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Clash of norms judicial leniency on defendant birthdays[☆]

Daniel L. Chen*, Arnaud Philippe

Institute for Advanced Study in Toulouse, Toulouse School of Economics, University of Toulouse Capitole, Toulouse, France

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ABSTRACT

We document judicial leniency on defendant birthdays across 4.8 million decisions. Our results are consistent with reference-dependent social preferences. First, French sentences are 1% fewer and around 5% shorter. Second, U.S. federal judges also round down sentences except when rounding up makes available sentencing reductions for good behavior. No leniency appears on the days before or after a defendant's birthday.

1. Introduction

Individuals frequently have to evaluate others' production or acts. In professional settings, those evaluations are usually done in an impartial way. Professors marking exams, loan officers assessing demands, and judges deciding cases are supposed to follow precise rules that only evaluate some defined material. While they are supposed to be independent, tangential norms could affect those evaluations. National or religious holidays, birthdays, and births or deaths can change the evaluators' judgment.

In this paper we examine the effect of defendant birthdays on judicial decisions. This event is interesting for at least three reasons. First, birthdays are associated with a strong societal norm. Indeed, birthdays elicit expectations of favorable treatment for the individual whose birthday it is (Greene et al., 1987). For example, patients expect celebration on their birthday (Phillips et al., 1973), teachers use birthday parties to integrate refugees (Windzio, 2015), and unmet expectations on birthdays are associated with suicide (Williams et al., 2011). Second, judicial decisions are associated with a strong professional norm of independence from extrajudicial factors. Across different societies, various norms and institutional mechanisms are designed to limit the influence of extrajudicial factors: oaths to be impartial, disclosures of conflicts of interest, recusals from cases, random assignments to prevent judge shopping, ethics committees, appeals, transparency and accountability, tenure, and prohibitions on honoraria, political speeches, or campaign donations. These professional norms are supposed to mute personal and general societal norms. Third, as judicial decision dates are usually set in advance and follow precise rules (for organizational purposes), birthdays are orthogonal to case characteristics, as the statistical tests

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* Corresponding author at: Directeur de Recherche, Centre National de la Recherche Scientifique (CNRS) