Supplementary Information for

Ramadan Fasting Increases Judicial Leniency in Judges from Pakistan and India

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This PDF file includes:

Text, Methods and Theoretical Framework S1 to S5, Supplementary Figs. S1 to S4, Supplementary Tables S1 to S15

Table of Contents

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S1. Data Description

Our empirical analysis uses data on the courts of India and Pakistan. For Pakistan we have data for district high courts, while for India, we have data for both lower district courts and high courts. The cases for Pakistan are drawn from the Central Repository of cases in Pakistan, used by lawyers to prepare their cases. We obtained access to a random sample of cases from 1950–2016 from all 16 district high court benches in Pakistan (from the universe of all cases decided in this period).[7] This case-level data is combined with judge characteristics from judicial administrative data. We successfully matched judicial administrative information for 22,126 out of the total 22,512 cases. Since the focus of our research is on rulings in criminal cases, our sample is composed of all criminal cases in this data. This is about 26% of the total available cases.[8]

For India, we obtain cases from the Indian eCourts platform—a semi-public system put in place by the Indian government as a "national data warehouse for case data" (Indian eCourts Portal, 2021). This publicly available information includes the filing, registration, hearing, and decision dates for each case, the name and position of the presiding judge, and the final judicial decision. The eCourts platform covers the universe of criminal cases in Indian lower courts, which is combined with judge information from judicial administrative data. The key advantage of Indian eCourts data is not just the larger sample size but also the link-up of lower court decisions to high court appeals and decision reversals. That is, for India we also have cases appealed or overturned in the high courts linked to lower court decisions. The high court data is scraped from websites of high courts and we use common case identifiers across lower and high courts to match cases. The Indian data spans across 436 districts from 1997–2018 and contains information on 372,089 cases. This complements the Pakistani data that only spans across 16 district or "divisional" courts. However, the Pakistan data has the advantage of spanning about 70 years (1950–2016), allowing us to exploit variation for many Ramadan months—falling in both summers and winters in the same district. Table S1 shows the summary statistics of the variables used in the study for India and Pakistan at different levels of the court hierarchy. Below, we detail the key outcome and explanatory variables. Further information on the variables, their sources, and data construction can be found in Section S2 and S3.

[7] These benches are called "divisional high court benches" in Pakistan's legal nomenclature.
[8] The remaining cases are constitutional or writ petitions pertaining to government abuse of power against the citizenry.

Outcome Variables. — The key outcome variable is the acquittal verdict. For Pakistan, it is a case-level measure constructed from the text of the judgment orders where legal experts at a law firm coded this variable. The law firm was divided into two independent teams that coded the acquittal dummy variable as 1 if the defendant obtained an acquittal in the case and 0 if the prosecution obtained conviction. For the case of India, the eCourts platform contains the exact decision made on every case. We parse through the strings of this decision variable and also construct an Acquittal verdict dummy that takes the value 1 when the decision equals the string "acquittal" and 0 if it equals "conviction." Appeals in the high court is a dummy variable that switches on if a lower court decision is appealed in the High Court of India, and 0 otherwise. Overturned too is an indicator variable that takes the value 1 if the appeal is "allowed" and 0 if it is "rejected" in the high court. This is our measure of decision reversals. Finally, we have a recidivism outcome variable. Although, to the best of our knowledge, no data exists on rearrests and criminal charges pressed in both India and Pakistan, nor are there criminal databases that are publicly available for linking to future crimes. Nevertheless, for the case of India, our data contains information on full names of defendants. We therefore exploit this information in court data and assess, if upon acquittal, the defendant ends up in court again in a new criminal case. That is, our dummy for recidivism switches on if the defendant reappears in another case after the conclusion of the first case. This allows us to assess a potential downstream consequence of the judicial decision.

Main Explanatory Variable. — The key explanatory variable used in the analysis is Ramadan Hours. This is the average daily number of prescribed fasting hours during the month of Ramadan. Supplementary Figure S1 depicts the variation in this variable from 1950 to 2016 for the Pakistani data and Supplementary Figure S2 presents the corresponding figure for India. It shows how our explanatory variable varies by district and through time. For instance, from the figures, we can observe that at the same time, intensity of Ramadan fasting can differ up to 2 hours across districts. We collect this data from the US Naval Observatory, which provides sunrise and sunset times for any geographic coordinate on earth at any given date in the Gregorian calendar. We map the historical dates to the Islamic calendar dates, using data from Islamic Philosophy Online Calendar. We calculate the average daily number of daylight hours during Ramadan for every district court and month for Pakistan. Since we

have the exact decision date in the case of India, we compute the average daily number of daylight hours based on district court and day in India.[9]

Control Variables. — As controls, we always add daylight hours and month of Ramadan in all specifications to account for the independent effects of length of day and month of Ramadan. We also add several additional control variables specific to case and judge characteristics that are obtained from judicial administrative data for both Pakistan and India. For Pakistan, these include number of pages in the judgment order, presence of chief justice on the bench, number of judges in a case, number of lawyers in a case, and judge characteristics such as dummies for judge's gender, prior employment (lawyer or former judge), and political activity prior to judicial appointment. For India, these include indicator for criminal case type (i.e., whether the case involved sexual assault, robbery, rape, kidnapping, theft or fraud), indicator for judgement type, and indicator for judge type (whether judge is a specialist criminal judge or part-time criminal judge).

Assigning Religion to Judges and Litigants. — The judges in Pakistan are substantially fewer in number, hence we are able to hand code the religion of the judge based on judge names. The Indian eCourts platform does not provide demographic metadata on judges and the large number of judges makes hand coding infeasible. However, religious identity can be determined accurately in India based on individuals' names using a machine learning algorithm. We train a machine classifier on a large database of labeled names and then use it to assign these characteristics in the legal data. The classifier is a two-label specification: Muslim or non-Muslim. In particular, we apply a neural net classifier to predict the identity label based on the name string using a bidirectional long short-term memory (LSTM) model that is implemented directly on the sequence of name-string characters within the judge name (see Ash et al., 2021[1] for further elaboration on LSTM algorithms). We choose this classifier due to its accuracy of about 99% when matched with hand coded religion clarification in Pakistan data. We do not differentiate within the non-Muslim religion categories because their names are not as distinctive as Muslim names and our research question concerns examining the effect of the Ramadan ritual that is only observed by Muslims.[10] Each name record is therefore assigned to a dummy that switches on for Muslim judge and Muslim litigant.

[9] The daylight hours data for India are precise to a one-minute range using https://www.esrl.noaa.gov.
[10] Fasting is also observed in other religions (e.g. Lent in Christianity), but it does not vary with length of day in Ramadan month.

S2. Variable Definitions and sources

Acquittals = This is a case-level dummy variable for Acquittals. For the case of Pakistan, a law firm coded this variable as 1 when State Prosecution obtained a victory and 0 otherwise based on reading the judgment orders. In the case of India, given the large number of observations and public access to data, we constructed the variable using text in the variable decision in Indian eCourts Database: it switches on when the string in judicial decision takes the value "acquittal" and switches off in case of "conviction".

Ramadan Hours = This is the average daily number of daylight hours in the month of Ramadan. It is collected from the US Naval Observatory, which provides sunrise and sunset times for any geographic coordinate on Earth at any given date in the Gregorian calendar. This is in turn mapped to the historical dates in the Islamic calendar dates, using data from Islamic Philosophy Online Calendar.

Daylight Hours = This is the average daily number of daylight hours averaged over a course of a month. It is collected from the US Naval Observatory, which provides sunrise and sunset times for any geographic coordinate on Earth at any given date in the Gregorian calendar.

Ramadan Month = This a dummy variable that switches on for the month of Ramadan. It is computed based on matching dates from the US Naval Observatory that gives Gregorian calendar dates as in our judgment texts with corresponding Islamic calendar dates from Islamic Philosophy Online Calendar.

Muslim = The judges in Pakistan are assigned through hand-coding them through the law firm based on judges' full names. The Indian eCourts platform does not provide demographic metadata on judges and the large number of judges makes hand coding infeasible. However, religious identity is determined accurately in India based on individuals' names using a Machine Learning algorithm. Applying a neural net classifier to predict the identity label based on the name string using a bidirectional Long Short-Term Memory Model (LSTM) allows us to accurately predict religion with about 99% accuracy. Each name record is assigned to a dummy that switches on for Muslim judge.

Appealed = This is a dummy variable that switches on if a lower court decision is appealed in the High Court, and zero otherwise. This is obtained from scrapping cases of High Court websites across India.

Overturned = This is an indicator variable that takes the value one if the decision is reversed and zero otherwise.

Criminal Case = A dummy for criminal cases. This is indicated in the text of the judgment order.

Bench Chief Justice = A dummy variable for the Chief Justice adjudicating in the case. This is also indicated in the text of the judgment order.

Number of Pages of Judgment Orders = A count variable for the number of pages of the judgment order in the particular case. This is also indicated in the text of the judgment order.

Age at appointment = The difference between date of birth and age at appointment. This data is obtained from Judicial Administrative Data Records at the High Court Registrar Offices.

