Heat and Law Enforcement

A. Patrick Behrer[1,2] and Valentin Bolotnyy[3]

[1]Stanford University, Center for Food Security and the Environment

[2]The World Bank

[3]Stanford University, Hoover Institution

July 6, 2023

Abstract

Using administrative criminal records from Texas, we show how high temperatures affect the decision-making of police officers, prosecutors, and judges. We find that police reduce the number of arrests made per reported crime on the hottest days and that arrests made on these days are more likely to be dismissed in court. For prosecutors, high temperature on the day they announce criminal charges does not appear to affect the nature and severity of the charges. Judges, however, dismiss fewer cases, issue longer prison sentences, and levy higher fines when ruling on hot days. Our results suggest that the psychological and cognitive consequences of exposure to high temperatures have meaningful consequences for criminal defendants as they interact with the criminal justice system.

1 Introduction

High temperature increases criminal activity.[1,2,3,4,5,6,7,8,9] But what effects does it have on other actors in the judicial process? One explanation for the impact of heat on crime, with broad support in both the psychological and economics literatures, is that heat has cognitive and psychological effects that reduce emotional control and increase aggression.[4,5,10,11] An implication of the cognitive and psychological channel, however, is that heat not only impacts potential civilian defendants, but also the police charged with arresting them, the prosecutors responsible for prosecuting them, and the judges who ultimately preside over their trials.

In this paper, we examine heat's impacts in the criminal justice system by focusing on non-defendant actors (i.e., the police, prosecutors, and judges). Heat's effects on these actors have important implications for how crimes are pursued and for the outcomes defendants ultimately experience. Despite a robust literature on heat and crime, much less attention has been given to how heat impacts the range of non-defendant actors in the judicial system. Some recent work has attempted to address this gap, with varied results. Police appear to reduce effort in the execution of their duties not related to criminal justice (i.e. traffic stops) on hotter days,[2,12] but do not commit more fatal shootings on those days.[13] Judges may grant fewer asylum requests on hot days,[14] though an examination of additional data on asylum requests has called this result into question.[15] Judges in India have been found to issue more convictions on hotter days.[16]

Separate work has demonstrated how heat warps decision-making – by increasing people's irritability, anger, and hostility.[4,5,17,18] The argument is succinctly summarized: "aggression in heat is mediated by emotions, cognitions[sic], and stress from affective-thermoregulatory conflict that produces violently aggressive behavior."[19] This is consistent with evidence that heat has much larger impacts on violent crimes, or crimes of passion, than on property crimes.[1,2,9,20]

Heat not only has negative impacts on psychological control but also on cognitive and non-cognitive skills in a range of settings.[21] Heat has been shown to reduce student performance in both the short[22,23,24] and long-term.[25] Laboratory studies find that performance of both cognitive and non-cognitive tasks declines as temperature increases.[26,27,28] Non-police government officials appear to be less zealous in the execution of their duties on hotter days[12] and consumers rely more on heuristics for decision-making when subjected to heat stress.[29] The cognitive impacts of heat may be particularly important in the context of a judicial system that often requires cognitively demanding decisions from police, prosecutors, and judges.

Capturing the full effect of heat on potential defendants is important from a welfare perspective. Existing work demonstrates that heat imposes substantial welfare costs by increasing criminal activity. But arrests and incarceration also impose welfare costs, particularly on those who are arrested.[30,31,32] Understanding the extent to which the number of arrests changes on hot days because of heat's impact on police, as opposed to increases in crime, consequently has important implications for how the welfare costs of heat-driven changes in crime are distributed. For example, if arrests on hot days do not keep pace with increases in crime because of declines in police effort, there is likely a substantial welfare cost being shifted onto victims that could be alleviated by increased police effort.

The overall impact of heat on welfare in the criminal justice system also depends on how heat impacts outcomes for defendants after crimes and arrests have occurred. It is well known that judges can be influenced by apparently-extraneous factors, such as the loss of a local college sports team around the time of a ruling.[33,34] Prosecutors are also not free from bias in their decisions,[35] although no evidence to date has shown how they are affected by heat. Judges and prosecutors may be influenced by heat for the same reason as civilians and police officers or as workers in other settings. Emotional affect, mood, and cognitive function all impact prosecutorial and judicial decision-making. Heat may influence judge and prosecutor decisions through its impacts on both cognitive and non-cognitive functions.

Heat's effects on emotional control and cognition are likely to manifest differently for different actors in the judicial system due to different mediating factors. Police and prosecutors, for example, tend to work in teams, while judges typically make decisions about cases on their own. Police and judges also make decisions under time pressure, either because they must make immediate decisions about arrests or because they must move quickly through large caseloads. Prosecutors, on the other hand, typically make decisions about charges over the course of multiple days. As a result, one might expect to observe the largest impacts of heat on judges - who typically act alone and under time pressure - followed by police, with the smallest effects on prosecutors.

While prosecutors and judges likely conduct most of their business in buildings with at least partial air conditioning, there are still numerous channels through which heat could impact their decision-making. Most directly, heat can reduce the effectiveness of the air conditioning that is in place. Comprehensive data on AC penetration in Texas courtrooms is not available, but, as late as 2021, there were Texas courtrooms that still relied on window units and did not have central air conditioning. While window units clearly have a mitigating impact, the absence of modern HVAC systems makes older public buildings less protected against heat even if they nominally possess air conditioning. High temperatures make it more difficult to maintain optimal temperature ranges within these buildings.

Aside from the condition of infrastructure in public buildings in which the law is administered, there are other settings and channels through which heat may impact decision-making in the legal system. Existing work has highlighted that both judges and prosecutors, for example, may be exposed to heat before or during their commute and that heat may also influence judge or prosecutor behavior due to exposure during breaks or by preventing them from going outside during a break in order to avoid exposure.[14] This exposure may exert a persistent impact on them throughout the day. Additionally, day time temperatures are correlated with the prior night's temperatures, which, when high, have been shown to have adverse impacts on sleep and consequently a person's behavior on the following day.[36] Police officers, though often working in air conditioned vehicles, are susceptible to the effects of heat through these same channels, as well as through more of the work day spent outside. Thus, even though police, prosecutors, and judges, spend large amounts of time working in climate controlled environments, heat may still play a role in their decision-making. We leave the decomposition of the effects of heat on decision-making across each of these channels to future research.

1.1 Our approach

We use the most comprehensive data set yet brought to bear on this topic in the U.S. (for details on our data see SI-1). Our data cover the universe of more than 10 million arrests across the state of Texas from 2010 through 2017, with comprehensive information on the subsequent prosecution and trials associated with each arrest. Our data are unique in providing detail at the individual defendant level across a large geographic region and in including information about the actions of police, prosecutors, and judges in each case. The richness of our data allows us to better understand how heat affects human behavior in the judicial system.

Our data contain demographic information on the arrested individual, including their home address, race, and date of birth, as well as information on the charge at arrest. Crucially, these data provide dates associated with major decisions: the date of arrest, the date on which the prosecutor files charge(s), and the date on which the judge makes a ruling. On average, in our data, more than five months elapse between the date of arrest and the date of a judge's decision.

Combining these data with detailed daily temperature data allows us to measure the causal effect of heat on the share of crimes resulting in an arrest, the probability of conviction or dismissal, and on decisions made by prosecutors and judges.

Specifically, we estimate a series of models that rely on quasi-random variation in day-to-day temperatures to examine how temperature on the day on which decisions are made (or filed) impacts the outcomes of those decisions. While Texas is generally a warm state, we observe substantial variation in day-to-day maximum temperatures both within and across the counties in our sample (Figure SI-1 and SI-2). Our main specification uses the now-standard two-way fixed effects (TWFE) model with binned temperature.[37,25]

Our analysis of the impact of heat on police action goes beyond existing examinations and looks at the effects of heat on core police responsibilities – the investigation and arrest of those committing a wide range of crimes, beyond traffic violations. We utilize two measures in this analysis. First, we examine how arrests compare to reported crimes on hotter versus cooler days in Houston, Texas's largest city. Second, we consider the outcomes of defendants who are arrested on hotter versus cooler days. The first measure serves as a proxy of police effort and forcefulness: if heat makes police more forceful or effort, for example, one would expect to see more arrests relative to reported crimes on hotter days. On the other hand, if heat reduces police forcefulness, one would expect to see fewer arrests relative to reported crimes on hotter days. Our second measure captures the effect of heat on the types of arrests that police make. If heat makes police more forceful, they may be more likely to arrest individuals that prosecutors, operating with more remove from the (literally) hot situation, may find difficult to prosecute. As a result, individuals arrested on hot days may be more likely to have their case dismissed.

