tell us what people mean by that (Inside DNA Exhibition 2007).

People are also less certain when it comes to providing their own DNA. In 2004, only three percent were willing "absolutely" to have their genetic information made available to the police or criminal justice system, compared with 42 percent willing to have it absolutely available to immediate family members (respondents were equally unwilling to give *carte blanche* to scientific researchers or any other actor). Another third would provide genetic information to the police if their permission were first asked; that proportion was higher for family member and scientists, but lower for pharmaceutical companies, insurance companies, and employers (Henneman et al 2004). Three years later, only a third would "trust the police to keep your profile information private" (Inside DNA Exhibition 2007).

We see no ambiguity, in short, in general public support for forensic DNA biobanking.

Large majorities of Americans (and Britons) endorse an offender index for those convicted of crimes, and substantial proportions support it for those arrested, for all adults, or even for all residents of the country no matter their age. There is greater ambiguity with regard to providing one's own DNA to such a database, and a strong desire for laws and regulations to control use of the information. None of these surveys, however, have large enough samples or analyze views in sufficient detail to determine variation by race, ethnicity, gender, or other indicia of disadvantage or vulnerability, so they do not speak directly to the moral and political concerns described above. We turn now to such an analysis.

The Data

Through Knowledge Networks, we conducted an online survey in May 2011 of 4,291 U.S. adults. The survey included an oversample of African Americans (n = 1,060), Asians (n = 344), self-defined multiracials[8] (n = 714), and Hispanics (n = 1,096). The latter could choose to be interviewed in Spanish (n = 578) or English (n = 518). The sample also included a few Native Americans (n = 16) and Hawaiian and Pacific Islanders (n = 54). Whites comprised 1,797 of the respondents. Note that a respondent could identify with a racial group or as multiracial while also being Hispanic. ("Hispanic" in this sense is an ethnicity rather than a categorically distinct race.)

The survey required 15 to 20 minutes and, as we noted above, covered a range of topics related to genomics. In addition to substantive questions and racial and ethnic identity, we collected demographic information including education level, income, age, employment, marital and parental status, Internet access, citizenship status, and home ownership status. We also

[8] Multiracials were defined as individuals who identified with more than one racial (not ethnic) group.

asked about views and values, such as religious affiliation, level of religiosity, and political ideology. Finally, we obtained the respondents' state of residence and location in relationship to a metropolitan area. A fuller description of how these variables were coded is presented in the Appendix.

The key questions for this paper addressed the use of genetic information for criminal procedure and forensic investigation; they are listed in Table 1. We also asked respondents as an open-ended question to explain why they would, or would not, contribute genetic information to a law-enforcement DNA database. We assumed that most respondents would know little about the collection of genetic information for law enforcement purposes, so we provided a paragraph of explanation about it, as follows:

> The federal government and almost all states require a collection of DNA sample from all people convicted of a serious crime. The samples are stored and may be used in future cases to try to determine a person's guilt or innocence of a particular crime.

This introduction appeared before all questions in Table 1.

Table 1: Questions related to collection of DNA information for law enforcement purposes. (Respondents could choose not to answer any question by clicking to the next screen.)

Question	**Answer Categories**
How much, if anything, have you heard or read about the collection of DNA samples from people convicted of a serious crime for purposes of criminal investigations?	A lot Some A little Nothing
Do you support or oppose government *funding* to enable more extensive use of DNA samples in the criminal justice system?	Strongly support Somewhat support Somewhat oppose Strongly oppose
Do you support or oppose government *regulation* of the use of DNA samples in the criminal justice system?	Strongly support Somewhat support Somewhat oppose Strongly oppose

Would you be willing or unwilling to contribute a DNA sample, for example by a swab from your mouth, for use in current or future investigations to determine a person's guilt or innocence of a particular crime?	Willing Somewhat willing Somewhat unwilling Unwilling
On another subject, do you think that the use of DNA samples collected from people convicted of a serious crime for law enforcement is likely to do ... ?	More good than harm to society Equal amounts of harm and good to society More harm than good to society
How much, if at all, do you trust that government officials will act for the public good in overseeing the use of DNA samples collected from people convicted of a serious crime for law enforcement?	A lot Some A little Not at all
How much, if at all, do you trust that private companies will act for the public good in developing the use of DNA samples collected from people convicted of a serious crime for law enforcement?	A lot Some A little Not at all
Which major political party do you think will do more to support government *funding* for the use of DNA samples collected from people convicted of a serious crime for law enforcement?	The Republican Party The Democratic Party Both political parties Neither political party
Which major political party do you think will do more to support government *regulation* of the use of DNA samples collected from people convicted of a serious crime for law enforcement?	The Republican Party The Democratic Party Both political parties Neither political party
SPLIT SAMPLE: A. Does the use of DNA samples collected from people convicted of a serious crime for law enforcement...?	It fits within my religious beliefs It conflicts with my religious beliefs It has nothing to do with my religious belief I do not have religious beliefs
OR B. Does the use of DNA samples collected from people convicted of a serious crime for law enforcement...?	It fits within my moral values It conflicts with my moral values It has nothing to do with my moral values I don't think in terms of moral values

Summary Statistics: Top-line results reveal the initial contours of the survey responses.[9] First, as Table 2 shows, Americans as a whole claim to be fairly knowledgeable about use of genomics in law enforcement.[10] Nearly 20 percent report knowing a lot -- the same as the proportion admitting that they know nothing. More African Americans and multiracials than whites, Asians, or Hispanics report knowing a lot on this topic; conversely, more Asian Americans and Hispanics report knowing nothing.

Table 2 : Respondents' knowledge of DNA collection from people convicted of a felony

	A lot	*Some*	*A little*	*Nothing*	*Refused*
All	19%	34%	25%	20%	7%
Whites	18	34	26	20	2
Blacks	24	30	23	22	2
Asians	14	37	22	24	3
Multiracials	23	36	18	20	3
Hispanics (of any race)	15	32	26	26	2

Weighted responses. Because different numbers of whites, blacks, Hispanics, etc., were surveyed, we report row proportions. Hispanics can be of any race.