S3. Details on Data Construction

Our empirical analysis uses data on the courts of India and Pakistan. For India, we obtain cases from the Indian eCourts platform—a semi-public system put in place by the Indian government as a "national data warehouse for case data". This publicly available information includes the filing, registration, hearing, and decision dates for each case, the name and position of the presiding judge, and the final judicial decision. The eCourts platform covers the universe of criminal cases in Indian lower courts, which is combined with judge information from judicial administrative data. The key advantage of Indian eCourts data is not just the larger sample size but also the link-up of lower court decisions to high court appeals and decision reversals. That is, for India we also have cases appealed or overturned in the high courts linked to lower court decisions. The high court data is scraped from websites of high courts and we use common case identifiers across lower and high courts to match cases. The Indian data spans across 436 districts from 1997–2018 and contains information on 372,089 cases. For Pakistan we have data for district high courts, while for India, we have data for both lower district courts and high courts. The cases for Pakistan are drawn from the Central Repository of cases in Pakistan, used by lawyers to prepare their cases. We obtained access to a random sample of cases from 1950–2016 from all 16 district high court benches in

Pakistan (from the universe of all cases decided in this period). This case-level data is combined with judge characteristics from judicial administrative data. We successfully matched judicial administrative information for 22,126 out of the total 22,512 cases. Since the focus of our research is on rulings in criminal cases, our sample is composed of all criminal cases in this data. This is about 26% of the total available cases. We randomly sample 336 cases every year from 1950 to 2016 to obtain data on 22,512 cases in the High Courts of Pakistan. This is about 0.1% of the total cases decided in this sample period. These cases were divided into constitutional petitions, 74% (cases against the executive e.g. office of Prime Minister, government agencies etc.) and criminal cases, 26% of the total cases. Since we focus on the effect of Ramadan on criminal judicial decision-making, we draw on all available criminal cases, i.e. 26% of the available sample. The outcome variable and case characteristics in the dataset are coded based on the reading of the judgment orders by a law firm. The law firm was divided into two teams of 5 paralegals each, with two senior lawyers overseeing each team, which independently coded the same 22,512 cases. Data coded by Team 1 is used in this study, although identical results are obtained with the codings from Team 2 (results available on request). For Indian Data, we use the eCourts platform. A semi-public portal that collected key information on Indian lower courts. This includes information on the judge, litigant, lawyer, case decision and law or section under which the case was adjudicated.

S4. Details on Method and Identification Strategy

Our empirical strategy relies on three sources of variation. The first identifying variation comes from the fact that cases are randomly assigned across Muslim and non-Muslim judges. This implies similar decisions are made by Muslim and non-Muslim judges. The second identifying variation comes from the fact that the Islamic calendar corresponds to the lunar cycle and months rotate over the seasons in cycles. This implies that the intensity of the fasting ritual varies according to which month in the Gregorian calendar Ramadan happens to fall in any given year. The third identifying variation for the number of hours of fasting comes from geographical location (latitude in particular), which determines the hours of daylight and, in interaction with the rotating seasonal calendar, leads to variation in ritual intensity across the north and south depending on whether Ramadan falls in the

summer, fall, winter, or spring. These sources of variation allow us to overcome three sources of endogeneity—different types of cases, direct effect of seasonality, and direct effect of Ramadan—that would otherwise confound the effect that Ramadan fasting has on decision-making.

Balance Checks. — It may be argued that the de jure random assignment of cases in South Asia is not observed in practice and that our results are driven by non-random case assignment of Muslim versus non-Muslim judges. We test for and find no evidence for this hypothesis, consistent with prior accounts[2]. Table S7 presents these balance test results where we observe Muslim and non-Muslim judges are equally likely to be assigned different types of cases pertaining to rape, child sexual abuse, robbery, assault, kidnapping, theft, and fraud. This strongly suggests that the type of cases are balanced and consistent with random assignment across Muslim and non-Muslim judges. Second, we also test whether changes in length of day within Ramadan affects the type of cases that show up in court. These results are presented in Table S8. We observe that Ramadan hours are uncorrelated with a long list of criminal case types, indicating the intensity of fasting rituals is also unlikely to change the type of cases that show up in court. These two balance tests strongly indicate that Muslim judges are not assigned specific types of cases nor the intensity of fasting ritual impact the type of cases adjudicated upon. Essentially identical evidence is found for Pakistan, which we present in Table S9 of Supplementary Material. In addition, we run regressions where the interaction of Muslim and Ramadan or Muslim and Ramadan Hours are the dependent variable and all the other variables are on the right-hand side and we check for joint significance of the case characteristics in Table S10.

S5. Theoretical Framework

This section consists of four short subsections. First, we introduce the model setup and derive the equilibrium. Then, we distinguish between two mechanisms, Ramadan Spirit (RS) versus Do the Right Thing (DRT) effect, that may explain the observed pattern of a decrease in acquittals as intensity of the Ramadan ritual increases. Last, we use our model to formulate a simple procedure that allows us to separate these two key mechanisms.

Setup of the Model. — We model a two-stage judge j choice about a judicial case c ruled at time t in district d. In the first stage, the judge commits to a cognitive effort $e_{cjdt} > 0$ when case c is heard. In the second stage, judge j observes the characteristics of the case and adjudicates. To ease the notations, the indices will be dropped when unnecessary.

For the judge, the relative payoff from acquitting the defendant, ΔD_{cjdt}, consists of three components,

$$\Delta D_{cjdt} = D_{cjdt} - P_{cjdt} + R(e_{cjdt}), \qquad (1)$$

where D_{cjdt} is the unknown legal score of the defendant, which depends on the legal evidence brought by the defendant before the court. We assume that according to judge j, D_{cjdt} is drawn from a normal distribution $N(D_0, \sigma_D^2)$ with D_0 corresponding to judges' common prior on any defendant's score. Similarly, P_{cjdt} is the unknown legal score of the prosecution, also drawn from a normal distribution $N(P_0, \sigma_P^2)$ with P_0 corresponding to judges' common prior on the prosecution's score. Finally, $R(e_{cjdt})$ corresponds to the unknown additional legal facts that the judge will observe depending on his cognitive effort e_{cjdt} and that will affect the defendant's relative score. We also assume that $R(e_{cjdt})$ is drawn from a normal distribution $N(0, e_{cjdt}^2)$. Hence, when the judge exerts higher cognitive effort e_{cjdt} in the first stage, he realizes a payoff ΔD_{cjdt} in the second stage that can be farther from his prior scores issued for the defendant and the prosecution. That is, higher cognitive effort reduces the effect of initial priors on judicial decision-making.

The judge cares about doing the right thing. Hence, in the second stage of the game, he acquits the defendant when $\Delta D_{cjdt} > 0$ and convicts otherwise. In the first stage, the judge invests effort e_{cjdt} so as to be able to distinguish as much as possible the defendant's score from the prosecution's score. Hence, the judge chooses a positive cognitive effort e_{cjdt} that maximizes the following utility function:

$$u_j = E\,|\Delta D_{cjdt}| - \gamma e_{cjdt}, \qquad (2)$$

where $\gamma > 0$ corresponds to the marginal cost of effort and $E\,|\Delta D_{cjdt}|$ represents the expected distance between the defendant's score and the prosecution's score.

Equilibrium. — Solving the optimization problem (2), we find the following result.

PROPOSITION 1. The optimal cognitive effort of the judge e^* is uniquely determined. It decreases with $|\Delta D_0|$ and γ.

Judicial bias is captured in our model by parameter $|\Delta D_0| = |D_0 - P_0|$. We show that when the judge has no clear-cut prior on whether the defendant is guilty or innocent (i.e., $|\Delta D_0|$ is low), he will invest more cognitive effort e_{cjdt}. The reason is that higher cognitive effort is useful when it enables the judge to better distinguish the scores of the prosecution and the defendant. If the judge initially has a strong prior about the case (i.e., $|\Delta D_0|$ is high), he does not need to exert much cognitive effort, as he distinguishes well the evidence brought before the court. Next, we consider the effect of a higher incentive to make better decisions. In our model, this channel is represented by parameter γ. When the marginal cost of effort γ is lower, the judge invests more cognitive effort in order to better distinguish the scores of the prosecution and the defendant.[11]

Ramadan Fasting Ritual and Judicial Decision-Making: Two Competing Mechanisms. — The Ramadan fasting ritual has specific characteristics. For a month, healthy adult Muslims are required to observe Sawn (or the fast) from dawn to sunset, abstaining from food, drink, sexual activities, and to implement in their daily lives the values of reflection,

[11] All mathematical proofs are relegated to Appendix D.

self-control and restraint.[12] Ramadan, as other rituals, therefore, has a theoretically ambiguous effect. On the one hand, it may deteriorate decision-making by introducing bias. On the other hand, it may improve the decision quality through psychological mechanisms of self-control and reflection[3] [4]. In the context of our model and empirical application, we hypothesize that the Ramadan ritual can have two effects on judges' decision-making processes.

Ramadan fasting ritual reduces bias against the defendant. During Ramadan, Muslim judges may be imbued with a Ramadan Spirit (RS) of taqwa (literally, God-consciousness and self-restraint) that makes them more lenient. In the context of the model, the Ramadan Spirit (RS) would increase the prior of the judge that the defendant is innocent without regard to the facts of the case, i.e., we expect ΔD_0 to increase.