Prosecutors have a great deal of discretion in the U.S. legal system.[38] They can choose to drop charges, not proceed with charges for lack of evidence, or change charges against a defendant. Our data record information about these decisions. Specifically, we observe whether prosecutors choose not to pursue charges, whether they change the initial charges, and if so in what direction. These charges are recorded in our data as distinct from the charges recorded by the arresting officers. They are also distinct from decisions made by the judge.

We examine two different aspects of prosecutor decisions to test the hypothesis that high temperatures influence their decisions. First, we consider whether prosecutors change the number of cases they choose to drop or release without prosecution on hot days. Second, we examine whether the prosecutor is more likely to add additional charges beyond the arresting charges and, conditional on adding charges, if they add more additional charges on hot days. Our data indicate all of the charges the defendant faced after their arrest. But they also indicate whether the prosecutor specifically added to those charges - distinct from whether or not the prosecutor increased the level of the arrested charge. For example, we see if a prosecutor adds a resisting arrest charge to a defendant who was initially arrested for being drunk and disorderly. In all analyses, we control for the total number of cases that a prosecutor decides on a given day to address concerns that there may be correlation between the temperature on a given day and the number of cases the prosecutor works through. We also control for defendant characteristics – gender, race, ethnicity – and whether the crime is violent or non-violent.

Turning to judges, our data and setting allow us to test a wider range of hypotheses around the impact of heat on judges than in previous work that examines asylum requests[14] or conviction decisions.[16] We use a much longer sample period than previous work in the U.S. that includes roughly twice as many cases as analyzed in previous work and addresses concerns about sample size.[14,15] Additionally, there is a greater variety of outcomes for defendants in a criminal case as compared to asylum cases, as well as a range of actions the judge can take besides determining guilt or innocence.

We assess whether judges making decisions on hotter days are more or less likely to dismiss a case against a defendant. Judges are often the most important decision-makers in whether a case is dismissed in the U.S. Convictions, on the other hand, depend on the actions of a larger group of people, including the judge, the prosecutor, and the jury. Dismissals may also occur because witnesses or others fail to show up. This suggests some dismissals are outside of the control of the judges. To the extent this is true, it will add noise to our results, but is unlikely to drive those results. One exception is if defense attorneys are less well-prepared on hotter days and so are less successful in arguing for dismissals. Given our results on the impact of heat on prosecutors, however, we believe this is unlikely.

Second, we consider the punishments issued by the courts. We have data on the length of the sentence, the length of probation, and the amount of any fines issued. Fines are separate from court costs that defendants are ordered to repay. We do not have information on the types of punishment a particular case is eligible for, so when we analyze punishments we only consider those cases for which the punishment data are not missing. In all analyses we control for the total number of cases that a judge hears on a given day, to address concerns that there may be correlation between the temperature and the number of cases the judge hears. We also control for defendant characteristics – gender, race, ethnicity – and whether the crime is violent or non-violent.

2 Results

2.1 The impact of heat on the police

We start with the effects of heat on our measures of police behavior. We find that arrests respond less to heat than reported crimes. Considering all types of crimes, there are generally three times as many reported crimes as arrests on any given day in our data. To test the impact of heat on police behavior, we examine how the difference between reported crimes and arrests changes on hot days and report results in Panel A of Figure 1 (full results are presented in Table SI-2).

We measure the difference between reported crimes and arrests, such that a positive difference indicates more reported crimes than arrests. We consider both the number of arrests on the day the crime is reported as well as arrests on the same day the crime is reported plus the subsequent three days. In both cases, hot days substantially increase the difference between reported crimes and arrests. On the hottest days, using the contemporaneous results, the difference between reported crimes and arrests is approximately 13% larger than the same difference on cooler days.

We turn now to an examination of how the cases of those arrested on hot days proceed through the judicial system. A significant advantage of our data compared to much of the data used in previous examinations of the impact of heat on crime is that we can observe the outcome of every step of the judicial process - from arrest to prosecution to trial - for a given case. We take advantage of the comprehensive scope of our data to examine whether individuals arrested on hot days experience different outcomes than those arrested on cooler days. In this analysis, we do not consider the temperature on the day of the trial, only the temperature on the day of the arrest.

Arrests increase on hot days but in this analysis we find that a larger share of these arrests result in dismissals (Panel B, Figure 1). The difference between dismissal and conviction rates begins to appear at temperatures above 80°F and continues to diverge as temperatures increase. At all temperatures above 80°F, the difference in the change in the share resulting in a dismissal is significantly different from the change in the share resulting in a conviction. We also examine how convictions and dismissals change on hot days for White, Black, and Hispanic defendants. We do not find evidence that the impact varies by race or ethnicity. The change in the relative share of dismissals and convictions is also not the result of different types of crimes occurring on hot days relative to less hot days. Accounting for different patterns of criminal activity on hot and cool days leaves 45% of the observed increase in the share of cases unexplained (Section SI-4). The change in the share of convictions, on the other hand, is almost completely explained by the changing make-up in the types of crimes that occur on hotter days.

Our findings are likely due to a combination of factors. Reported crime increases are likely driven by actual increases in criminal activity due to heat, as prior work has shown. It is also possible that civilians are more likely to call the police on hot days, either to report actual criminal activity or to report something that is not actually criminal activity. Police, in turn, make more arrests on hot days than on cooler days, but their arrest rate falls further behind the reported crime rate on hot days. While this pattern could be consistent with heat not having any effect on police and only effects on crime and/or crime reporting, the fact that arrests on hot days are more likely to be dismissed does suggest that heat is having a deleterious effect on police decision-making.

2.2 The impact of heat on prosecutors

We do not find evidence that heat impacts prosecutor decisions regarding whether to drop a case. We show in Panel A of Figure 2 (full results in Table SI-3) that prosecutors do not appear to release defendants or drop charges with any greater or lesser frequency on hot days. Our point estimates suggest that they may be more likely to add charges on hotter days, but these estimates are very imprecise, with standard errors of the same magnitude as the point estimates. We find that, conditional on adding charges, prosecutors may add more charges on hot days, but our point estimate is only weakly significant and only a small share (roughly 2.5%) of cases in our data ultimately see additional charges being added.

When we examine these outcomes separately for White, Black, and Hispanic defendants, we find little to no evidence that heat differentially impacts prosecutors' treatment of defendants of different races or ethnicities. Our estimates for how heat impacts prosecutors' decisions to release defendants early, for example, does not vary across race or ethnicity. We do find that prosecutors may be more likely to add charges to Black defendants on hotter days, but our estimates also suggest that conditional on having added charges, White and Hispanic defendants have more additional charges than Black defendants. While meriting future work to examine this question more closely, our results do not suggest that heat leads to differential prosecutorial decisions based on the race or ethnicity of the defendant.

Overall, we find that heat does not exert a meaningful influence on prosecutor decisions. This may be because of the more diffuse decision-making process in most prosecutor offices, making temperature on the day of the decision less relevant for the process. This is consistent with existing work on prosecutor bias, which suggests prosecutors may be biased in specific circumstances (e.g., male prosecutors prosecuting female defendants[35]), but not on average. We do not know which prosecutor in a prosecutor's office pursued a given case and how the process unfolded, which leaves open the possibility that more refined data might in fact show the impacts of heat on decision-making in specific contexts.

2.3 The impact of heat on judges

Our results indicate that judges consistently behave in ways that are less favorable to defendants when decisions are made on hotter days (Panel B, Figure 2 and Table SI-4). Our estimate for how convictions change on hot days is imprecise and not significant, but indicates a 90°F day increases convictions by about 1%. Dismissals, however, fall by just under 5% on a day with mean temperature above 90°F. The fact that convictions are decided through a process involving the prosecutors, jury, and judge, while dismissals tend to be decided by a judge alone, provides further evidence that teamwork can mitigate the effect of heat on decision-making. Though juries also deliberate over numerous days, making our estimate of the effect of heat on their decision-making process imprecise, these findings are in line with the effects of heat on police and prosecutors.