[9] Additional top-line results are reported in the Appendix. All results are weighted to reflect accurately the U.S. population as a whole. Results from distinct racial or ethnic groups are weighted to reflect the portion of the U.S. population belonging to that particular group. The exception is Hispanic respondents, for whom the most updated weights were not available at the time of writing. Future iterations will update the results for Hispanics with appropriate weights.

[10] We did not ask how respondents acquired their knowledge. Many individuals may learn about forensic genetics through television shows such as *NCIS* or *CSI* -- that is, through portrayals that simplify and sharpen the use of DNA information compared with its actual use in criminal trials.

Assuming that people are being reasonably honest, the American public is not deeply knowledgeable about forensic DNA biobanks, but neither is it totally ignorant. We can get a better sense of whether these claims are persuasive once we place the knowledge item into relationship with other questions and background variables.

We report approval levels for use of DNA in law enforcement in Table 3. Overall, twice as many respondents think that collecting DNA from convicted felons will be a positive good than think it will be a mixed blessing; very few think it will be harmful to society. However, the results show

Table 3 : Respondents' approval of DNA collection from people convicted of a felony

	More good than harm	*Equal amounts of harm and good*	*More harm than good*	*Refused*
All	61%	31%	6%	3%
Whites	61	30	6	3
Blacks	43	44	9	3
Asians	55	36	6	3
Multiracials	61	32	4	4
Hispanics	54	31	11	5

Weighted responses. Because different numbers of whites, blacks, Hispanics, etc., were surveyed, we report row proportions. Hispanics can be of any race.

important differences by race; all people of color except multiracials are less enthusiastic than whites about forensic DNA collection, and blacks are especially concerned. They are the only group for whom skepticism is as strong as enthusiasm. Blacks and Hispanics are also slightly more likely than the other groups to see collection of DNA for law enforcement purposes as

harmful.

As Table 4 shows, the same racial pattern emerges with regard to respondents' willingness to contribute their own DNA sample to genetics databases maintained for law enforcement purposes.

Table 4 : Respondents' willingness to contribute DNA to databases collected for law enforcement purposes

	Willing	*Somewhat willing*	*Somewhat unwilling*	*Unwilling*	*Refused*
All	31%	28%	17%	23%	2%
Whites	33	28	16	22	2
Blacks	23	27	15	33	2
Asians	28	33	25	11	3
Multiracials	30	31	18	20	2
Hispanics	34	32	13	19	3

Weighted responses. Because different numbers of whites, blacks, Hispanics, etc., were surveyed, we report row proportions. Hispanics can be of any race.

Overall, respondents are cautious but not hostile. Despite concern expressed in the media about the problems with this technology, many more are willing than unwilling to contribute, and more express willingness to do so without hesitation than express refusal. As before, whites and multiracials are the most sanguine, although interestingly, now they are joined by Hispanics. And as before, blacks are the most negative.

Regression Methods and Results: Summary statistics provide the initial contours of respondents' views and show the contours of the political dynamics of a public debate about forensic biobanking. But they do not help us understand why groups differ in their views since they do not take into account possible differences in such things as socioeconomic status, life

circumstances, or political ideology. For that we turn to regression techniques. Given that the outcome variables are substantively ordered (i.e., they increase monotonically in their negativity) and mutually exclusive,[11] we employ an ordered logit specification. We report regression results here by including dummy variables for respondent race and/or ethnicity; separate within-race regressions are reported in the Appendix. It is difficult, however, to interpret the coefficients from these regression models due to the non-linearity of the model specification, so in some instances we provide simulation results for the quantities of interest. These simulations are generally are easier to interpret than coefficient estimates.[12]

Table 5 presents results from the first regressions for the three questions on knowledge, approval, and willingness to contribute. For these and subsequent questions, higher values were associated with a more unknowing, cautious, or negative response. (That is, individuals assigned higher values reported being *least familiar* with this technology, or saw the *most* harm, or were *most unwilling* to contribute their DNA.) The regression results are revealing. First, in Model I.A we see few differences in self-reported familiarity with the use of DNA in the criminal justice system: the coefficients associated with the racial group (and ethnic group) dummy variables are small, and none is significant at the 5% level. We therefore cannot rule out that there exist no differences between people of different races and ethnicities with regard to self-reported knowledge about this technology, even after controlling for demographic characteristics, ideology, and context. Introducing the interacted Hispanic term in Model I.B

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[11] In these regression analyses, individuals who did not answer a particular question were dropped from that specific analysis. Given that no more than 3 percent of respondents did not answer any given question, this is unlikely to cause any significant bias.

[12] We used the Zelig package within the statistical software program R for all regression analyses and simulations. At the conclusion of this project, we will post all of the necessary data and the replication code to a publicly accessible data repository.

does nothing to change these results. (Adding the interaction term allows us to check whether and how the effect of being Hispanic varies according to different racial groups. We can therefore compare people who reported being black and Hispanic, or white and Hispanic, etc.) Older respondents are statistically but not substantively less

Table 5 : Weighted ordered logit regression coefficients for Knowledge (I.A, I.B), [13] **Approval (II.A, II.B),**[14] **and Willingness to Contribute (III.A, III.B)**[15]