Ramadan fasting ritual increases judges' incentives to do the right thing. During Ramadan, Muslim judges may wish to "do the right thing" and make "better" decisions, paying more attention to the facts of the case. This would also be consistent with anthropological literature arguing that Ramadan fasting is associated with greater reflection and self-control (see for instance, Osanloo, 2006[5]). Therefore, judges might have a higher incentive to parse the evidence brought to court during the Ramadan fasting ritual. We call this potential effect of the Ramadan ritual the "Do the Right Thing" (DRT) effect. In the context of our model, the DRT effect arises by decreasing the marginal cost of effort during the Ramadan fasting ritual. The compounded effect of these two effects on judicial decision-making is summarized below in Proposition 2:

PROPOSITION 2. The RS effect necessarily increases the likelihood of the defendant winning. The DRT effect increases the likelihood of the defendant winning if and only if $\Delta D_0 \leq 0$.

Figure S3 represents the potential mechanisms explaining the decrease in acquittals as the intensity of the Ramadan ritual increases, which we highlighted in Proposition 2. The figure presents the probability density distribution of the defendant's relative score ΔD, which is drawn from a normal distribution $N(D_0 - P_0, \sigma_D^2 + \sigma_P^2 + e^2)$. As represented in Figure S3, the defendant wins if and only if $\Delta D > 0$. If the Ramadan ritual induces a RS effect, this will

[12] Quran, Chapter 2, Verse, 183[6].

increase ΔD_0 and the distribution of ΔD would be shifted on the right, as represented in Panel (a). As a result, the likelihood of the defendant winning (i.e., when $\Delta D > 0$) would increase by an amount equal to the shaded region in Panel (a) of Figure S3. In contrast, if the Ramadan fasting ritual increases the judge's incentive to Do the Right Thing (DRT), then the standard deviation of the distribution of ΔD would increase. As a result, if the judge initially had a prior against the defendant (i.e., $\Delta D_0 < 0$) and wants to DRT, the likelihood of him finding legal facts that contradict his initial prior increases. That is, in light of the DRT effect, the judge will face a smaller cost from exerting effort and might consider additional legal facts in favor of the defendant that he would have missed otherwise. The likelihood of the judge finding the defendant innocent increases by the shaded region in Panel (b) of Figure S3.

Disentangling the Ramadan Spirit Effect from Do the Right Thing Effect. — The RS and DRT effects have different implications on the fairness of judicial decisions. In our framework, the RS effect introduces a judicial bias that is independent of the legal facts of the case. The DRT effect by contrast can allow judges to overcome their initial biases about both the defendant and the prosecution and make better decisions as a result.

These two effects can be disentangled through two distinct methodologies. The first is based on the characteristics of the litigants and reoffense rate. If the RS effect dominates, then we should expect a higher reoffense rate by litigants acquitted during Ramadan by Muslim judges. Indeed, these acquitted litigants are more likely to be criminals than those acquitted by non-Muslim judges, or by Muslim judges outside Ramadan. By contrast, if the DRT effect dominates, then we should not expect a higher reoffense rate by litigants acquitted during Ramadan by Muslim judges. Indeed, these acquitted litigants are less likely to be criminals than those acquitted by non-Muslim judges, or by Muslim judges outside Ramadan.

The second methodology is based on the analysis of cases ruled in both lower Courts and appellate Courts. If the RS effect dominates, then we should expect judicial decisions made by Muslim judges during Ramadan to be appealed and reverted more often. This might not be true when the DRT effect dominates, since Muslim judges during Ramadan might be making better decisions. The precise impact of both the DRT and the RS effects on the likelihood of appeal and reversal rate would also depend on the relative bias of appellate

Court judges relative to lower Court judges. To understand this mechanism more precisely, we formalize it in the rest of this Section.

Consider a judicial case c, ruled by a lower court judge j in district d and time t. This case is subject to an appeal and is ruled again in an appeal court by judge j' in district d' at time t'. We denote $D^{H}_{cd'j't'} > 0$ the unknown score of the defendant, while $P^{H}_{cd'j't'} > 0$ is the unknown score of the prosecution in the appellate court. We assume that $D^{H}_{cd'j't'}$is drawn from a normal distribution $N(D^{H}_{0}, \sigma^{2}_{D})$, while $P_{cjdt}$is also drawn from a normal distribution $N(P^{H}_{0}, \sigma^{2}_{P})$. We denote $\Delta D^{H}_{0} = D^{H}_{0} - P^{H}_{0}$the prior of a high court judge on the defendant's score. Since the legal facts established in the lower court are retained, the high court judge j' will rule the defendant innocent when $\Delta D_{cd'j't'} + q(e_{cjdt}) > 0$ and will convict the defendant otherwise. We establish the following result:

PROPOSITION 3. If the RS effect dominates, acquittal decisions made by Muslim judges during Ramadan are more likely to be reversed in appellate courts. If the DRT effect dominates, acquittal decisions made by Muslim judges during Ramadan are less likely to be reversed in appeal courts if and only if $\Delta D_{0} < \Delta D^{H}_{0}$.

Our statement that the RS effect necessarily leads to more decision reversals in appellate courts is intuitive. Appeal judges are not affected by the RS effect since they are seldom ruling during Ramadan. Hence, they would be more likely to disagree with the lower court decisions of judges when these judges are imbued with the unjustified leniency of the RS. By contrast, the impact of the DRT effect on appeal decisions depends on judges' priors in both the lower court and the appellate court. Consider, for example, the case where $\Delta D_{0} < 0$and $\Delta D^{H}_{0} < 0$, so that both lower court and appellate court judges are initially biased against defendants. A higher cognitive effort from lower court judges enables both lower court and high court judges to acquit more. However, the effect is stronger for high court judges when they are less biased against defendants than their peers in lower courts (i.e., $\Delta D_{0} < \Delta D^{H}_{0}$). Hence, the likelihood of lower court judges' acquittal decisions being overturned is reduced. By contrast, a higher cognitive effort from lower court judges makes them more likely to acquit than their peers in high courts when $\Delta D_{0} > \Delta D^{H}_{0}$. In this case, the

likelihood of lower court judges' acquittal decisions being overturned is higher when the DRT effect dominates. The intuitions are similar in the cases where $\Delta D_0 \geq 0$ and/or $\Delta D_0^H \geq 0$.

Turning to the influence of the RS and the DRT effects on the reversal of conviction verdicts in lower court, we establish the following result:

PROPOSITION 4. If the RS effect dominates, conviction decisions made by Muslim judges during Ramadan are less likely to be reversed in appellate courts. If the DRT effect dominates, conviction decisions made by Muslim judges during Ramadan are less likely to be reversed in appellate courts if and only if $\Delta D_0 > \Delta D_0^H$.

When the RS effect dominates, given their leniency bias, Muslim judges imbued with a RS only convict when the defendant's relative score is very low. As a result, they are less likely to disagree with high court judges when they convict defendants. Hence, if the RS effect dominates, conviction decisions made by Muslim judges during Ramadan are less likely to be reversed in appellate courts. By contrast, the impact of the DRT effect on appeal decisions depends on judges' priors in both the lower court and the appellate court. Consider again the case where $\Delta D_0 < 0$and $\Delta D_0^H < 0$, so that both lower court and appeal court judges are initially biased against defendants. A higher cognitive effort from lower court judges enables both lower court and high court judges to convict less. However, the effect is stronger for high court judges when they are less biased against defendants than their peers in lower courts (i.e. $\Delta D_0 < \Delta D_0^H$). Hence, the likelihood of lower court judges' conviction verdicts being overturned is increased. However, a higher cognitive effort from lower court judges makes lower court judges less likely to convict than their peers in high courts when $\Delta D_0 > \Delta D_0^H$. In this case, the likelihood of lower court judges' conviction decisions being overturned is lower when the DRT effect dominates.

Propositions 3 and 4 are about decision reversals in high courts conditional on lower court cases being appealed. However, when litigants rationally expect judicial outcomes in high courts, these results can easily be extended to predict appeal decisions by litigants conditional on lower court cases being ruled during Ramadan by Muslim judges.[13]

[13] Proposition 3 extends as follows: If the RS effect dominates, acquittal decisions made by Muslim judges during Ramadan are more likely to be appealed. If the DRT effect dominates, acquittal decisions made by Muslim judges during Ramadan are less likely to be appealed if and only if D0 <D0H. Similarly, Proposition 4

In summary, this conceptual framework provides the micro-foundations for our empirical analysis of the influence of Ramadan fasting on judicial decision-making and helps us better understand the mechanisms. Importantly, our framework also allows us to separate different plausible yet counterintuitive channels that may be operating to explain the increased acquittals in lower courts as a result of Ramadan fasting. On one hand, Ramadan fasting may incentivize judges to be incorrectly more lenient. This effect may be due to what we labeled the Ramadan Spirit, a general tendency to see defendants more favorably. On the other hand, the Ramadan ritual can motivate judges to do the right thing. When lower court decisions are biased against defendants, these two mechanisms are confounded and lead to more acquittal verdicts in lower courts. We found that ascertaining the impact of Ramadan fasting necessitates the study of appeals and decision reversals. If the RS effect dominates, our model predicts that their decisions should be appealed and overturned more often in appellate courts. In contrast, if it is the effect of Ramadan on judges' incentive to DRT that dominates, then judges would invest more cognitive effort in overcoming their initial biases against defendants. Their acquittal verdicts should be appealed and reversed less, while the opposite is true for conviction verdicts.

extends as follows: If the RS effect dominates, conviction decisions made by Muslim judges during Ramadan are less likely to be appealed. If the DRT effect dominates, conviction decisions made by Muslim judges during Ramadan are less likely to be appealed if and only if $D0 > D0H$.