Courts appear to issue more severe punishments on hotter days relative to cooler days. The length of confinement increases by approximately 6.5% when the decision is made on a day with mean temperature above 90°F. Fines also increase on hot days, by approximately 4%, but we do not observe changes in the length of probation.

The number of cases that result in a sentencing decision or a court fine is relatively small. Figure SI-3 shows the results of a randomization inference test to examine whether our estimates of the impact of days above 90°F on sentence length and fines are simply due to random chance in which cases happen to be decided on the hottest days. The *p*-value from the randomization inference test in both cases suggests that our results are significant and not due to random chance in which cases are decided on hot days.

As with prosecutors and police, heat does not appear to impact court decisions differentially based on the defendant's race or ethnicity. We find that hot days impact decisions about conviction or dismissal similarly for White, Black, and Hispanic defendants. Nor does heat impact the length of sentence or fine amount differently for White, Black, or Hispanic defendants. Our results are also robust to including controls for temperature on the day of the arrest separately from the temperature on the day of the court's decision.

Taken together, these effects suggest that outdoor temperatures do impact decisions made by judges. Judges issue more severe sentences on hotter days and become less willing to dismiss cases. This is consistent with the hypothesis that heat increases cognitive and emotional stress in ways that have consequences for the outcome of cognitively intensive tasks. Heat can thus have meaningful effects on performance even in settings without physical labor. The effects are lower in magnitude than the effects of heat on judicial decisions in India,[16] consistent with the notion that while AC penetration in Texas courtrooms is not complete it is far greater than in Indian courts. We interpret this difference as representative of the mitigating impact that AC in courtrooms may have on judges. More detailed work examining the role of AC in reducing the effects of heat on cognitively demanding job performance is warranted.

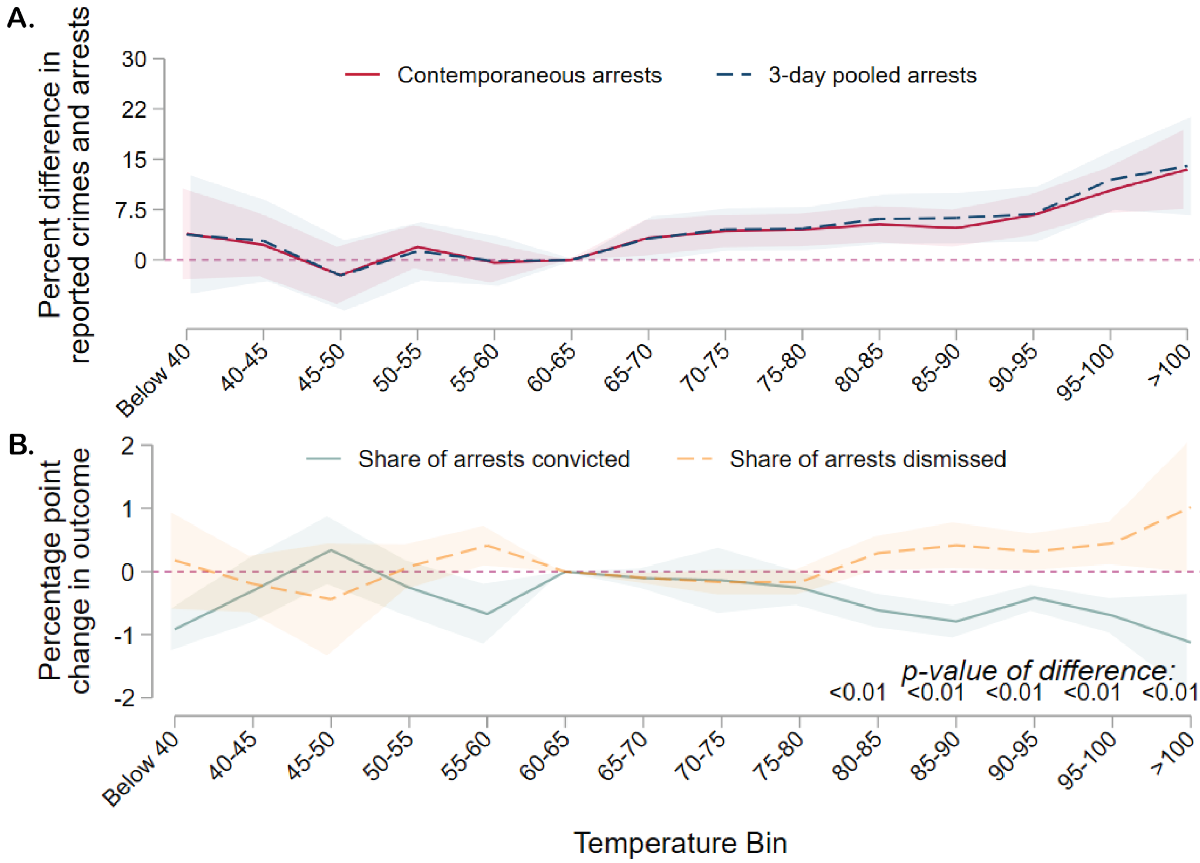


Figure 1: Outcomes related to police behavior on hot days - Panel **A** reports the coefficients from two regressions of heat on the difference between reported crimes and recorded arrests in the Greater Houston area. The solid red line considers the difference between reported crimes and arrests on that day. The dashed blue line considers reported crimes and recorded arrests on the same day plus the subsequent three days. In both cases the difference between reported crimes and arrests grows on hotter days. There are more reported crimes than arrests on a typical day, but on a day with a maximum temperature above 100°F this difference is roughly 13% larger than on a day with a maximum temperature between 60 and 65°F. Full results of this estimation are reported in Table SI-2. In Panel **B**, we report the coefficients from a regression of heat on the share of arrests that result in a dismissal (dashed orange line) and conviction (solid green line). Temperatures below approximately 80°F have little effect on these shares. However, a greater share of arrests made on a hot day result in a dismissal relative to arrests occurring on a day with a maximum temperature between 60 and 65°F. Hot days also reduce the share of arrests that result in convictions relative to a day with a maximum temperature between 60 and 65°F. In both panels, the regressions include a full suite of controls for precipitation, county, week, month, and year fixed effects. In both panels the shaded area indicates the 99% CI.