	I.A	*I.B*	*II.A*	*II.B*	*III.A*	*III.B*
Black	0 (0.1)	-0.01 (0.1)	0.68 (0.1) *	0.72 (0.11)*	0.55 (0.1) *	0.56 (0.1) *
Native American	0.56 (0.61)	0.53 (0.61)	0.21 (0.64)	0.04 (0.64)	-0.49 (0.6)	-0.47 (0.6)
Asian American	0.19 (0.14)	0.21 (0.14)	0.42 (0.16)*	0.51 (0.16)*	-0.06 (0.13)	-0.07 (0.14)
Pacific Islander	-0.38 (0.6)	-0.36 (0.67)	0.23 (0.62)	0.48 (0.66)	-0.06 (0.52)	-0.09 (0.59)
Multiracial	-0.06 (0.2)	-0.19 (0.28)	0.25 (0.23)	-0.07 (0.32)	-0.17 (0.2)	0.05 (0.27)
Income	0 (0.01)	0 (0.01)	-0.04 (0.01)*	-0.04 (0.01)*	0 (0.01)	0 (0.01)
Age	-0.01 (0)*	-0.01 (0)*	-0.02 (0)*	-0.02 (0)*	-0.01 (0)*	-0.01 (0)*
Gender	0.08 (0.06)	0.09 (0.06)	-0.12 (0.07)	-0.11 (0.07)	-0.2 (0.06)*	-0.21 (0.06)*
Education	-0.03 (0.02)	-0.02 (0.02)	-0.09 (0.02)*	-0.09 (0.02)*	0 (0.02)	0 (0.02)
Household Size	0.02	0.02	0.02	0.01	-0.04	-0.04

[13] Positive coefficient means increased lack of knowledge.
[14] Positive coefficient means an increased belief of more harm than good.
[15] Positive coefficient means unwillingness to contribute.

	(0.02)	(0.02)	(0.03)	(0.03)	(0.02)*	(0.02)
Work	0.16 (0.07)*	0.16 (0.07)*	-0.05 (0.08)	-0.06 (0.08)	-0.01 (0.07)	-0.01 (0.07)
Metro Area	-0.15 (0.08)	-0.16 (0.08)	-0.07 (0.09)	-0.09 (0.1)	0.11 (0.08)	0.12 (0.08)
Married	0.17 (0.07)*	0.17 (0.07)*	0.03 (0.08)	0.03 (0.08)	0.16 (0.07)*	0.16 (0.07)*
Citizen	-0.56 (0.14)*	-0.5 (0.15)*	-0.01 (0.15)	0.17 (0.17)	0.12 (0.14)	0.07 (0.15)
Ideology	0.09 (0.02)*	0.09 (0.02)*	-0.01 (0.02)	-0.01 (0.02)	0.04 (0.02)*	0.04 (0.02)
Hispanic		0.09 (0.12)		0.36 (0.14)*		-0.07 (0.12)
Black * Hispanic		0.5 (0.51)		-0.21 (0.5)		-0.28 (0.45)
Asian * Hispanic		-0.2 (1.13)		-1.39 (1.19)		0.13 (0.94)
Pacific Islander * Hispanic		-0.04 (1.54)		-1.52 (1.85)		0.1 (1.3)
Multiracial * Hispanic		0.22 (0.42)		0.46 (0.48)		-0.42 (0.4)
N	3671	3671	3636	3636	3663	3663
Residual Deviance	10080.1	10077.8	5773.4	5762.2	10146	10143.5

Model A includes fixed effects for race, with whites comprising the baseline group; Model B includes in addition an interaction effect with Hispanic ethnicity. Standard errors are reported in parentheses.

* indicates significance at the 5% level.

knowledgeable; people who work outside the home, are married, are not American citizens, and are ideologically conservative make fewer claims to knowledge about DNA biobanks in the

criminal justice system.

There are greater differences among people of different races with regard to expectations that using this technology will, on balance, harm or benefit society (Model II.A and Model II.B). Holding demographic and other variables constant, African Americans and Asian Americans are more likely to be skeptical about the net societal gains of DNA biobanks, with the effect being the strongest for non-Hispanic blacks and non-Hispanic Asians (Model II.B). Indeed, simulation results show that switching respondent race from white to African American results in a 16 percent decrease in the probability that the respondent will say that they believe that DNA biobanks will lead to more good than harm for society, while a switch from white to Asian American results in a 12 percent drop. We see no statistically significant difference between Hispanic and non-Hispanic blacks or between Hispanic and non-Hispanic Asians. There is, however, a statistically significant difference between Hispanic and non-Hispanic whites (Model II.B); being in the former category results makes a respondent 7 percent less likely to view this technology as as net benefit to society.

Older respondents and those with higher incomes are statistically, though not substantively, more likely to see good than harm from forensic biobanking. People with higher education also tend to approve of the technology. These results, along with those for race and ethnicity, suggest that support for biobanking accords with support for other relatively stringent policies for law enforcement.

Analysis of the respondent's willingness to contribute genetic material to a DNA database shows the same pattern as overall approval (Models III.A and III.B). For this question, African Americans stand out. Blacks are statistically and substantively less likely than whites to want to participate in DNA collection: simulation shows that a black respondent is on average

11 percent more likely than an identical white respondent to be unwilling to contribute to DNA database. No other group, whether with or without interactions between race and Hispanic ethnicity, are statistically distinguishable from whites.

For the first time in these analyses, gender matters; women are more likely than men to be willing to contribute DNA information to a law-enforcement genetics database. On average, being female is linked with an increased 4 percent probability of being willing to participate in DNA collection. Once again, older respondents are statistically but not substantively more favorable toward this technology; married respondents are not only more knowledgeable but more willing to contribute. Overall, racial disadvantage is associated with unwillingness to contribute one's own DNA, while other forms of vulnerability (gender, and perhaps age) have the opposite relationship.

We now shift focus to policy views. Whether and how DNA is collected and used for law enforcement purposes depends highly on government funding and regulation; the next set of analyses explores public opinion on these issues. As shown in Table 1, we asked about support for "government funding to enable more extensive use of DNA samples in the criminal justice system" and for "government regulation of the use of DNA samples in the criminal justice system." Top-line results for these questions are included in the Appendix.