Supplementary Material S6. Supplementary Figures and Tables

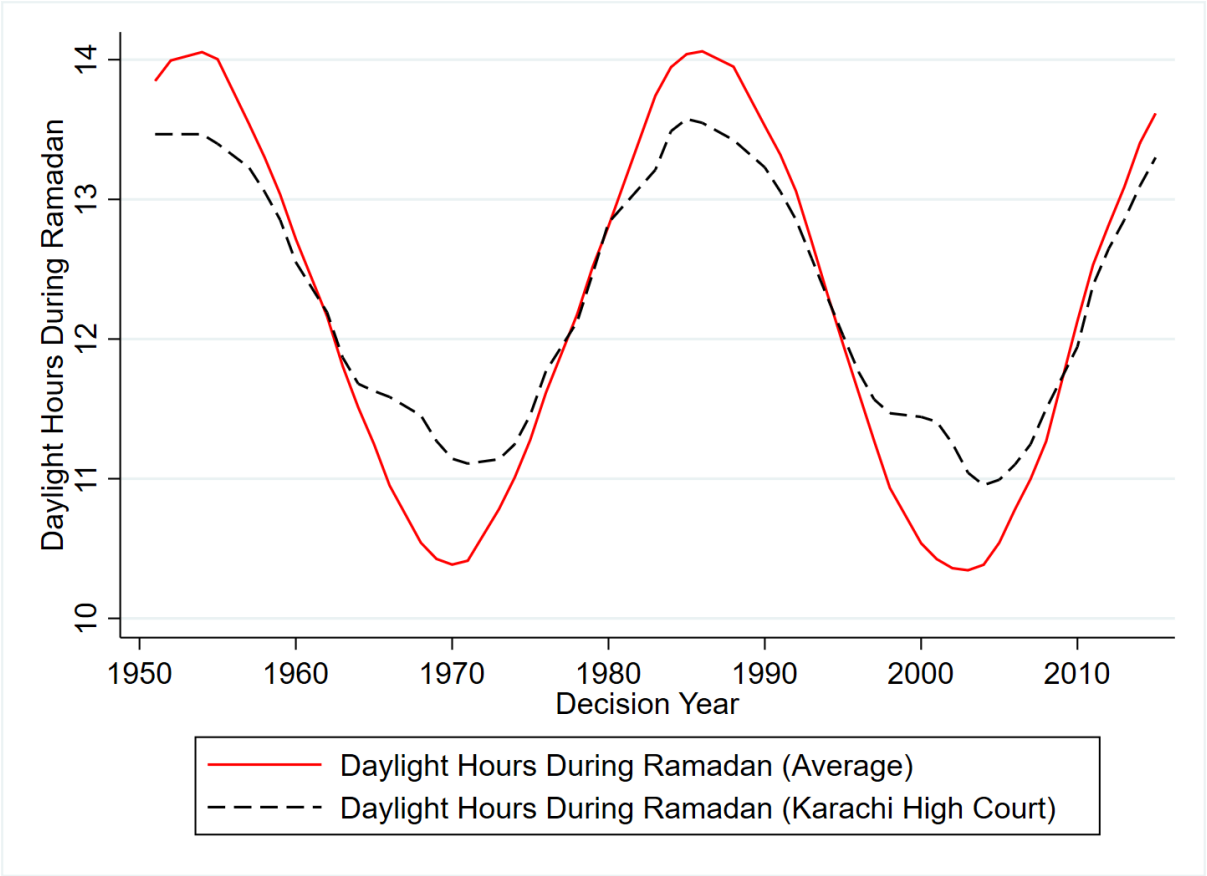


Figure S1: Daily Ramadan Fasting Hours – Pakistan (1950-2016) Each line represents the average daily number of sunrise-to-sunset hours during the month of Ramadan for each year, measured at the location of the district court in Pakistan.

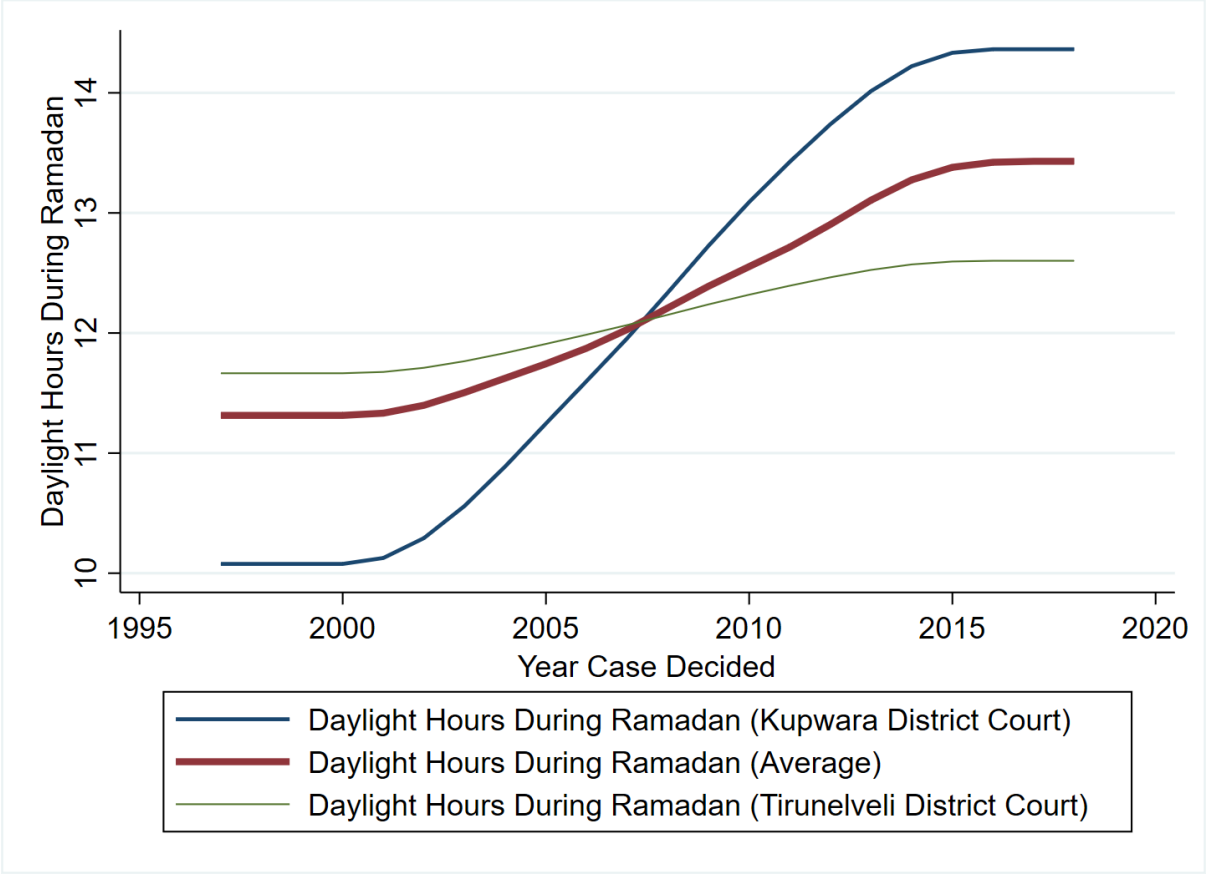
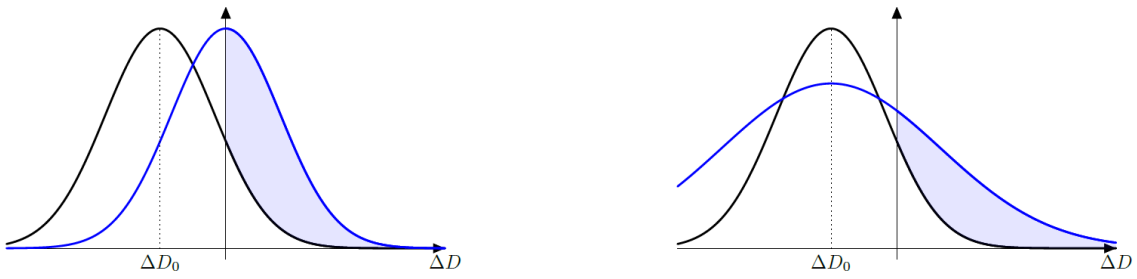


Figure S2: Daily Ramadan Fasting Hours – India (1997-2018) Each line represents the average daily number of sunrise-to-sunset hours during the month of Ramadan for each year, measured at the location of the district court in India.



a) Effect of the RS effect

b) Effect of the DRT effect

Figure S3: Ramadan Spirit and Do the Right Thing Effect. the figure above presents the distributions of the defendant's relative score D and how it is affected by the leniency effect of the "Ramadan spirit'" (panel a) and "Do the Right Thing" effect (panel b). Dark line represents the prior distributions. The shaded regions in both panels represent the increase in the likelihood of a judge finding the defendant innocent.