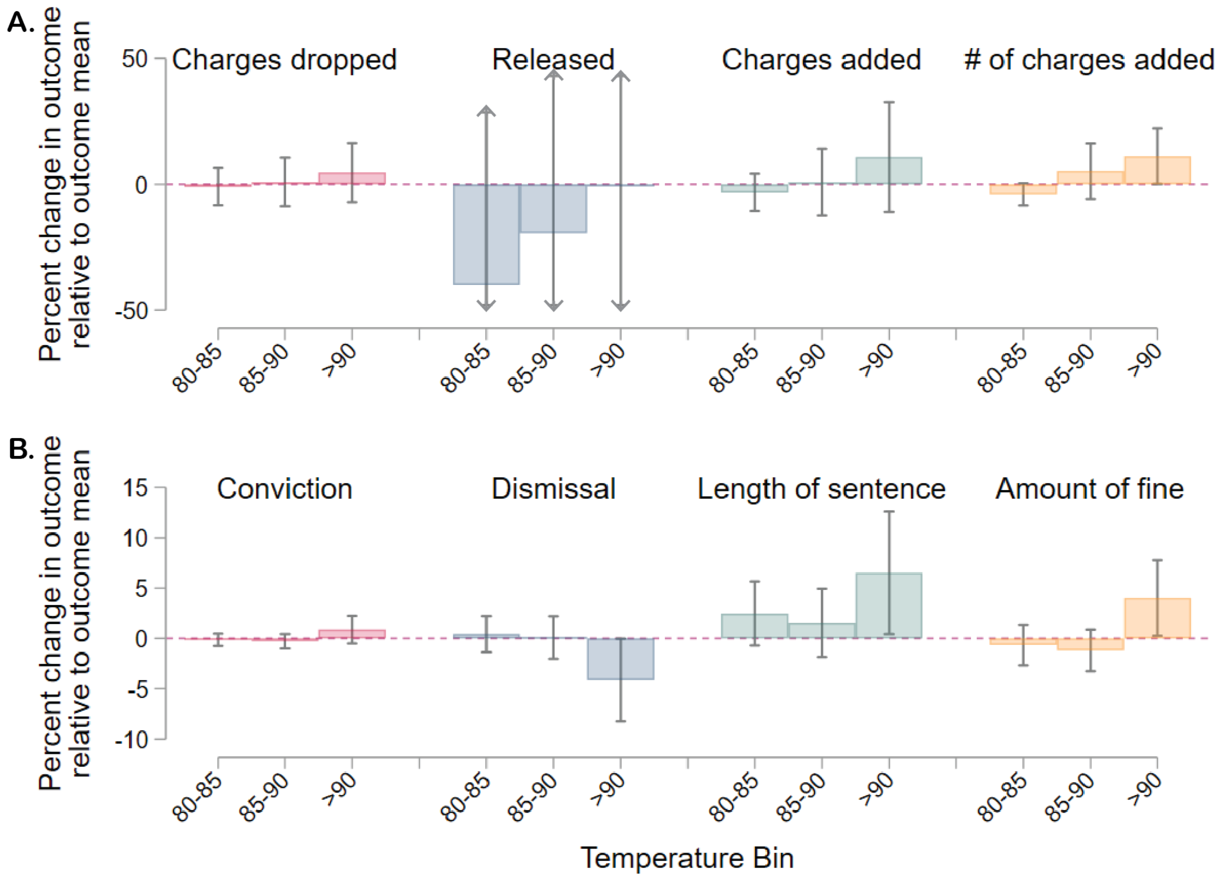


Figure 2: Heat's impact on prosecutors and judges - Panel **A** reports the coefficients from four separate linear fixed effects regressions of heat on outcomes measuring prosecutor behavior. Outcomes are measured at the case level. We report coefficients from the highest three temperature bins here and outcomes are defined above the coefficient estimates. Standard errors are clustered at the prosecutor level. All include controls for dew point, minimum vapor pressure deficit, and the gender, race, and ethnicity of the defendant. All regressions are weighted by the total cases the prosecutor tries in our sample. "Dropped" refers to cases that are coded in the data as "No Bill," "Agency drop charge," "Pros. reject charge," "Withdrawn by complainant," and "Pros. rejected charge due to diversion." "Released" refers to cases that are coded in the data as "Released w/o Pros" and are not coded as "Dropped." Full regression results are detailed in Table SI-3. Panel **B** reports results from a similar set of regressions but measures outcomes for judges. We include the same set of controls and cluster standard errors at the court level. Conviction indicates the defendant was convicted of the original charge. Dismissal indicates the charge was dismissed. Coefficients indicate the percentage increase in the outcome from the outcome's mean for an additional day in each bin. In both panels the grey bars represent the 99% CI. Full results are reported in Table SI-4.

3 Discussion

We study how the adverse effects of heat on cognition, mood, and emotional state in turn affect the decision-making process of police officers, prosecutors, and judges. We move beyond existing work on the effect of heat on police by showing that its effects are more complex than just simple reduction in effort. Police make more arrests on hot days, but fewer arrests per reported crime. We thus document the “regulatory gap” caused by heat that has previously been hypothesized.[12] We also show that not only is effort reduced, but that arrests made on hot days are also more likely to be dismissed relative to arrests made on cooler days. We thus provide evidence, consistent with abundant evidence of the negative cognitive impacts of heat,[21] that heat hurts the decision-making process of police officers and leads to the unnecessary detention of civilians.

Heat does not appear to impact prosecutorial decision-making. Though judges and prosecutors work in similar environments, prosecutors work on charges over several days and in teams, while judges largely decide on sentence severity alone and often under significant time pressure. That heat appears to impact judges more than prosecutors suggests that teamwork, among other factors, could play an important role in reducing the adverse effects of heat on decision-making. Further research on teamwork and heat would thus be valuable.

There are important limitations to our results. We do not observe police behavior directly, only the consequences of that behavior as it appears in the record of arrests. Our results are consistent with our hypotheses of how and why heat may impact police behavior, but we do not measure direct changes in behavior.

Similarly, we cannot isolate the mechanism through which heat impacts judge behavior. While there are multiple channels through which heat could impact judges - including, but not limited to, exposure during commuting, changed patterns of behavior during the day, and exposure due to imperfect air-conditioning coverage - we do not have direct evidence for these channels. We note, however, that the common perception of judges working exclusively in highly air-conditioned environments does not appear to be true in our setting. While there is no comprehensive database of courthouse air-conditioning penetration in Texas, our review of public information on individual courthouse renovations in Texas indicate that even as late as 2021 courthouses in Texas lacked comprehensive air conditioning.

Our results on prosecutors are also limited because we do not observe the particular race, ethnicity, and gender of prosecutors. Existing work on prosecutor bias has found that while prosecutors may not be biased in general, they can be biased against specific classes of defendants who are unlike them.[35] While we do not find evidence that heat impacts prosecutor behavior in general, it remains possible that it exacerbates these types of biases. Evidence from India indicates that the impact of heat on judges varies by gender,[16] further suggesting that more detailed examination of prosecutor behaviour might uncover evidence of heat’s impacts.

Our results highlight that climate change will have an impact on the criminal justice system apart from its direct impact on the commission of crimes. Taken with the existing evidence of the impact of heat on crime, our results indicate that, absent comprehensive adaptation, a higher frequency of high temperatures will result in worse decision-making by police and harsher decisions made by judges.

Finally, our results lend support to a psychological mechanism for the impact of heat on crime. While other mechanisms may explain the link between heat and the commission of crime, the cognitive and psychological explanation provides a parsimonious theory that unifies both the impacts of heat on the commission of crimes and the impacts we document throughout the judicial system. Heat reduces self-control, negatively impacts mood, increases aggression, and places heightened stress on cognitive faculties. As a consequence, crime increases, police make arrests they likely should not be making, and judges working on tight schedules - as opposed to prosecutors who operate in a team on looser deadlines - make harsher and more punitive judgements. A psychological explanation does not preclude other mechanisms from operating in certain circumstances, including ours, but no other single theory offers a consistent explanation for the full set of these impacts.

4 Acknowledgements

We thank Elise Breshears, Alex Bunin, Marshall Burke, Natalia Emanuel, Rebecca Goldstein, Adrienne Harrold, Peter Hong, Wallis Nader, Ishan Nath, and Jisung Park, as well as members of ECHOLab at Stanford, participants in the LAGV conference, the N. American Urban Economics Association meeting, the Midwest Economics Association meeting, and UCLA's Climate Adaptation Research Symposium for their assistance and suggestions. We are also grateful to Robin Robinson for her excellent research assistance. The study was approved by Stanford University's Institutional Review Board as Protocol 56777. An earlier version of this study was circulated as a working paper titled "Heat, Crime, and Punishment." The findings, interpretations, and conclusions expressed in this paper are entirely those of the authors. They do not necessarily represent the views of the World Bank and its affiliated organizations, or those of the Executive Directors of the World Bank or the governments they represent.

5 Code & Data availability

The micro data on criminal defendants cannot be made publicly available under our agreement with the Texas Department of Public Safety. To request the raw micro data, contact the department directly.

Code and aggregated data to replicate the tables and figures in the paper will be made available, where possible, on the authors' websites.

References

[1] Matthew Ranson. "Crime, weather, and climate change". In: *Journal of environmental economics and management* 67.3 (2014), pp. 274–302.

[2] Kilian Heilmann and Matthew E Kahn. *The Urban Crime and Heat Gradient in High and Low Poverty Areas*. Tech. rep. National Bureau of Economic Research, 2019.

[3] Keith D Harries, Stephen J Stadler, and R Todd Zdorkowski. "Seasonality and assault: Explorations in inter-neighborhood variation, Dallas 1980". In: *Annals of the Association of American Geographers* 74.4 (1984), pp. 590–604.

[4] Craig A Anderson. "Temperature and Aggression: Ubiquitous Effects of Heat on Occurrence of Human Violence." In: *Psychological Bulletin* 106.1 (1989), p. 74.

[5] Craig A Anderson et al. "Temperature and Aggression". In: *Advances in Experimental Social Psychology*. Vol. 32. Elsevier, 2000, pp. 63–133.

[6] Craig A Anderson. "Heat and Violence". In: *Current Directions in Psychological Science* 10.1 (2001), pp. 33–38.

[7] Anna Bruederle, Jörg Peters, and Gareth Roberts. "Weather and crime in South Africa". In: 739 (2017).