Appendix Table A2 shows extremely strong support for increased funding, and little opposition. There is some variation by race or ethnicity, but from a political perspective the similarity in endorsement outweighs the small differences in hesitation across groups. Appendix Table A3 shows equal enthusiasm for regulation of forensic DNA databases; Americans may be eager to use this technology, but they are also wary of it getting out of control. African Americans and Latinos are even more desirous of regulation than respondents of other races.

Again, however, the political message is one of very strong support for, and almost no opposition to, careful oversight.

Table 6 shows the regression results with regard to policy views.

Table 6 : Weighted ordered logit regression coefficients for views on government funding (IV.A and IV.B)[16] and regulation (V.A and V.B)[17] of forensic biobanks

	IV.A	*IV.B*	*V.A*	*V.B*
Black	0.12 (0.1)	0.09 (0.1)	-0.18 (0.1)	-0.22 (0.1)*
Native American	0.38 (0.63)	0.49 (0.63)	0.06 (0.6)	0.23 (0.61)
Asian	-0.04 (0.15)	-0.08 (0.15)	0.19 (0.14)	0.13 (0.14)
Pacific Islander	-0.27 (0.59)	-0.18 (0.64)	-0.23 (0.59)	-0.13 (0.63)
Multiracial	-0.34 (0.21)	-0.02 (0.29)	-0.23 (0.21)	-0.09 0.28)
Income	-0.01 (0.01)	-0.01 (0.01)	0.01 (0.01)	0.01 (0.01)
Age	-0.01 (0)*	-0.01 (0)*	-0.01 (0)*	-0.01 (0)*
Gender	-0.08 (0.06)	-0.09 (0.06)	0 (0.06)	-0.01 (0.06)
Education	0.01 (0.02)	0.01 (0.02)	-0.02 (0.02)	-0.03 (0.02)
Household Size	0 (0.02)	0 (0.02)	-0.01 (0.02)	0 (0.02)
Work	0.1 (0.07)	0.1 (0.07)	0 (0.07)	0 (0.07)
Metro Status	-0.06 (0.08)	-0.04 (0.08)	-0.04 (0.08)	-0.02 (0.08)

[16] Positive coefficient means increased opposition.

[17] Positive coefficient means increased opposition.

Married	-0.08 (0.07)	-0.08 (0.07)	-0.06 (0.07)	-0.06 (0.07)
Citizen	0.05 (0.15)	-0.08 (0.16)	0.39 (0.14)*	0.22 (0.16)
Ideology	0.16 (0.02)*	0.16 (0.02)*	0.13 (0.02)*	0.13 (0.02)*
Hispanic		-0.24 (0.13)		-0.33 (0.13)*
Black * Hispanic		0.26 (0.51)		0.21 (0.49)
Asian * Hispanic		0.19 (1.18)		0.06 (1.18)
Pacific Islander * Hispanic		-0.81 1.82)		-0.82 (1.82)
Multiracial * Hispanic		-0.57 (0.44)		-0.12 (0.43)
N	3795	3795	3785	3785
Residual Deviance	8332.2	8325.3	8895.2	8886.9

Model A includes fixed effects for race, with whites comprising the baseline group; Model B includes in addition an interaction effect with Hispanic ethnicity. Standard errors are reported in parentheses.

* indicates significance at the 5% level.

As in the summary statistics and in contrast to levels of approval or willingness to participate, we see little difference across racial and ethnic groups with regard to either funding or regulation. Even with controls, non-Hispanic blacks and white Hispanics favor regulation somewhat more than the other groups (Model V.B). (For all blacks, this measure is falls just shy of statistical significance [Model V.A].)

Interestingly, ideology is associated with policy views more consistently than is race or

ethnicity. At a statistically significant level, conservatives oppose increases in both government funding and regulation of the use of DNA for law enforcement purposes. The former finding surprises us; conservatives generally support increased spending on law enforcement at least as much as do liberals. Possibly in the current political climate, opposition to spending of any kind outweighs conservatives' desire to enhance this arena of law enforcement. Their relatively greater opposition to regulation is more intuitively plausible than their opposition to funding if one assumes that regulation implies restriction on when and how DNA samples may be used.

We push this issue further by exploring how much respondents trust various actors in this policy domain. As noted in Table 1, we asked about trust that "government officials will act for the public good in overseeing" use of DNA in the criminal justice arena,[18] and, for comparison, about trust that "private companies will act for the public good in developing" use of DNA in the criminal justice arena. Tables A4 and A5 in the Appendix present summary statistics and Table 7 the regression results.

As table A4 shows, Americans are reasonably trusting in the government's willingness and ability to act in the public interest in this arena; that accords sensibly with their support for more funding. It is unclear to us whether high levels of trust contradict the desire to regulate -- in the sense that regulation by some is needed to control other untrustworthy governmental actors -- or whether high levels of trust accord with the desire to regulate -- in the sense that people believe the government can in fact effectively manage this potentially explosive technology. African Americans stand out as the group with least trust and most mistrust. That is the first clear signal that this issue could be somewhat volatile in the political arena, especially since it

[18] We did not specify any government official, so respondents could interpret the question to include any kind of government official, including police officers, lawyers, judges, regulators, state and federal elected officials, or even the president.

reinforces the somewhat weaker expressions of concern that have appeared in the earlier survey items.

As Table A5 shows, almost all Americans also trust private companies, a lot or somewhat, to act in the public interest when developing and using DNA technology in the criminal justice arena. In fact, overall and within each racial or ethnic group, they trust private companies "a lot" even more than they trust the government "a lot." Variations across racial groups remain the same. This set of responses raises yet another question: do people genuinely believe that both public and private actors are trustworthy, or are these two items evidence of response set, or are they evidence of general ignorance and an amorphous sense of good will in the absence of deep knowledge? (Or are they evidence of effective television programming in CSI and NCIS?) Comparing these trust items to other trust items in the survey about different uses of genomic science will help us sort out the answer eventually, as will the regression analysis below. From a political perspective, nevertheless, the central point is Americans' large reservoir of good will for both public and private actors with regard to forensic DNA databanks -- with the small caveat about relative mistrust among black Americans remaining important.