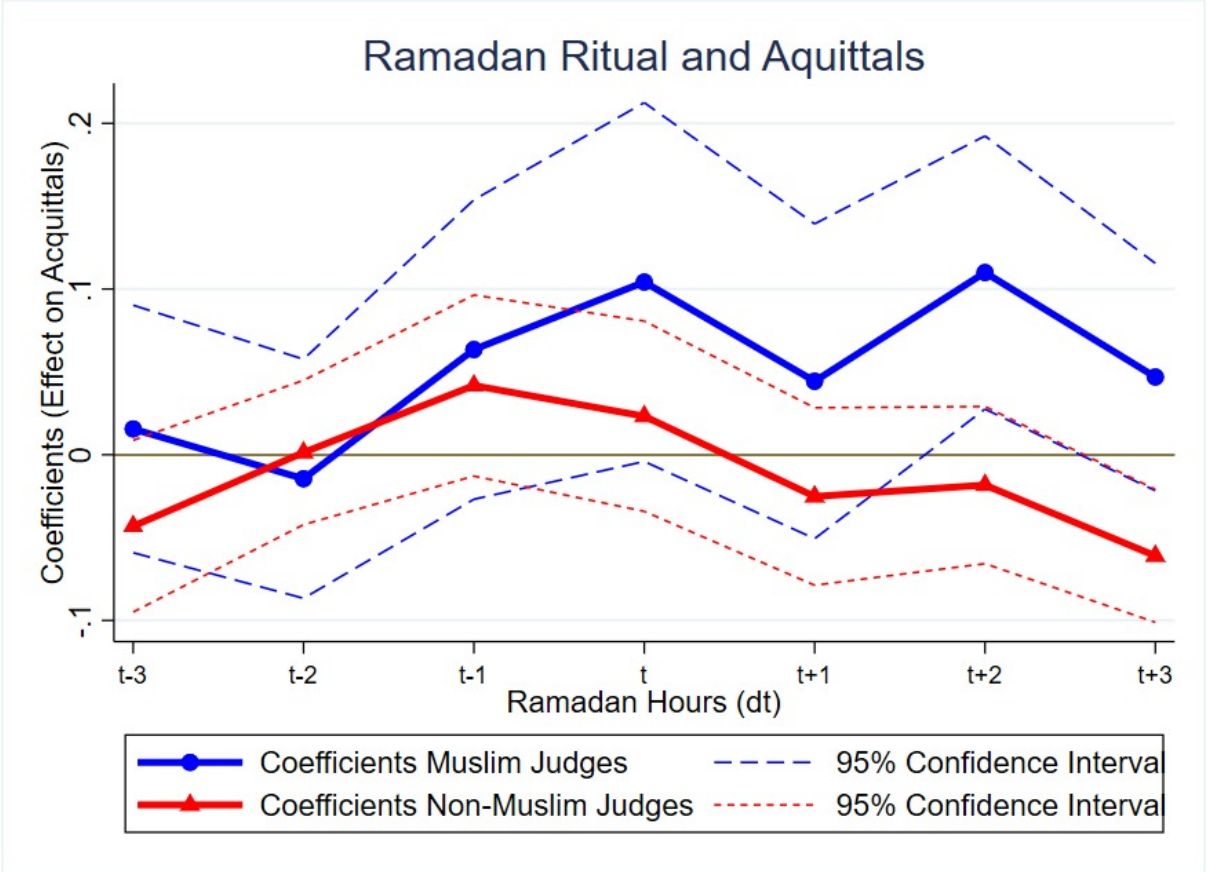


Fig. S4 | The Impact of Ramadan Hours in India. This Figure is presenting the daylight hours effect for Ramadan month and for the months before and after Ramadan. It plots the coefficients in our baseline regression using Pakistan case data with Ramadan Hours (t), and coefficients on daylight hours during preceding and subsequent Islamic calendar months. Specifically, we also plot coefficients on Jumada al Akhirah Hours (t-3), Rajab Hours (t-2), Shaban Hours (t-1), Shawwal Hours (t+1), Dhul Kada Hours (t+2), Dhul Hijja Hours (t+3). A similar 95% Confidence intervals are also reported.

Table S1: Descriptive Statistics – Pakistan and India

Variables	Observations	Mean	Std. Dev.	Min	Max
Panel A: Outcome variables and case characteristics (variation by cases) – Pakistan					
Acquittals	5,848	0.518	0.499	0	1
Pages Judgment Order	5,848	8.937	8.135	1	81
Chief Justice on Bench	5,848	0.062	0.241	0	1
Number of Lawyers	5,848	4.030	3.715	1	30
Number of Judges	5,848	1.733	0.817	1	4
Panel B: Main Explanatory Variable (variation by district-month) – Pakistan					
Ramadan Hours	5848	1.083	3.478	0	14.4
Panel C: Judge Characteristics (variation by judges) - Pakistan					
Muslim	917	0.658	0.474	0	1
Gender	917	0.944	0.229	0	1
Promoted to SC	917	0.064	0.245	0	1
Former Lower Court Judge	917	0.101	0.301	0	1
Fr. Office holder of Bar Ass.	917	0.621	0.484	0	1
Panel D: Outcome variables and case characteristics (variation by cases) – India – Lower court					
Acquittal	372,089	0.533	0.498	0	1
Criminal Miscellaneous	372,089	0.042	0.202	0	1
Judgment Type	372,089	0.022	0.149	0	1
Panel E: Explanatory Variables (variation by district-day) – India – Lower court					
Ramadan Hours	372,089	0.978	3.510	0	14.46
Panel F: Judge Characteristics (variation by judges) – India – Lower court					
Muslim	7,668	0.053	0.225	0	1
Session Judge	7,668	0.131	0.337	0	1
Panel G: Outcome variables and case characteristics (variation by cases) – India – High court					
Appealed	372,089	0.003	0.059	0	1
Overturned	19,914	0.219	0.413	0	1
Criminal Miscellaneous	372,089	0.042	0.202	0	1
Judgment Type	372,089	0.022	0.149	0	1
Panel H: Explanatory Variables (variation by district- day) – India – High court					
Ramadan Hours	372,089	0.978	3.510	0	14.46
Panel I: Judge Characteristics (variation by judges) – India – High court					
Muslim	7,668	0.053	0.225	0	1
Session Judge	7,668	0.131	0.337	0	1

Note: Panels A, B and C of the table reports the summary statistics for the Pakistani baseline sample of 5848 judicial cases, 917 judges covering the 16 divisional or district courts of Pakistan over the 1950-2016 period. Panel D, E, F, G, H and I report the summary statistics for the Indian baseline sample of 372,089 judicial cases, 7,668 judges covering the 436 Indian district courts and 25 High Courts of India over the 1997-2018 period.

Table S2: Impact of Rituals on Acquittals and Appeals on Violent Crimes vs Non-Violent Crimes- India

	Violent Crimes		Non-Violent Crimes	
	(1)	(2)	(3)	(4)
Panel A: Acquittal Verdicts in Lower Court				
Muslim X Ramadan Hours	0.00903	0.00907	0.000111	0.000119
Standard error	(0.00531)	(0.00531)	(0.00238)	(0.00239)
95% two-sided CI	-0.00148 - 0.0195	-0.00142 - 0.0196	-0.00457 - 0.00479	-0.00458 - 0.00481
P value	(0.0917)	(0.0896)	(0.963)	(0.960)
Anderson q-values	{0.18}	{0.17}	{0.62}	{0.62}
District and Time FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Observations	5,215	5,215	366,828	366,828
R-squared	0.481	0.494	0.289	0.290
Mean of Dependent Variable	0.575	0.575	0.533	0.533
Number of Judges	890	890	7634	7634
	(1)	(2)	(3)	(4)
Panel B: Appealed Verdicts in High Court				
Muslim X Ramadan Hours	-0.000938	-0.000889	-0.0000299	-0.0000309
Standard error	(0.000402)	(0.000386)	(0.000124)	(0.000124)
95% two-sided CI	-0.00173 - -0.000143	-0.00165 - -0.000125	-0.000275 - 0.000215	-0.000275 - 0.000214
P value	(0.0211)	(0.0229)	(0.810)	(0.804)
Anderson q-values	{0.14}	{0.15}	{0.62}	{0.61}
District and Time FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Observations	5,215	5,215	366,828	366,828
R-squared	0.065	0.066	0.045	0.045
Mean of Dependent Variable	0.002	0.002	0.003	0.003
Number of Judges	890	890	7634	7634

Robust standard errors appear in brackets (clustered at district-level). The dependent variable is Acquittals in Panel A and Appeals in Panel B, a dummy variable for acquittals and appeals respectively. The cases are considered Violent if it is armed robbery, homicide or assault. Controls include indicator for case type (rape, assault, robbery, child sexual abuse, kidnapping, fraud and theft), indicator for judge type (whether judge is a specialist criminal judge or part-time criminal judge). We also include Ramadan month dummy, Muslim dummy, Daylight Hours, Ramadan Hours and their interactions individually as controls. Fixed effects include district fixed effects and year, month, week and day fixed effects where time corresponds to date of decision. The unit of observation is at the case level. Anderson sharpened q-values are also reported, in curly brackets. The sharpened q-values can, theoretically, also be less than unadjusted p-values when many hypotheses are rejected, because if there are many true rejections, you can tolerate several false rejections too and still maintain a low false discovery rate. *** p<0.01, ** p<0.05, * p<0.1.