[8] Teevrat Garg, Gordon C McCord, and Aleister Montfort. "Can Social Protection Reduce Environmental Damages?" In: (2020).

[9] David Blakeslee et al. "In the heat of the moment: economic and non-economic drivers of the weather-crime relationship". In: *Working Paper* (2018).

[10] Robert A Baron and Paul A Bell. "Aggression and heat: The influence of ambient temperature, negative affect, and a cooling drink on physical aggression." In: *Journal of personality and social psychology* 33.3 (1976), p. 245.

[11] Ingvild Almås et al. *Destructive Behavior, Judgment, and Economic Decision-making under Thermal Stress*. Working Paper 25785. National Bureau of Economic Research, Apr. 2019. DOI: 10.3386/w25785. URL: http://www.nber.org/papers/w25785.

[12] Nick Obradovich, Dustin Tingley, and Iyad Rahwan. "Effects of Environmental Stressors on Daily Governance". In: *Proceedings of the National Academy of Sciences* 115.35 (2018), pp. 8710–8715.

[13] Sébastien Annan-Phan and Bocar A Ba. "Hot Temperatures, Aggression, and Death at the Hands of the Police: Evidence from the US". In: *Aggression, and Death at the Hands of the Police: Evidence from the US (July 3, 2020)* (2020).

[14] Anthony Heyes and Soodeh Saberian. "Temperature and Decisions: Evidence from 207,000 Court Cases". In: *American Economic Journal: Applied Economics* 11.2 (2019), pp. 238–65.

[15] Holger Spamann. "No, Judges Are Not Influenced by Outdoor Temperature (or Other Weather): Comment". In: *Harvard Law School John M. Olin Center Discussion Paper* 1036 (2020).

[16] Terry-Ann Craigie, Vis Taraz, and Mariyana Zapryanova. "Temperature and Convictions: Evidence from India". In: (2022).

[17] Jaap JA Denissen et al. "The effects of weather on daily mood: a multilevel approach." In: *Emotion* 8.5 (2008), p. 662.

[18] Richard P Larrick et al. "Temper, temperature, and temptation: Heat-related retaliation in baseball". In: *Psychological Science* 22.4 (2011), pp. 423–428.

[19] Ehor Boyanowsky. “Violence and aggression in the heat of passion and in cold blood: The Ecs-TC syndrome”. In: *international Journal of Law and psychiatry* 22.3-4 (1999), pp. 257–271.

[20] Anita Mukherjee and Nicholas J Sanders. *The Causal Effect of Heat on Violence: Social Implications of Unmitigated Heat Among the Incarcerated.* Working Paper 28987. National Bureau of Economic Research, July 2021. DOI: `10.3386/w28987`. URL: `http://www.nber.org/papers/w28987`.

[21] Joshua Graff Zivin, Solomon M Hsiang, and Matthew Neidell. “Temperature and Human Capital in the Short-and Long-Run”. In: *Journal of the Association of Environmental and Resource Economists* (2017).

[22] R Jisung Park et al. “Heat and learning”. In: *American Economic Journal: Economic Policy* 12.2 (2020), pp. 306–39.

[23] R Jisung Park. “Hot temperature and high stakes performance”. In: *Journal of Human Resources* (2020).

[24] Teevrat Garg, Maulik Jagnani, and Vis Taraz. “Temperature and human capital in India”. In: *Journal of the Association of Environmental and Resource Economists* 7.6 (2020), pp. 1113–1150.

[25] R Jisung Park, A Patrick Behrer, and Joshua Goodman. “Learning is inhibited by heat exposure, both internationally and within the United States”. In: *Nature human behaviour* (2020), pp. 1–9.

[26] Jerry D Ramsey. “Task performance in heat: a review”. In: *Ergonomics* 38.1 (1995), pp. 154–165.

[27] Chris Hocking et al. “Evaluation of cognitive performance in the heat by functional brain imaging and psychometric testing”. In: *Comparative Biochemistry and Physiology Part A: Molecular & Integrative Physiology* 128.4 (2001), pp. 719–734.

[28] Olli Seppanen, William J Fisk, and QH Lei. “Effect of temperature on task performance in office environment”. In: *Lawrence Berkeley National Laboratory* (2006).

[29] Amar Cheema and Vanessa M Patrick. “Influence of warm versus cool temperatures on consumer choice: A resource depletion account”. In: *Journal of Marketing Research* 49.6 (2012), pp. 984–995.

[30] Michael Mueller-Smith. “The criminal and labor market impacts of incarceration”. In: *Unpublished Working Paper* 18 (2015).

[31] Carrie Pettus-Davis et al. “The economic burden of incarceration in the US”. In: *Institute for Advancing Justice Research and Innovation. Washington University in St. Louis* (2016).

[32] Ashley Provencher and James M Conway. “Health effects of family member incarceration in the United States: A meta-analysis and cost study”. In: *Children and Youth Services Review* 103 (2019), pp. 87–99.

[33] Jens Ludwig and Sendhil Mullainathan. “Fragile algorithms and fallible decision-makers: lessons from the justice system”. In: *Journal of Economic Perspectives* 35.4 (2021), pp. 71–96.

[34] Ozkan Eren and Naci Mocan. “Emotional Judges and Unlucky Juveniles”. In: *American Economic Journal: Applied Economics* 10.3 (2018), pp. 171–205.

[35] Stephanie Holmes Didwania. "Gender-Based Favoritism Among Criminal Prosecutors". In: (2018).

[36] Kelton Minor et al. "Rising temperatures erode human sleep globally". In: *One Earth* 5.5 (2022), pp. 534–549.

[37] Olivier Deschênes and Michael Greenstone. "The economic impacts of climate change: evidence from agricultural output and random fluctuations in weather". In: *American Economic Review* 97.1 (2007), pp. 354–385.

[38] David Alan Sklansky. "The problems with prosecutors". In: *Annual Review of Criminology* 1 (2018), pp. 451–469.

[39] Texas Department of Public Safety. *Seventeenth Report Examining Reporting Compliance to the Texas Computerized Criminal History System*. Tech. rep. 2019.

[40] Brian A Reaves and Matthew J Hickman. *Census of state and local law enforcement agencies, 2008*. US Department of Justice, Office of Justice Programs, 1998.

[41] Joshua Graff Zivin and Matthew Neidell. "Temperature and the allocation of time: Implications for climate change". In: *Journal of Labor Economics* 32.1 (2014), pp. 1–26.

[42] E Somanathan et al. *The impact of temperature on productivity and labor supply: Evidence from Indian manufacturing*. Tech. rep. Indian Statistical Institute, New Delhi, India, 2015.

[43] Aldert Vrij, Jaap Van der Steen, and Leendert Koppelaar. "Aggression of police officers as a function of temperature: An experiment with the fire arms training system". In: *Journal of community & applied social psychology* 4.5 (1994), pp. 365–370.

Supplementary Information

SI-1 Materials & Methods

SI-1.1 Texas Department of Public Safety (TDPS) Data

We start with confidential data from the TDPS that include detailed information about every arrest made in Texas from 2010 through 2017. These data are collected and organized by the TDPS and come directly from specific criminal justice agencies within each Texas county. Arrests are reported by the arresting agencies, prosecutor information is reported by the prosecutors, and the court dispositions are reported by the courts. Data are reported to TDPS every 7 to 30 days, as required by the Texas Code of Criminal Procedures, Chapter 66.252.

Texas state law also requires that counties maintain at least a 90% data completeness rate over a rolling five year period in order to be eligible for certain state funds. Completeness means that the data reflect the most up-to-date status or disposition of each case. We received our data in 2019, so at least 90% of the cases through 2017 have been deemed to accurately reflect their most up-to-date status in our data.[39]

The TDPS arrest disposition data come in several parts. We combine files providing data on the individual arrested, the circumstances of the arrest, details of any prosecution, details of any court trial, and details of the subsequent sentencing or appeal.

The prosecution data can be linked to the individual and arrest data using the unique individual and incident IDs. They include the prosecuting agency, date the prosecutor took action on the case, the action taken, the level of the offense that was prosecuted, and the charge prosecuted. The court data include the court that tried the case, the date of the trial, the final pleading of the defendant, the level of the offense and charge that the court ruled on, the sentence handed down by the court, the length of any court ordered probation or confinement, the amount of any court costs the defendant was ordered to pay, and the amount of any fines the defendant was ordered to pay. The data also include whether the case was appealed and the outcome of the appeal. We link arrest and prosecution charges to the court data using the unique individual and incident IDs.