We turn now to the regression results in Table 7. Compared with both Hispanic and non-Hispanic whites, African Americans strongly and significantly mistrust both private companies and government officials once controls are introduced. On average, a black respondent is 12 percent less likely than a white respondent to trust private companies "a lot" when it comes to this new technology, and about 13 percent less likely than a white respondent to trust government officials "a lot." This latter statistic is perhaps a testament to the African American community's longstanding tense relationship with city police departments. Asian Americans and Hispanics also tend to mistrust both government officials and private companies more than do

whites and non-Hispanic whites, respectively, once controls are introduced, but these differences do not rise to the level of statistical significance.

Respondents with more education are more likely to trust both sets of actors, as are those living outside of a metropolitan area. (Both are statistically significant at the 5 percent level.) People with low incomes and older respondents are statistically, but not substantively, likely to express mistrust of both sets of actors -- even though in earlier results, older respondents showed slightly more support for this new technology.

The most surprising result here is that the more conservative a respondent is, the more he or she is likely to trust government officials to act in the public good when dealing with DNA samples collected for law enforcement. This perhaps reflects conservatives' usual support for law enforcement agencies even when they are hostile to most governmental actors, but it seems to contradict their opposition to greater funding for forensic DNA biobanks.

Table 7 : Weighted ordered logit regression coefficients for trust in government officials (VI.A and VI.B)[19] and private companies (VII.A and VII.B)[20]

	VI.A	*VI.B*	*VII.A*	*VII.B*
Black	0.82 (0.1)*	0.85 (0.1)*	0.65 (0.1)*	0.67 (0.1)*
Native American	-0.55 (0.64)	-0.64 (0.65)	-0.05 (0.65)	-0.11 (0.65)
Asian American	0.23 (0.14)	0.26 (0.14)	0.15 (0.14)	0.17 (0.15)
Pacific Islander	0.02 (0.58)	-0.11 (0.63)	0.37 (0.58)	0.62 (0.63)

[19] Positive coefficient means increased distrust.
[20] Positive coefficient means increased distrust.

Multiracial	0.21 (0.21)	0.36 (0.28)	0.29 (0.21)	0.25 (0.28)
Income	-0.02 (0.01)*	-0.02 (0.01)*	-0.03 (0.01)*	-0.03 (0.01)*
Age	-0.01 (0)*	-0.01 (0)*	-0.01 (0)*	-0.01 (0)*
Gender	-0.06 (0.06)	-0.06 (0.06)	-0.13 (0.06)*	-0.13 (0.06)*
Education	-0.05 (0.02)*	-0.05 (0.02)*	-0.04 (0.02)*	-0.03 (0.02)*
Household Size	0.04 (0.02)	0.03 (0.02)	0.06 (0.02)*	0.06 (0.02)*
Work	0.08 (0.07)	0.08 (0.07)	0.05 (0.07)	0.05 (0.07)
Metro Status	-0.29 (0.08)*	-0.3 (0.08)*	-0.21 (0.08)*	-0.21 (0.08)*
Married	-0.08 (0.07)	-0.08 (0.07)	0.03 (0.07)	0.03 (0.07)
Citizen	-0.04 (0.14)	0.02 (0.15)	0.11 (0.14)	0.15 (0.16)
Ideology	-0.05 (0.02)*	-0.05 (0.02)*	0.04 (0.02)	0.04 (0.02)
Hispanic		0.16 (0.12)		0.1 (0.13)
Black * Hispanic		-0.37 (0.45)		-0.31 (0.45)
Asian American * Hispanic		-0.34 (1.05)		-0.07 (1.05)
Pacific Islander * Hispanic		0.87 (1.6)		-1.48 (1.52)
Multiracial * Hispanic		-0.42 (0.42)		0.03 (0.43)
N	3778	3778	3777	3777

Residual Deviance	9462.4	9459.6	9069	9067.2

Model A includes fixed effects for race, with whites comprising the baseline group; Model B includes in addition an interaction effect with Hispanic ethnicity. Standard errors are reported in parentheses.
* indicates significance at the 5% level.

Conclusion

To summarize: Self-reported measures of knowledge about biobanks in the arena of criminal justice show some racial and ethnic differences in the population as a whole, but they are explained away once we control for standard demographic, attitudinal, and contextual measures. Both with and without controls, African Americans are more likely than non-Hispanic whites to anticipate societal harm from this technology, more likely to mistrust government officials and private companies in dealing with this technology, and less likely to be open to contributing their own genetic information to a law-enforcement genetics database. They may oppose increased funding and support increased regulation more than whites do, but that remains ambiguous, statistically speaking.

We see similar, although more muted, patterns for Asian Americans and white Hispanics; both groups are more cautious than non-Hispanic whites about the merits of this technology, and more white Hispanics favor increased government regulation. Older Americans are sometimes, though minimally, supportive of this technology; the views of women, the unmarried, those living in metropolitan areas, and poorly educated respondents sometimes resemble those of minority groups. Respondents with low incomes sometimes hold the opposite views from minority groups (although income is not substantively important), and conservative ideology is a powerful, though inconsistent, predictor..

Overall, in our survey as in earlier ones, Americans endorse forensic DNA biobanks,

support their funding, and trust the public officials and private companies that will develop and use the technology. Again as in earlier surveys, there is some nuance: respondents endorse regulation and are less willing to contribute their own DNA than they are eager for others to do so. Throughout almost all of these opinions, racial or ethnic differences are a salient mechanism through which Americans understand and evaluate this emerging technology. Although surely most views on this issue are not deeply knowledgeable or settled -- the topic is new, rapidly changing, fairly technical, and not directly relevant to many people -- they accord with typical attitudes toward the criminal justice system. Extrapolating from these particular survey items, we conclude that compared with whites (or multiracials), people of color worry more overpolicing even more than underpolicing. Although they are just as eager to catch the next Grim Sleeper, many have doubts that DNA databanks are a solution to the problem of racial or ethnic bias in the criminal justice system.