Table S3: Impact of Ramadan Ritual on Appeals in High Courts - India

	Acquitted in lower Court		Convicted in lower Court	
	(1)	(2)	(3)	(4)
	Appealed			
Muslim X Ramadan Hours	-0.00013	-0.00013	-0.00007	-0.00007
Standard error	(0.00006)	(0.00005)	(0.00029)	(0.00029)
95% two-sided CI	-0.0003--0.000004	-0.0003--0.000005	-0.0007-0.0005	-0.0006-0.005
P value	(0.044)	(0.042)	(0.789)	(0.800)
District and Time FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Observations	198,589	198,589	173,472	173,472
R-squared	0.046	0.046	0.059	0.060
Mean of Dependent Variable	0.003	0.003	0.004	0.004
Number of Judges	6394	6394	4889	4889

Robust standard errors appear in brackets (clustered at district-level). The dependent variable is Appealed, a dummy variable that switches on if the court verdict is appealed in the High Court. Muslim X Ramadan Hours is the interaction between the dummy for Muslim and average daylight hours in Ramadan. Controls include indicator for case type (rape, assault, robbery, child sexual abuse, kidnapping, fraud and theft), indicator for judge type (whether judge is a specialist criminal judge or part-time criminal judge). We also include Ramadan month dummy, Muslim dummy, Daylight Hours, Ramadan Hours, their corresponding interactions as controls in all columns of this table. Fixed effects include district fixed effects and year, month, week and day fixed effects where time corresponds to date of decision. The unit of observation is at the case level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table S4: Modeling Selection of Cases using Leave Out Instrument - India

	First Stage		Second Stage	
	(1)	(2)	(3)	(4)
	Appealed		Overturned	
Muslim X Ramadan Hours			-0.0087	-0.0079
Standard Error			(0.0036)	(0.0036)
P value			(0.0154)	(0.0150)
Appeal Leniency IV	8.7618	8.8412		
Standard Error	(0.4159)	(0.4094)		
P value	(0.001)	(0.001)		
District and Time FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
athrho	0.1305	0.1179	0.1305	0.1179
	(0.0489)	(0.0504)	(0.0489)	(0.0504)
lnsigma	0.6995	-0.8984	0.6995	-0.8984
	(0.0026)	(0.0358)	(0.0026)	(0.0358)
Observations	6,739,667	6,739,667	6,739,667	6,739,667
Selected Observations	19928	19928	19928	19928
Non-selected Observations	6,719,739	6,719,739	6,719,739	6,719,739
Mean of Dependent Variable	0.0029	0.0029	0.0029	0.0029
Number of Judges	15778	15778	15778	15778

Robust standard errors appear in brackets (clustered at district-level). The dependent variable in Columns (1) and (2) is Appealed, a dummy variable that switches on if the court verdict is appealed in the high court. The dependent variables in column (3) and (4) is Overturned in column 3 and 4, a dummy variable that switches on for lower court verdict reversed in the high court. The equations are estimated via full information maximum likelihood using Chiburis and Lokshin (2007) Stata command heckman the extends the standard Heckman selection equation from probit to an ordered probit. The leave-out leniency of a judge is used as an instrumental variable (similar to Norris et al., 2021). Muslim X Ramadan Hours is the interaction between the dummy for Muslim and average daylight hours in Ramadan. Controls include indicator for case type (rape, assault, robbery, child sexual abuse, kidnapping, fraud and theft), indicator for judge type (whether judge is a specialist criminal judge or part-time criminal judge). We also include Ramadan month dummy, Muslim dummy, Daylight Hours, Ramadan Hours, their corresponding interactions individually as controls in all specifications. Fixed effects include district fixed effects and year, month, week and day fixed effects where time corresponds to date of decision. The unit of observation is an individual case. *** p<0.01, ** p<0.05, * p<0.1.

Table S5: Evaluating the Physiological Deprivation Channel by religion – India

	Muslim Judges			Non-Muslim Judges		
	(1)	(2)	(3)	(4)	(5)	(6)
	Caseload	Days to First Hearing	Days Delay	Caseload	Days to First Hearing	Days Delay
Ramadan Hours	-0.0350	143.5	103.9	-0.874	138.7	-111.5
Standard error	(0.673)	(125.0)	(78.55)	(0.690)	(121.3)	(120.5)
95% two-sided CI	-1.364 - 1.294	-103.1 - 390.2	-51.14 - 258.9	-2.231 - 0.482	-99.72 - 377.1	-348.4 - 125.5
P value	(0.959)	(0.252)	(0.188)	(0.206)	(0.253)	(0.356)
District and Time FE	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,295	12,295	12,295	183,141	183,141	183,141
R-squared	0.103	0.066	0.052	0.030	0.017	0.012
Number of Judges	395	395	395	7167	7167	7167

Robust standard errors appear in brackets (clustered at district-level). The dependent variables in Columns (1) and (4) is Caseload, that denotes the number of cases decided per day by the judge, for cases decided by Muslim and non-Muslim judges, respectively. The dependent variables in Columns (2) and (5) is Days to First Hearing which denotes the days the case is pending before the judge schedules the first hearing, by Muslim and non-Muslim judges, respectively. Likewise, dependent variable is Case Delay for Columns (3) and (6) and represent the time the case in pending in court until decision for Muslim and non-Muslim judges, respectively. Controls include indicator for case type (rape, assault, robbery, child sexual abuse, kidnapping, fraud and theft), indicator for judge type (whether judge is a specialist criminal judge or part-time criminal judge). We also include Ramadan month dummy, Muslim dummy, Daylight Hours and Ramadan Hours individually as controls. Fixed effects include district fixed effects and year, month, week and day fixed effects where time corresponds to date of decision. The unit of observation in this table is at the judge-day level since the variation in dependent variables is at this level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table S6: Evaluating the Physiological Deprivation Channel by religion - Pakistan

	Muslim Judges		Non-Muslim Judges	
	(1)	(2)	(3)	(4)
	Caseload	Case Delay	Caseload	Case Delay
Ramadan Hours	0.00843	0.100	0.0263	0.259
Standard error	(0.00955)	(0.138)	(0.0156)	(0.194)
95% two-sided CI	-0.0119 - 0.0288	-0.194 - 0.395	-0.00683 - 0.0595	-0.153 - 0.672
P value	(0.391)	(0.478)	(0.111)	(0.201)
District and Time FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	2,964	2,964	1,453	1,453
R-squared	0.050	0.063	0.071	0.086
Number of Judges	587	587	314	314

Robust standard errors appear in brackets (clustered at district-level). The dependent variables are Caseload, a variable for number of cases decided per day by judge and Case Delay difference between filing and decision year. Ramadan Hours are the number of daylight hours in Ramadan. The controls include case characteristics like, presence of chief justice on the bench, and judge characteristics such as dummies for judge's gender, prior employment (lawyer or former judge), and political activity prior to judicial appointment. We also include Ramadan Hours and Daylight Hours individually as controls in all specifications. Fixed effects include district fixed effects and year fixed effects where time corresponds to date of decision. The unit of observations is at the level of variation in dependent variable i.e. judge-time level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table S7: Random Case Assignment Check - India

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
				Muslim Judge				
Rape	-0.0355							-0.0230
Standard Error	(0.0328)							(0.0282)
P value	(0.279)							(0.415)
Children Sexual Assault		-0.000775						-0.00199
Standard Error		(0.105)						(0.106)
P value		(0.994)						(0.985)
Robbery			-0.00372					-0.00385
Standard Error			(0.0043)					(0.0043)
P value			(0.390)					(0.366)
Assault				0.0626				0.0633
Standard Error				(0.0569)				(0.0568)
P value				(0.272)				(0.265)
Kidnapping					-0.0405			-0.0273
Standard Error					(0.0290)			(0.0148)
P value					(0.164)			(0.0663)
Theft						0.0164		0.0160
Standard Error						(0.0242)		(0.0240)
P value						(0.498)		(0.507)
Fraud							0.00308	0.00243
Standard Error							(0.0361)	(0.0366)
P value							(0.932)	(0.947)
District and Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	372,089	372,089	372,089	372,089	372,089	372,089	372,089	372,089
R-squared	0.154	0.154	0.154	0.154	0.154	0.154	0.154	0.154
Number of Judges	7668	7668	7668	7668	7668	7668	7668	7668
F-Statistics [P-values]	1.17[0.28]	0.001[0.99]	0.74[0.3]	1.21[0.27]	1.94[0.16]	0.46[0.4]	0.01[0.93]	1.17[0.3]

Note: Robust standard errors appear in brackets (clustered at the district level). Dependent variable is a dummy variable that switches on when the case is adjudicated by a Muslim judge. Independent variables are indicator variables that switch on when the case involved rape, child sexual abuse, robbery, assault, kidnapping or theft. F-statistics and corresponding p-values are also reported in the last row to test for joint significance. Fixed effects include district, year, month, week and day fixed effects where time corresponds to date of decision. The unit of observation is at the case level. *** p<0.01, ** p<0.05, * p<0.1.