We drop all arrests and charges for which we do not have court outcome data (i.e., the arrest charge does not have a match in the court data) and charges for which the court has not issued a decision.[1] We also drop misdemeanor C cases as these are inconsistently reported in our data. This leaves us with 2.6 million arrests. We geocode the addresses provided with the address information and match each arrest to the county in which the individual lived when they were arrested. We then collapse the data to the count of arrests at the county-day level. This leaves us with a balanced panel of 742,188 county-day observations from 2010 through 2017.

SI-1.2 Crime Reports from the Houston Police Department

We supplement our TDPS data on arrests with daily data from the Houston police department, the largest city police department in Texas and the fifth largest by officer count in the United States,[40] on reported crimes. These data report the date, hour, location, and type of crime committed from 2010 through 2018. Importantly, they include reported crimes that do not have an associated arrest and that therefore do not appear in the TPDS data. We geocode the provided locations to match the incidents to the U.S. Census tracts associated with each address. Addresses in the Houston PD data correspond to the location from which each report was filed – not, as in the TDPS data, to

[1] These are indicated as cases where the result is "pending" or "no determination." Dropping non-matching court cases drops 11% of the arrests in our raw sample.

the address at which the defendant lived at the time. To account for this, and to account for the fact that defendants may commit crimes in Houston even if they do not live in Houston, we create a sample of arrests from the TDPS data that matches the geographic and temporal coverage of the TPDS incident data. We do so by pulling all arrests between 2010 and 2017 where the address of the defendant was in one of the five counties of the greater Houston area. We match these addresses to census tracts as well, in order to facilitate comparisons between reported incidents and arrests.

SI-1.3 Weather Data

We match our daily arrest counts with daily weather data from the PRISM Climate Group's gridded re-analysis product. The PRISM product provides daily information on minimum and maximum temperature, minimum and maximum vapor pressure deficit, dew point, and precipitation on a 4km by 4km grid for the continental United States. We aggregate these measures to the county level by taking the average across the grid points within the county. We assign daily maximum temperature to one of 12 5°F temperature bins from 40°F up to 100°F. Days below 40°F and above 100°F are included in separate bins. We also bin daily precipitation to control for the impacts of particularly rainy days. We assign days to four exclusive precipitation bins: no precipitation, less than half an inch, one half to one inch, and more than one inch.

SI-1.4 Summary Statistics

In Table SI-1 we present summary statistics for our primary measure of temperature - daily maximum temperature - for aggregate crimes, and for aggregate crimes by race and ethnicity. Roughly 60% of the days in our sample experience a maximum temperature above 70°F and the majority of days in the sample have no precipitation. We summarize the spatial distribution of hot days in Figure SI-1. Arrests are broadly distributed across the state.

High temperature is also evenly distributed across the state. We show the average annual number of days over 90°F. Counties in the Rio Grande Valley have, on average, the largest number of these days, but every county in Texas experiences at least 40 such days in an average year. Figure SI-2 underlines the variation in temperatures within counties across years in our sample and across months within a given year. Panel A shows the number of days above 90°F in each year of our sample for three counties selected from each tercile of the distribution of 90°F+ days. While there is clear separation in the number of days as you move down the distribution - Taylor County never experiences a year with as many hot days as the coolest year in Starr County, and Aransas County experiences only one year matching Taylor's coolest year - there is also clear variation within each county across years in the number of hot days. On average these three counties experience yearly deviations of as many as 25 days on each side of their average number of 90°F+ days.

Looking at the distribution of hot days within the same three counties across months of the year, it is clear there is also variation in when days become hot and cease to be hot within a year. Starr County experiences 50 such days in March during our sample, while Aransas and Taylor experience almost no such days in March. All experience a substantial number of 90°F+ days in August, but while these decline to zero by October in Aransas it takes until January to reach zero days above 90°F in Starr.

SI-2 Empirical Approach

In all of our analyses, we rely on day-to-day variation in local temperatures within a county to identify the impact of hotter temperatures on our outcomes of interest. Identification rests on the assumption that day-to-day variations in temperature within a county are plausibly exogenous with respect to our outcome of interest. We control for annual trends and month-to-month seasonality in temperature.

SI-2.1 Analysis of Outcomes in the Justice System

In our analysis of we take the standard empirical approach and estimate a linear fixed effects model with various temperature and precipitation bins. We focus on individual cases and estimate regressions of the form

$$Y_{pidmy} = \beta_k \sum T_{idmyk} + \rho_l \sum R_{idmyl} + \delta_y + \psi_i + \eta_d + \Omega_m \quad (1)$$

where T_{idmyk} is an indicator for whether the mean temperature, in the prosecutor and court analysis, or maximum temperature, in the police analysis, in county i on day d in month m and year y is in the k^{th} temperature bin. We use one bin for temperatures below 40°F and one for those above 90°F. Bins in between are in 5°F increments and we omit the 60-65°F bin. In keeping with,[14] we focus on the mean temperature, rather than the daily max, because mean temperature is more likely to capture high temperatures during the morning commute.

Maximum temperature, in contrast, generally captures the temperature during the peak of the afternoon, when judges and prosecutors are likely to be least exposed to the heat.[2] We use maximum temperature in the police analysis because police are likely to be operating outside throughout the day, including at the hottest parts of the day. In all judge and prosecutor regressions, we also control for the total number of cases that the prosecutor filed or judge heard on that day to account for any instances in which having to work through a large wave of cases might influence their behavior. We link prosecutor offices and the courts to counties according to Texas data on where each prosecutor or court is based, in order to assign daily temperatures.

R_{idmyl} is an indicator for whether the day falls in the l^{th} precipitation bin. We omit the highest bin in our estimation. $\eta_d, \Omega_m, \delta_y$, and ψ_i are day-of-week, month, calendar year, and county fixed effects. Our county fixed effects absorb any time invariant location specific determinants of crime. Our daily and monthly fixed effects account for variation in crimes over the course of a week (e.g., there may be more crimes on Fridays) and the year (e.g., there is less outdoor activity in the winter and generally lower crime). Our results are robust to several alternative sets of fixed effects, including a month × year fixed effect.

Y_{pidmy} represents our outcome of interest for defendant p (e.g., an indicator for whether an arrest resulted in a conviction or the length of defendant p's sentence). Again, our identification rests on plausibly exogenous variation in the temperature on the day of the arrest for defendant p net of any year, month, or day of the week specific variation in temperature or outcomes. In our analysis of prosecutor and judicial decision-making, T_{idmyk} represents the temperature on the day that the prosecutor or judge made a decision in the case of defendant p. Our outcome of interest is again β_k, which in this specification estimates the increase in the probability that a case arrested on a hot day (or decided on a hot day, depending on the analysis) experiences a given judicial outcome Y_{pidmy}. In our main specifications of prosecutor and judge outcomes we do not control for temperature on the day of the arrest - relying instead on the fact that temperatures on the day of arrest and temperatures on these decision days are not highly correlated, likely because they occur an average of five months apart. In robustness checks we do control for these temperatures and our results do not change.

[2]Using max temperature, however, produces qualitatively similar results to using mean temperature.

When we evaluate prosecutorial and court discretion, we only consider those cases that have reached a particular stage of the judicial process. For example, the share of cases where charges are added by prosecutors are calculated as the number of cases with added charges as a share of the number of cases that prosecutors choose to pursue.

SI-3 Framework

To clarify the differences between considering reported crimes and arrests, consider the following analytic framework. We express arrests (A) as a function of criminal (C) and police (P) activity, which in turn are determined jointly in equilibrium and depend, in part, on temperature:

$$Arrests = A(C, P) \tag{2}$$

How do arrests evolve with changes in temperature (T), which we define as deviations from the optimum temperature? It will depend on the combined impact of temperature on criminal and police activity.

$$\frac{dA(C,P)}{dT} = \frac{\partial A}{\partial C}\left[\underbrace{\frac{\partial C}{\partial T}}_{(1)} + \underbrace{\frac{\partial C}{\partial P}\frac{dP}{dT}}_{(2)}\right] + \frac{\partial A}{\partial P}\left[\underbrace{\frac{\partial P}{\partial T}}_{(3)} + \underbrace{\frac{\partial P}{\partial C}\frac{dC}{dT}}_{(4)}\right] \tag{3}$$

The four terms on the right hand side capture different aspects of the relationship between heat and arrests. Terms one and two capture the direct impact of heat on criminal activity and the "rational criminal" response to temperature: term 1 captures the direct impact of heat on criminal defendants. Term 2 reflects how crime changes in response to changes in police activity driven by temperature changes. The total effect of these two terms is the object most existing work on heat and crime, using data on reported crimes, has estimated.[3] Term three captures the direct impact of heat on police activity (the effect estimated by ref.[12]). Term four captures any changes in police effort in response to changes in crime due to heat: if, for example, police increase patrols on hot days because they know crime increases on these days.