Whether the new technology is increasingly used to exonerate those falsely convicted and/or is increasingly substituted for less reliable eyewitness reports or police discretion --- that is, whether the third approach that we outlined earlier is plausible -- remains to be seen. Even if either or both of those occurs, it also remains to be seen whether disadvantaged minorities' opinion changes in response to this new factor or deepens in the channels that it is now carving. We will get somewhat more purchase on that question once we analyze the survey questions about religious and moral values associated with use of DNA in the criminal justice system, and once we have examined the open-ended survey question. If people's views are deeply linked to their religious or moral convictions, changes in the public policy arena may have little impact on their attitudes and policy preferences. But if their views on this issue are not deeply rooted, as we suspect, forensic DNA biobanks might come to hold a different place in the American

public's understanding of the criminal justice system.

As always, an exploratory survey generates more questions than answers. Why do conservatives oppose increased funding for expanding use of this new technology; why do they trust government officials more than private companies in this arena? Could blacks or liberals be thinking about possible exoneration when they choose the "more good than harm" response, while whites or conservatives are thinking about more convictions when they choose the same response? What should we make of the completely consistent and completely trivial positive correlation between age and support for this new technology; is this the hint of a cohort change in response to genomics? Few of the regression analyses explain much of the variance in response; if we focus only on those who claim considerable knowledge, will we find stronger associations with demographic, attitudinal, or contextual covariates? Are high levels of trust in both public and private actors genuine or survey artifacts? Some of these questions can be answered in a further analysis of this survey, but others await not only another survey but also political and policy developments in the American criminal justice system.

Appendix

Table A1: Construction of Key Variables

Variable	*Description*	*Minimum*	*Maximum*	*Median/Mode*
Income	Discrete numerical variable	Less than $5,000	$175,000 or more	$50,000 to $59,999
Age	Discrete numerical variable	18 years	97 years	48 years
Gender	Dichotomous categorical variable	0 = Male	1 = Female	
Education	Discrete numerical variable	No formal education	Professional or doctorate degree	High school graduate
Household Size	Discrete numerical variable	1 person	14 people	2.9 people
Work Status	Dichotomous categorical variable	0 = Not working	1 = Working	
Metro Area	Dichotomous categorical variable	0 = Lives in non-metro area	1 = Lives in metro area	
Married	Dichotomous categorical variable	0 = Not married (includes living with partner)	1 = Married or separated	
Citizen	Dichotomous categorical variable	0 = Not U.S. citizen	1 = U.S citizen	
Ideology	Scaled categorical variable	-3 = “Extremely liberal”	3 = “Extremely conservative”	0 = “Moderate, middle of the road”

Table A2: Respondents’ views of whether the government should provide funds for more extensive use of DNA samples

	Strongly support	*Somewhat support*	*Somewhat oppose*	*Strongly oppose*	Refused
All	40%	45%	8%	5%	2%
Whites	41	44	8	5	2
Blacks	39	44	10	5	3
Asians	44	42	9	3	2
Multiracials	42	42	9	5	2
Hispanics	46	39	7	5	3

Weighted responses. Because different numbers of whites, blacks, Hispanics, etc., were surveyed, we report row proportions. Hispanics can be of any race.

Table A3: Respondents' views of whether the government should regulate DNA use in criminal justice system

	Strongly support	*Somewhat support*	*Somewhat oppose*	*Strongly oppose*	Refused
All	38%	43%	1%	6%	2%
Whites	39	43	10	6	3
Blacks	42	42	9	5	3
Asians	36	42	15	4	3
Multiracials	37	45	12	4	2
Hispanics	43	39	9	5	4

Weighted responses. Because different numbers of whites, blacks, Hispanics, etc., were surveyed, we report row proportions. Hispanics can be of any race.

Table A4: Respondents' trust of government officials on the issue of DNA collection

	A lot	*Some*	*A little*	*Not at all*	*Refused*
All	24%	46%	17%	10%	3%
Whites	25	47	16	9	3
Blacks	12	40	29	17	3
Asians	23	45	23	8	2
Multiracials	20	44	23	11	3
Hispanics	20	46	21	10	4

Weighted responses. Because different numbers of whites, blacks, Hispanics, etc., were surveyed, we report row proportions. Hispanics can be of any race.

Table A5: Respondents' trust of private companies on the issue of DNA collection

	A lot	*Some*	*A little*	*Not at all*	*Refused*
All	29%	47%	14%	7%	3%
Whites	30	47	14	7	3
Blacks	18	46	21	11	3
Asians	30	47	17	5	1
Multiracials	24	47	19	7	3
Hispanics	28	45	16	7	3

Weighted responses. Because different numbers of whites, blacks, Hispanics, etc., were surveyed, we report row proportions. Hispanics can be of any race.