Table S8: Impact of Ramadan Ritual on Case Composition – Muslim and Non-Muslim Judges - India

Panel A: Muslim Judges

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Rape	*Child Sexual Assault*	*Robbery*	*Assault*	*Kidnapping*	*Theft*	*Fraud*
Ramadan Hours	-0.00170	-0.00209	0.00742	-0.00005	-0.00117	0.00180	-0.00074
Standard error	(0.00327)	(0.00150)	(0.00410)	(0.00011)	(0.00118)	(0.0014)	(0.0007)
P value	(0.603)	(0.167)	(0.0724)	(0.642)	(0.326)	(0.206)	(0.286)
District and Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	19,995	19,995	19,995	19,995	19,995	19,995	19,995
R-squared	0.090	0.839	0.016	0.006	0.086	0.120	0.007
Number of Judges	400	400	400	400	400	400	400

Panel B: Non-Muslim Judges

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Ramadan Hours	-0.0011	0.0002	0.0023	-0.0001	-0.0007	-0.0001	0.0001
Standard error	(0.00195)	(0.000557)	(0.00160)	(0.0001)	(0.00112)	(0.0008)	(0.0002)
P value	(0.592)	(0.733)	(0.152)	(0.155)	(0.509)	(0.899)	(0.803)
District and Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	352,057	352,057	352,057	352,057	352,057	352,057	352,057
R-squared	0.306	0.075	0.106	0.003	0.289	0.027	0.004
Number of Judges	7243	7243	7243	7243	7243	7243	7243

Note: Robust standard errors appear in brackets (clustered at the district level). Dependent variables are indicator variables that switch on when the case involved rape, child sexual abuse, robbery, assault, kidnapping or theft, respectively, for each column. Ramadan Hours are number of daylight hours in Ramadan. We also include dummies for the month of Ramadan and average Daylight Hours as controls in all specifications. Fixed effects include district fixed effects and year, month, week and day fixed effects where time corresponds to date of decision. The controls include all remaining columns in the dependent variable except the dependent variable used in the respective column. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table S9: Balance Check on Case Characteristics – Muslim and Non-Muslim Judges - Pakistan

Panel A: Muslim Judges					
	(1)	(2)	(3)	(4)	(5)
	# Pg. Judg.	Bench CJ	# Lawyer	# Judge	# Appeals
Ramadan Hours	0.508	-0.0172	0.280	-0.0544	0.0313
Standard error	(0.425)	(0.00830)	(0.177)	(0.0279)	(0.0366)
95% two-sided CI	-0.397 - 1.414	-0.0348 - 0.000527	-0.0975 - 0.657	-0.114 - 0.00501	-0.0466 - 0.109
P value	(0.250)	(0.0563)	(0.135)	(0.0699)	(0.405)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Observations	3,849	3,849	3,849	3,849	3,849
R-squared	0.213	0.060	0.106	0.115	0.072
Mean of dep. variable	9.077	0.063	4.161	1.758	1.145
Panel B: Non-Muslim Judges					
	# Pg. Judg.	Bench CJ	# Lawyer	# Judge	# Appeals
Ramadan Hours	-0.616	-0.0107	0.0983	-0.0436	-0.0254
Standard error	(0.553)	(0.0116)	(0.165)	(0.0622)	(0.0509)
95% two-sided CI	-1.795 - 0.564	-0.0354 - 0.0140	-0.254 - 0.450	-0.176 - 0.0890	-0.134 - 0.0832
P value	(0.283)	(0.369)	(0.561)	(0.494)	(0.626)
Fixed Effects	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Observations	1,997	1,997	1,997	1,997	1,997
R-squared	0.192	0.092	0.151	0.127	0.109
Mean of dep. variable	8.667	0.059	3.777	1.685	1.103

Robust standard errors clustered at district level appear in brackets. The dependent variables are Number of Pages of judgment order (column 1), dummy for Chief Justice on bench (column 2), number of lawyers on the case (column 3), number of judges on the case (column 4), number of criminal appeals decided (column 5). Ramadan Hours is the average sunlight hours during Ramadan. Fixed effects include district, month and year fixed effects and controls include all available judge and case controls. We also include Ramadan Month and Daylight Hours individually as controls in all specifications. Panel A covers cases decided by Muslim judges, while Panel B covers cases decided by non-Muslim judges. The unit of observation is an individual case. *** p<0.01, ** p<0.05, * p<0.1.

Table S10: Additional Balance Check - Joint Orthogonality Test

	(1)	(2)	(3)	(4)
	Indian Courts		*Pakistani Courts*	
	Muslim X Ramadan	*Muslim X Ramadan Hours*	*Muslim X Ramadan*	*Muslim X Ramadan Hours*
Rape	0.00186	0.0270		
	(0.00196)	(0.0267)		
Assault	-0.00168	-0.0219		
	(0.00470)	(0.0639)		
Robbery	0.000214	0.00291		
	(0.00100)	(0.0137)		
Children Sexual Assault	0.00679	0.0936		
	(0.00285)	(0.0370)		
P value	(0.0176)	(0.0119)		
Theft	-0.00239	-0.0313		
	(0.00230)	(0.0308)		
Fraud	-0.00966	-0.131		
	(0.00607)	(0.0833)		
Kidnapping	-0.00208	-0.0285		
	(0.00174)	(0.0240)		
# Pg. Judg.			-0.00003	0.000267
			(0.000229)	(0.00280)
Bench CJ			0.000376	-0.00005
			(0.00714)	(0.0894)
# Lawyer			0.00005	0.00162
			(0.000435)	(0.00584)
# Judge			-0.000409	-0.00749
			(0.00182)	(0.0212)
# Appeals			-0.00277	-0.0319
			(0.00210)	(0.0247)
District and Time FE	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes
Observations	372,089	372,089	5,848	5,848
R-squared	0.129	0.130	0.688	0.685
F-Stats (Joint Significance)	1.53	1.67	0.74	0.64
p-values (Joint Significance)	0.155	0.114	0.605	0.669

Note: Robust standard errors appear in brackets (clustered at the district-level). The dependent variables are either Muslim X Ramadan (Columns 1 and 3) or Muslim X Ramadan Hours (Columns 2 and 4). Controls include indicators for judge type (whether the judge is a specialist criminal judge or part-time criminal judge) and judge characteristics such as dummies for judge's gender and prior employment (lawyer or former judge). Fixed effects include district and time fixed effects as in baseline regressions. F-Statistics in each column correspond to joint significance tests on the displayed case characteristics in the table. Level terms for Ramadan, Ramadan Hours and Muslim are always controlled for. *** p<0.01, ** p<0.05, * p<0.1.

Table S11: No Differential Impact by Crop Season

Panel A: Pakistan

	Muslim Judges		Non-Muslim Judges	
	(1)	(2)	(3)	(4)
	Acquittals			
Crop Season X Ramadan Hours	-0.00402	-0.00460	-0.00846	-0.00934
Standard error	(0.00393)	(0.00359)	(0.00943)	(0.00913)
P value	(0.322)	(0.220)	(0.384)	(0.322)
Ramadan Hours	0.0545	0.0560	0.0380	0.0426
Standard error	(0.0227)	(0.0228)	(0.0428)	(0.0408)
P value	(0.0300)	(0.0267)	(0.388)	(0.312)
Crop Season	-0.0449	-0.0427	0.00432	0.00224
Standard error	(0.0287)	(0.0279)	(0.0326)	(0.0330)
P value	(0.139)	(0.147)	(0.896)	(0.947)
District and time FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Observations	3,849	3,849	1,997	1,997
R-squared	0.052	0.055	0.064	0.072

Panel B: India

	Muslim Judges		Non-Muslim Judges	
	(1)	(2)	(3)	(4)
	Acquittals			
Crop Season X Ramadan Hours	0.00129	0.00161	-0.000526	-0.000579
	(0.00351)	(0.00357)	(0.00157)	(0.00158)
P value	(0.713)	(0.652)	(0.738)	(0.714)
Ramadan Hours	0.0639	0.0614	0.0352	0.0363
	(0.0385)	(0.0385)	(0.0234)	(0.0240)
P value	(0.0991)	(0.113)	(0.133)	(0.131)
Crop Season	-0.0122	-0.00556	0.00547	0.00642
	(0.0471)	(0.0463)	(0.0241)	(0.0241)
P value	(0.796)	(0.905)	(0.820)	(0.790)
District and time FE	Yes	Yes	Yes	Yes
Controls	No	Yes	No	Yes
Observations	19,995	19,995	352,057	352,057
R-squared	0.230	0.233	0.293	0.294

Note: Robust standard errors appear in brackets (clustered at the district-level). The dependent variable is Acquittal Verdict, a dummy variable that switches on for acquittal decisions. Crop Season X Ramadan Hours is the interaction between the dummy for crop harvesting season in Pakistan and India (for months April to June) and average daylight hours in Ramadan. The Crop season Dummy, Ramadan month dummy and Daylight Hours individually are also always included. Panel A reports results on Pakistan with controls including case characteristics: number of pages in the judgment order, presence of chief justice on the bench, number of judges in a case, number of lawyers in a case, and judge characteristics such as dummies for judge's gender and prior employment (lawyer or former judge). Fixed effects include district and year fixed effects. Panel B reports results on India with controls including judge experience, indicator for case type (rape, assault, robbery, child sexual abuse, kidnapping, fraud and theft), indicator of judge type (whether judge is a specialist criminal judge or part-time criminal judge). Fixed effects include district, year, month, week and day fixed effects where time corresponds to date of decision. The unit of observation is at the case level. *** p<0.01, ** p<0.05, * p<0.1.