Heat may impact police activity for many of the same reasons that it impacts criminal activity. Ref.[12] finds police are less active in the heat, arguably because exerting effort on hot days is more costly. This is consistent with a broad literature that finds reductions in labor supply and productivity on hot days in a variety of settings.[41,42] If these negative impacts dominate any change in behavior due to anticipated changes in crime this would manifest as an overall negative sign on term four.[4]

Heat may also, however, make the police more likely to arrest individuals relative to cooler days (i.e. term 3 may be positive). There are at least two reasons for this. If heat increases aggression and violence in the commission of crimes, police may pre-emptively arrest individuals to defuse a situation that heat-driven aggression has exacerbated in a way that would not have occurred on a cooler day. Police officers may also arrest more frequently on hotter days because the officers themselves become more aggressive. Existing work suggests that police are negatively impacted by hot temperatures in ways that make them more aggressive, more tense, and produce more

[3] The best estimates of term two suggest that it is zero or close to zero and the majority of the existing effect operates through term one.[2]

[4] Ref.[2] use data on instances when LAPD officers leave their cars and find that this actually appears to increase on hotter days, suggesting that term four may be slightly positive. They do confirm a decline in traffic stops, consistent with ref..[12]

negative views of defendants.[43] Heat also appears to increase out-group bias[9] and may strengthen the pre-existing biases of police officers.

SI-4 The mechanical effect of crime composition on dismissal rates

What is driving the change in dismissals? One possibility is that different crimes have different rates of dismissal and conviction and heat impacts those crimes differently. Existing work shows that violent crimes increase substantially on hot days while non-violent crimes are less responsive.[1] This implies that the violent crime share of arrests is higher on hot days than on less hot days. If violent crimes are dismissed at higher rates than non-violent crimes, we might see this pattern simply because of the change in the type of crimes that occur on hot days. Violent crimes are also dismissed at higher rates and convicted at lower rates than non-violent crimes. To what extent does this drive our results?

Our estimates suggest that on days greater than 100°F, the share of arrests for violent crimes as a percent of total arrests increases from 15% to 17%. If we assume that the share of violent crimes that is dismissed remains constant across hotter and cooler days, that implies a mechanical 0.65 percentage point increase in dismissals due to the change in the types of crimes that occur on hot days. We observe an increase in dismissal rates of 1.01 percentage points on hotter days relative to cooler days. So it appears that the mechanical change in dismissals can explain roughly 65% of the increase that we observe. The implied mechanical decline in the convictions rate, on the other hand, is roughly 100% of the observed decline in convictions. The change in convictions is thus due primarily to the changing make-up of crimes on hot days rather than the changing behavior of prosecutors or judges. The implied mechanical changes are based, however, on the assumption that the rate at which violent crimes are convicted or dismissed remains constant across arrests on hot and cold days. Our evidence supports this assumption, but it is difficult to test its validity.

We also examine whether the increase in dismissals is driven by a potential increase in arrests of first-time offenders on hot days and judges or prosecutors exhibiting leniency toward these first-time offenders. We find no evidence that hot days increase the number of first-time offenders or that these cases are driving the increase in dismissals on hot days. We also control for the number of cases a prosecutor issues decisions on and a judge hears on the same day. Doing so, we find no evidence that being arrested on a hotter day means one's case is decided when prosecutors or judges have higher workloads.

SI-5 Additional Tables

Table SI-1: Summary statistics

	Mean	SD	Min	Max
Annual averages of weather measures				
T above 100F	17.10	20.18	0	138
T 95-100F	36.75	14.41	0	94
T 90-95F	49.50	13.36	8	102
T 85-90F	45.26	12.17	13	121
T 80-85F	42.94	10.34	17	80
T 75-80F	37.18	9.06	13	87
T 70-75F	31.75	7.15	11	60
T 65-70F	27.26	6.24	9	46
T 55-60F	17.07	5.33	2	37
T 50-55F	13.06	5.32	1	31
T 45-50F	9.15	4.48	0	24
T 40-45F	6.50	3.99	0	21
T below 40F	8.89	8.15	0	38
Days with no prec	232.53	31.23	125	313
Days with less than 0.5 in	19.67	7.49	1	64
Days with 0.5 to 1 in	5.78	2.70	0	17
Days with>1in	107.27	28.44	25	201
Daily crime averages				
Total crimes	3.24	11.10	0	213
Violent crimes	0.57	2.10	0	46
Non-violent crimes	1.59	5.65	0	137

NOTES: We aggregate our weather variables to the annual level and report averages across all counties and years in the sample. Thus, "Mean", for example, indicates the average number of annual days in a temperature bin across all counties and years in the sample. Daily crime average statistics are daily averages across all Texas counties.

Table SI-2: Impact of heat on the difference in reported crimes and arrests in Houston

	Contemporaneous arrests	3-day pooled arrests
T above 100F	0.045	0.047
	(0.010)	(0.012)
T 95-100F	0.034	0.040
	(0.005)	(0.007)
T 90-95F	0.022	0.023
	(0.005)	(0.007)
T 85-90F	0.016	0.021
	(0.004)	(0.006)
T 80-85F	0.018	0.020
	(0.004)	(0.006)
T 75-80F	0.015	0.015
	(0.004)	(0.005)
N	1,840,860	1,839,600
Outcome mean, T60-65	0.33	0.03
Fixed Effects:		
Tract	Yes	Yes
Month	Yes	Yes
Year	Yes	Yes
DOW	Yes	Yes

NOTES: All columns report the results of a linear fixed effects specification. We estimate the impact of a hot day on the difference between the number of incidents reported to the Houston Police Department (Houston PD) and the number of arrests reported to the Texas Department of Public Safety (TDPS). In all cases we aggregate the count of incidents (Houston PD) data or arrests (TDPS data) to the tract-day level and conduct analysis at that level of aggregation. The sample in all cases is a balanced panel of tracts that contain at least one Houston PD crime report at the daily level from 2010 to 2017. In column 2, we pool arrests across the day of interest and the following two days. Errors are clustered at the tract level and are reported in parentheses. All regressions are weighted by the total population in each tract-year. All regressions include the full set of precipitation bins and temperature bins. Coefficients report the raw change in the difference between incidents and arrests for a day in a given temperature bin relative to the omitted 60-65°F bin. Postive differences indicate more incidents than arrests. 100× the coefficient estimates divided by the mean reported at the bottom of the table indicates the percent change in the difference on days in each bin relative to a day in the omitted 60-65°F bin.

Table SI-3: Impact of heat on day of prosecution action on filed charges

	Dropped	Released	Added charge	Number of added charges
T above 90F	1.613	-0.000	0.278	0.158
	(2.015)	(0.005)	(0.274)	(0.076)
T 85-90F	0.300	-0.002	0.020	0.073
	(1.649)	(0.003)	(0.167)	(0.077)
T 80-85F	-0.355	-0.004	-0.086	-0.058
	(1.269)	(0.003)	(0.093)	(0.031)
N	1,992,677	1,992,677	1,992,677	51,321
Outcome mean:	35.18	0.01	2.58	1.42
Fixed Effects:				
County	Yes	Yes	Yes	Yes
Month	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
DOW	Yes	Yes	Yes	Yes

NOTES: Standard errors are clustered at the prosecutor level. Outcome for charges is specified in column headings. All regressions are linear probability panel fixed effects. All include controls for dew point, minimum vapor pressure deficit, and the gender, race, and ethnicity of the defendant. All regressions are weighted by the total cases the prosecutor tries in our sample. "Dropped" refers to cases that are coded in the data as "No Bill," "Agency drop charge," "Pros. reject charge," "Withdrawn by complainant," and "Pros. rejcted charge due to diversion." "Released" refers to cases that are coded in the data as "Released w/o Pros" and are not coded as "Dropped."