Table A6 : Weighted ordered logit regression coefficients for respondent knowledge disaggregated by race/ethnicity

	Whites	*Blacks*	*Hispanics*	*Asians*	*Multiracials*
Income	0 (0.01)	0.01 (0.01)	-0.02 (0.01)	0.03 (0.02)	0.02 (0.02)
Age	-0.01 (0)*	0 (0)	-0.01 (0)*	0 (0.01)	-0.01 (0.01)*
Gender	0.1 (0.09)	0.19 (0.12)	0.14 (0.12)	0.43 (0.21)*	-0.01 (0.14)
Education	-0.01 (0.02)	-0.03 (0.03)	0.02 (0.02)	-0.02 (0.05)	-0.03 (0.04)
Household Size	0.01 (0.03)	-0.07 (0.04)*	0.07 (0.04)	0.06 (0.08)	0 (0.05)
Work Status	0.04 (0.1)	0.01 (0.13)	-0.18 (0.12)	0.2 (0.22)	-0.13 (0.15)
Metro Area	-0.13 (0.12)	-0.11 (0.19)	-0.21 (0.22)	-0.75 (0.56)	0.85 (0.2)*
Married	0.29 (0.1)*	-0.05 (0.14)	0.27 (0.13)*	0.14 (0.24)	-0.08 (0.15)
Citizen	-0.41 (0.15)*	-0.71 (0.34)*	-0.22 (0.13)	-0.57 (0.27)*	-0.58 (0.38)
Ideology	0.02 (0.03)	0.02 (0.04)	-0.02 (0.04)	0.18 (0.07)*	0.14 (0.05)*
N	1740	1006	1033	337	697
Residual Deviance	4762.4	2829.3	2861.9	1016.2	1942.2

* indicates significance at the 5% level. Standard errors in parentheses.

Table A7 : Weighted ordered logit regression coefficients for approval disaggregated by race/ethnicity

	Whites	*Blacks*	*Hispanics*	*Asians*	*Multiracials*
Income	-0.03 (0.01)*	-0.05 (0.01)*	-0.03 (0.01)*	-0.08 (0.02)*	0.01 (0.02)
Age	-0.01 (0)*	-0.02 (0)*	0 (0)	-0.01 (0.01)	-0.02 (0.01)*
Gender	-0.06 (0.1)	0 (0.13)	-0.01 (0.12)	0.15 (0.22)	-0.02 (0.16)
Education	-0.1 (0.02)*	0.02 (0.04)	-0.05 (0.02)*	0.03 (0.05)	-0.08 (0.04)
Household Size	0 (0.04)	-0.04 (0.04)	0.03 (0.04)	0.08 (0.08)	-0.04 (0.06)
Work Status	0.04 (0.11)	-0.17 (0.14)	-0.02 (0.13)	-0.16 (0.24)	-0.01 (0.17)

Metro Status	-0.05 (0.14)	0.11 (0.19)	-0.13 (0.23)	-0.57 (0.61)	-0.08 (0.21)
Married	0 (0.11)	0.19 (0.15)	-0.16 (0.13)	0.78 (0.26)*	0.03 (0.17)
Citizen	0.23 (0.17)	0.94 (0.38)*	0.13 (0.14)	0.32 (0.29)	-1.82 (0.44)*
Ideology	0.01 (0.03)	0.02 (0.04)	0.08 (0.04)	0.07 (0.08)	0.07 (0.06)
N	1740	1006	1033	337	697
Residual Deviance	3090.4	1997	2200.4	685.8	1227.9

* indicates significance at the 5% level. Standard errors in parentheses.

Table A8 : Weighted ordered logit regression coefficients for willingness to contribute, disaggregated by race/ethnicity.

	Whites	*Blacks*	*Hispanics*	*Asians*	*Multiracials*
Income	0 (0.01)	-0.02 (0.01)	0 (0.01)	0.01 (0.02)	0.04 (0.02)*
Age	-0.01 (0)*	-0.01 (0)*	-0.01 (0)	0 (0.01)	0.01 (0.01)
Gender	-0.21 (0.09)*	-0.09 (0.12)	-0.14 (0.12)	0.51 (0.2)*	0.01 (0.14)
Education	-0.01 (0.02)	0.08 (0.03)*	0.03 (0.02)	0.03 (0.04)	0 (0.04)
Household Size	-0.03 (0.03)	-0.09 (0.04)*	0.03 (0.04)	0.13 (0.08)	0.07 (0.05)
Work Status	-0.08 (0.1)	-0.08 (0.13)	-0.08 (0.12)	0.41 (0.22)	-0.13 (0.15)
Metro Area	0.07 (0.12)	0.04 (0.19)	-0.01 (0.22)	0.79 (0.62)	0.06 (0.19)
Married	0.09 (0.1)	0.3 (0.14)*	-0.1 (0.13)	0.27 (0.23)	-0.02 (0.15)
Citizen	0.3 (0.15)*	-0.15 (0.33)	0.22 (0.13)	-0.05 (0.26)	0.32 (0.36)
Ideology	0.03 (0.03)	-0.07 (0.04)	-0.06 (0.04)	0.22 (0.08)*	0.1 (0.05)*
N	1740	1006	1033	337	697
Residual Deviance	4800	2803.7	2844.2	1003	1943.3

* indicates significance at the 5% level. Standard errors in parentheses.

Table A9 : Weighted ordered logit regression coefficients for views on government funding disaggregated by race/ethnicity.

	Whites	*Blacks*	*Hispanics*	*Asians*	*Multiracials*
Income	0 (0.01)	0 (0.01)	-0.02 (0.01)	-0.01 (0.02)	0 (0.02)
Age	-0.01 (0)*	-0.02 (0)*	-0.01 (0)*	-0.01 (0.01)	-0.02 (0.01)*
Gender	-0.07 (0.09)	0.12 (0.12)	-0.12 (0.12)	0.04 (0.22)	0 (0.15)
Education	0.02 (0.02)	0.04 (0.04)	0.04 (0.02)	-0.07 (0.05)	0 (0.04)
Household Size	-0.03 (0.03)	-0.03 (0.04)	0.03 (0.04)	0.13 (0.08)	-0.02 (0.06)
Work Status	0.02 (0.1)	-0.04 (0.13)	-0.34 (0.13)*	-0.2 (0.23)	0.16 (0.16)
Metro Area	-0.18 (0.13)	0.08 (0.19)	-0.7 (0.22)*	-1.52 (0.58)*	0.06 (0.21)
Married	0.01 (0.1)	0.01 (0.14)	0.16 (0.13)	0.35 (0.24)	0.03 (0.16)
Citizen	0.21 (0.16)	0.98 (0.37)*	0.25 (0.14)	-0.16 (0.28)	0.6 (0.4)
Ideology	0.09 (0.03)*	0.02 (0.04)	-0.08 (0.04)	0.14 (0.08)	0.17 (0.05)*
N	1740	1006	1033	337	697
Residual Deviance	3845.2	2299.6	2303.5	806.7	1582.1

* indicates significance at the 5% level. Standard errors in parentheses.