Table S12: Robustness to Including State-by-Year Fixed Effects

	(1)	(2)	(3)	(4)
	Overturned			
Muslim X Ramadan Hours	-0.00977	-0.00973	-0.00987	-0.00851
Standard error	(0.00401)	(0.00403)	(0.00398)	(0.00409)
95% two-sided CI	-0.0177 - -0.00187	-0.0177 - -0.00180	-0.0177 - -0.00203	-0.0166 - -0.000466
P value	(0.0155)	(0.0163)	(0.0138)	(0.0382)
District FE	Yes	Yes	Yes	Yes
Time FE	No	Yes	Yes	Yes
Control	No	No	Yes	Yes
State X Year FE	No	No	No	Yes
Observations	19,901	19,901	19,901	19,901
R-squared	0.182	0.194	0.196	0.208
Mean of Dependent Variable	0.219	0.219	0.219	0.219
Number of Judges	2777	2777	2777	2777

Robust standard errors appear in brackets (clustered at district-level). The dependent variable is Overturned, a dummy variable that switches on for lower court verdict reversed in the High Court. Controls include indicator for case type (rape, assault, robbery, child sexual abuse, kidnapping, fraud and theft), indicator for judge type (whether judge is a specialist criminal judge or part-time criminal judge). We also include Ramadan month dummy, Muslim dummy, Daylight Hours, Ramadan Hours, their corresponding interactions as controls in all columns of the table. Fixed effects include district, year, month, week, day and in Column 4, we also include State by Year fixed effects. The unit of observation is at the case level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table S13: No Differential Impact on Recidivism by Murder and Armed Robbery

	(1)	(2)	(3)
		Recidivism	
Robbery X Muslim X Ramadan Hours		0.0102	
		(0.0129)	
P value		(0.429)	
Murder X Muslim X Ramadan Hours			-0.000633
			(0.00668)
P value			(0.925)
Robbery X Ramadan Hours		0.000254	
		(0.00200)	
P value		(0.899)	
Murder X Ramadan Hours			-0.0126
			(0.00402)
P value			(0.00188)
Muslim X Ramadan Hours	-0.000480	-0.000522	-0.000486
	(0.00119)	(0.00120)	(0.00119)
P value	(0.686)	(0.664)	(0.682)
Ramadan Hours	-0.00721	-0.00727	-0.00804
	(0.0122)	(0.0121)	(0.0122)
P value	(0.554)	(0.550)	(0.510)
Robbery X Muslim		-0.0664	
		(0.0777)	
P value		(0.393)	
Murder X Muslim			-0.00483
			(0.0714)
P value			(0.946)
District and Time FE	Yes	Yes	Yes
Controls	Yes	Yes	Yes
Observations	362,562	362,562	362,562
R-squared	0.202	0.202	0.202

Robust standard errors appear in brackets (clustered at the district-level). The dependent variable is Recidivism, a dummy variable that switches on if a defendant is charged with a new crime in the court following his or her acquittal. Muslim X Ramadan Hours is the interaction between the dummy for Muslim and average daylight hours in Ramadan. We also include Ramadan month dummy, Muslim dummy, Daylight Hours, Ramadan Hours, their corresponding interactions individually as controls. Robbery and Murder are dummy variables when the case involved armed robbery and murder, respectively. The unit of observation is an individual case.*** p<0.01, ** p<0.05, * p<0.1.

Table S14: Impact of Ramadan over Time

	(1)	(2)	(3)	(4)
	Pakistani Courts		Indian Courts	
	Muslim Judge	Non-Muslim Judge	Muslim Judge	Non-Muslim Judge
Muslim X Jumada Hours (t-3)	-0.000838	-0.00427	0.0156	-0.0431
Standard error	(0.00184)	(0.00316)	(0.0381)	(0.0264)
95% two-sided CI	-0.00476 - 0.00308	-0.0110 - 0.00246	-0.0596 - 0.0908	-0.0951 - 0.00886
P value	(0.655)	(0.196)	(0.683)	(0.104)
Muslim X Rajab Hours (t-2)	-0.000437	0.00272	-0.0145	0.00134
Standard error	(0.00199)	(0.00293)	(0.0368)	(0.0222)
95% two-sided CI	-0.00468 - 0.00380	-0.00351 - 0.00896	-0.0871 - 0.0582	-0.0424 - 0.0450
P value	(0.829)	(0.367)	(0.694)	(0.952)
Muslim X Shaban Hours (t-1)	-0.00463	-0.00171	0.0635	0.0418
Standard error	(0.00187)	(0.00299)	(0.0461)	(0.0279)
95% two-sided CI	-0.00861 - -0.000644	-0.00807 - 0.00466	-0.0275 - 0.154	-0.0130 - 0.0966
P value	(0.0257)	(0.576)	(0.170)	(0.135)
Muslim X Ramadan Hours (t)	0.0178	-0.000703	0.104	0.0232
Standard error	(0.00190)	(0.00381)	(0.0553)	(0.0293)
95% two-sided CI	0.0137 - 0.0218	-0.00882 - 0.00742	-0.00481 - 0.213	-0.0344 - 0.0808
P value	(0.000001)	(0.856)	(0.0609)	(0.428)
Muslim X Shawal Hours (t+1)	0.00470	0.00554	0.0443	-0.0252
Standard error	(0.00279)	(0.00352)	(0.0485)	(0.0273)
95% two-sided CI	-0.00125 - 0.0106	-0.00196 - 0.0130	-0.0513 - 0.140	-0.0789 - 0.0285
P value	(0.113)	(0.136)	(0.361)	(0.357)
Muslim X Dhulqada Hours (t+2)	-0.00341	0.00155	0.110	-0.0183
Standard error	(0.00287)	(0.00297)	(0.0421)	(0.0242)
95% two-sided CI	-0.00954 - 0.00272	-0.00477 - 0.00788	0.0270 - 0.193	-0.0659 - 0.0293
P value	(0.254)	(0.609)	(0.00969)	(0.450)
Muslim X Dhulhijja Hours (t+3)	-0.00233	-0.000949	0.0469	-0.0610
Standard error	(0.00307)	(0.00267)	(0.0350)	(0.0205)
95% two-sided CI	-0.00887 - 0.00422	-0.00665 - 0.00475	-0.0222 - 0.116	-0.101 - -0.0208
P value	(0.460)	(0.728)	(0.182)	(0.00305)
Observations	3,849	1,997	19,995	352,057
R-squared	0.060	0.079	0.235	0.295

Robust standard errors appear in brackets (clustered at the district-level). The dependent variable Acquittals, a dummy variable that switches on if the defendant is acquitted. Columns 1 and 2 report estimates with leads and lags for Pakistan, for Muslim and non-Muslim judges respectively, while Columns 3 and 4 provide the corresponding estimates for India. Muslim X Ramadan Hours is the interaction between the dummy for Muslim and average daylight hours in Ramadan. We also include Ramadan month dummy, Muslim dummy, Daylight Hours, Ramadan Hours, their corresponding interactions individually as controls. Pre and post-Ramadan sunlight hours are also included along with their components. The remaining controls such as case characteristics and time fixed effects are identical to that in Table 1. The unit of observation is an individual case. *** p<0.01, ** p<0.05, * p<0.1.

Table S15: Main Results Correcting for Multiple Hypotheses

	(1)	(2)	(3)	(4)	(5)
	Acquittals				Overturned
	Muslim Judge	Non-Muslim Judge	Muslim Judge	Non-Muslim Judge	-
	Pakistani Courts	Pakistani Courts	Indian Courts	Indian Courts	Indian Courts
Muslim X Ramadan Hours					-0.010
p-value					(0.016)
Sharpened q-value					{0.089}
Ramadan Hours	0.042	0.014	0.066	0.033	0.073
p-value	(0.042)	(0.603)	(0.077)	(0.150)	(0.071)
Sharpened q-value	{0.332}	{0.999}	{0.292}	{0.292}	{0.105}
District and Time FE	Yes	Yes	Yes	Yes	Yes
Controls	Yes	Yes	Yes	Yes	Yes
Observations	3,849	1,997	19,995	352,057	19,914

Robust standard errors appear in brackets (clustered at district-level). The dependent variable is Acquittals, a dummy variable for acquittals and zero if convictions. We include Ramadan month dummy, Muslim dummy, Daylight Hours, Ramadan Hours and their interactions individually as controls. Fixed effects include district fixed effects and year, month, week and day fixed effects where time corresponds to date of decision. The unit of observation is at the case level. The sharpened q-values can, theoretically, also be less than unadjusted p-values when many hypotheses are rejected, because if there are many true rejections, you can tolerate several false rejections too and still maintain a low false discovery rate. *** p<0.01, ** p<0.05, * p<0.1.