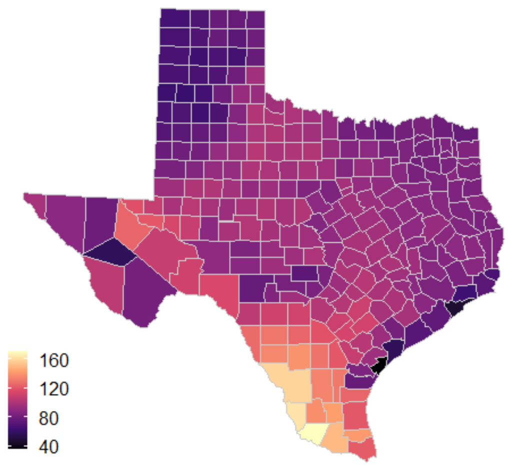
Table SI-4: Impact of heat on courts

	Outcomes		Punishments	
	Conviction	Dismissal	Confinement	Fines
T above 90F	0.609	-1.216	0.065	0.040
	(0.464)	(0.588)	(0.030)	(0.018)
T 85-90F	-0.195	0.030	0.016	-0.012
	(0.242)	(0.304)	(0.016)	(0.010)
T 80-85F	-0.096	0.128	0.025	-0.007
	(0.204)	(0.258)	(0.015)	(0.010)
N	1,140,602	1,140,602	763,199	1,071,518
Outcome mean,:	69.12	29.45	578.71	546.83
Fixed Effects:				
County	Yes	Yes	Yes	Yes
Month	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
DOW	Yes	Yes	Yes	Yes

NOTES: Standard errors are clustered at the court level and shown in parentheses. Outcomes are specified in the column headings. Conviction indicates the defendant was convicted of the original charge. Dismissal indicates the charge was dismissed. In columns 1 and 2, outcomes are measured as the percentage of cases with that result. For example, 29.45% of cases are dismissed. Coefficients indicate the percentage point increase in the outcome for an additional day in each bin. In columns 3 and 4, Confinement and Fines outcomes are logged so that coefficients should be interpreted as percentage changes from the non-logged mean presented in the middle of the table. Confinement is measured in days, fines are measured in dollars. All regressions are linear panel fixed effects. We include the full set of temperature and precipitation bins in all regressions, but suppress some coefficients for readability. All regressions include controls for the total number of cases heard in the day, dew point, and vapor pressure deficit minimum.

SI-6 Additional Figures

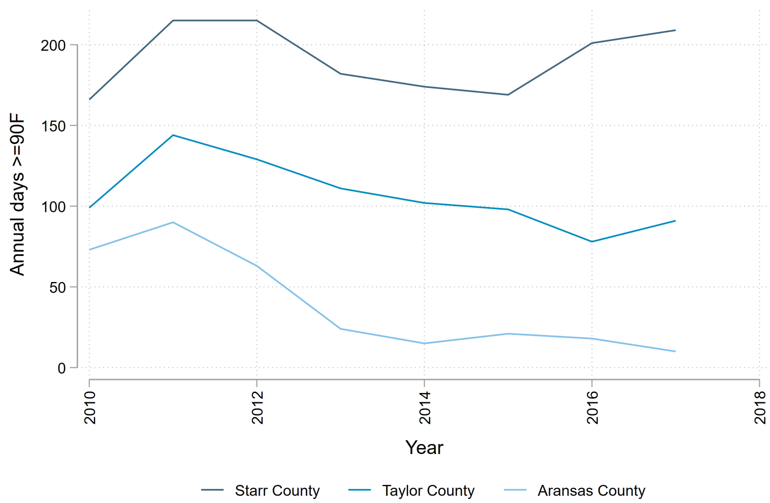
Figure SI-1: Map of Days with Maximum Temperature > 90°F



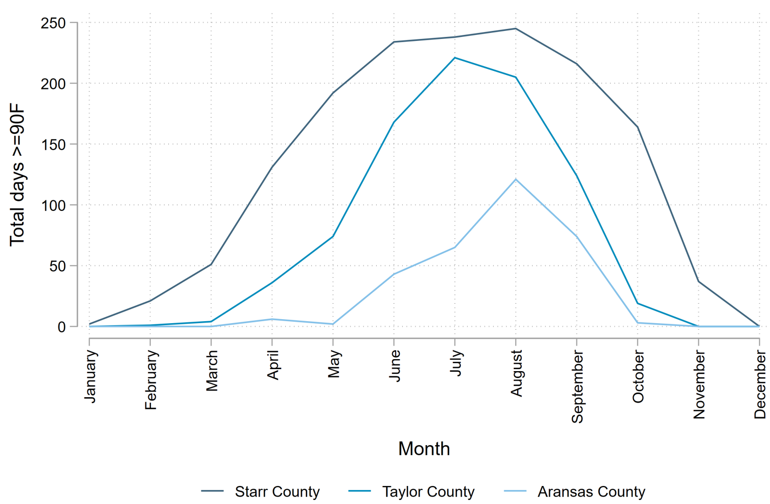
NOTES: The average number of annual days with maximum temperature over > 90°F by county over the full sample period.

Figure SI-2: Hot day distributions

(a) Annual hot days

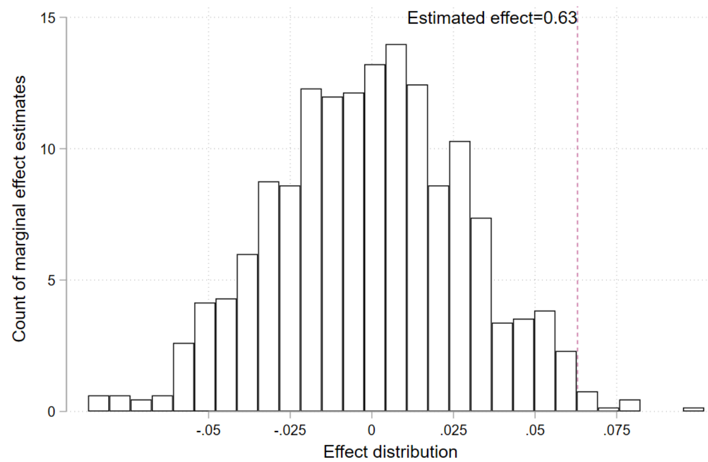


(b) Monthly hot days

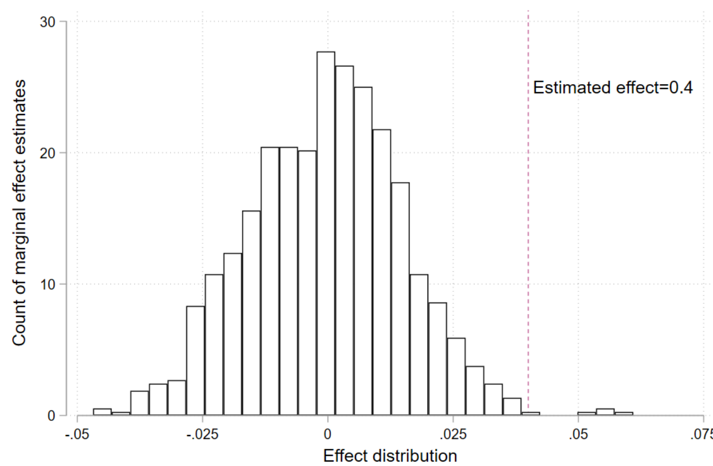


Notes: Panel A shows the trend in days > 90°F in three selected counties from each tercile of the distribution of the average number of hot days over the sample. Panel B shows the trend on average by month for the same counties to illustrate that there is significant variation across counties in our sample – both in the number of hot days from year to year and in the timing of those hot days throughout the year.

Figure SI-3: Randomization inference tests



Outcome: length of confinement



Outcome: amount of court fines

NOTES: We re-estimate the impact of heat on the day of a judge's decision on each outcome 1,000 times, re-assigning temperatures randomly across days but preserving the overall distribution of temperature days. This generates a distribution of estimated effects centered on a null effect of zero. We observe that our true estimated effect is well outside this distribution, suggesting that it is not the result of random chance in the cases that happened to be decided on particularly hot days.