Table A10 : Weighted ordered logit regression coefficients for views on government regulation, disaggregated by race/ethnicity.

	Whites	*Blacks*	*Hispanics*	*Asians*	*Multiracials*
Income	0.02 (0.01)	-0.01 (0.01)	0.01 (0.01)	-0.01 (0.02)	0 (0.02)

Age	-0.01 (0)*	-0.02 (0)*	-0.01 (0)*	-0.01 (0.01)	-0.01 (0.01)*
Gender	-0.06 (0.09)	0.17 (0.12)	-0.05 (0.12)	0.18 (0.21)	-0.03 (0.15)
Education	-0.01 (0.02)	0.01 (0.04)	-0.01 (0.02)	-0.13 (0.04)*	-0.06 (0.04)
Household Size	-0.05 (0.03)	0.02 (0.04)	0.02 (0.04)	0.13 (0.08)	-0.06 (0.06)
Work Status	-0.08 (0.1)	0.25 (0.13)	-0.27 (0.13)*	-0.09 (0.23)	-0.03 (0.16)
Metro Area	-0.08 (0.13)	0.01 (0.19)	-0.12 (0.23)	-0.27 (0.53)	-0.25 (0.2)
Married	-0.02 (0.1)	-0.02 (0.15)	-0.12 (0.13)	0.12 (0.23)	0.12 (0.16)
Citizen	0.4 (0.16)*	0.96 (0.37)*	0.33 (0.14)*	0.37 (0.27)	0.68 (0.41)
Ideology	0.11 (0.03)*	0.02 (0.04)	0.02 (0.04)	0.08 (0.08)	0.15 (0.05)*
N	1740	1006	1033	337	697
Residual Deviance	4109.3	2290.2	2450.6	880.4	1593.7

* indicates significance at the 5% level. Standard errors in parentheses.

Table A11 : Weighted ordered logit regression coefficients for view of trust in government officials, disaggregated by race/ethnicity.

	Whites	*Blacks*	*Hispanics*	*Asians*	*Multiracials*
Income	-0.01 (0.01)	-0.02 (0.01)	0 (0.01)	-0.02 (0.02)	0.01 (0.02)
Age	0 (0)	-0.01 (0)*	0 (0)	0 (0.01)	0 (0.01)
Gender	-0.06 (0.09)	0.09 (0.12)	-0.08 (0.12)	0.42 (0.21)*	-0.15 (0.14)
Education	-0.07 (0.02)*	0.07 (0.03)*	0 (0.02)	0.02 (0.04)	-0.01 (0.04)
Household Size	0.02 (0.03)	-0.08 (0.04)*	0.01 (0.04)	0.04 (0.08)	0.04 (0.06)
Work Status	0.11 (0.1)	-0.16 (0.13)	-0.1 (0.13)	0.13 (0.22)	-0.13 (0.16)
Metro Area	-0.2 (0.12)	0.03 (0.19)	0.16 (0.22)	-0.51 (0.54)	0.12 (0.2)
Married	-0.13 (0.1)	0.22 (0.14)	-0.29 (0.13)*	0.39 (0.23)	-0.38 (0.15)*
Citizen	0.01 (0.15)	0.33 (0.34)	0.03 (0.14)	-0.51 (0.27)	0.45 (0.38)

Ideology	-0.05 (0.03)	0 (0.04)	0.02 (0.04)	0.18 (0.08)*	-0.11 (0.05)*
N	1740	1006	1033	337	697
Residual Deviance	4414.7	2684.4	2703.2	930.1	1854.7

* indicates significance at the 5% level. Standard errors in parentheses.

Table A12 : Weighted ordered logit regression coefficients for views of trust in private companies, disaggregated by race/ethnicity.

	Whites	*Blacks*	*Hispanics*	*Asians*	*Multiracials*
Income	-0.03 (0.01)*	-0.02 (0.01)	-0.01 (0.01)	-0.04 (0.02)	0.03 (0.02)
Age	0 (0)	-0.02 (0)*	-0.01 (0)*	0 (0.01)	-0.01 (0.01)*
Gender	-0.15 (0.09)	0.13 (0.12)	-0.16 (0.12)	0.21 (0.21)	-0.22 (0.14)
Education	-0.05 (0.02)*	0.09 (0.03)*	0.02 (0.02)	0.06 (0.05)	-0.04 (0.04)
Household Size	0.05 (0.03)	-0.11 (0.04)*	0.02 (0.04)	0.15 (0.08)*	0.04 (0.06)
Work Status	0.08 (0.1)	-0.2 (0.13)	-0.26 (0.13)*	0.19 (0.23)	-0.3 (0.16)
Metro Area	-0.19 (0.12)	-0.11 (0.19)	-0.19 (0.22)	-1.1 (0.55)*	0.23 (0.2)
Married	0 (0.1)	0.49 (0.14)*	-0.21 (0.13)	0.48 (0.24)*	-0.46 (0.16)*
Citizen	0.26 (0.16)	0.16 (0.33)	0.19 (0.14)	-0.42 (0.27)	0.46 (0.4)
Ideology	0.04 (0.03)	0.03 (0.04)	0.08 (0.04)	0.13 (0.08)	0.01 (0.05)
N	1740	1006	1033	337	697
Residual Deviance	4250.2	2622.5	2643.4	862	1768.8

* indicates significance at the 5% level. Standard errors in parentheses.

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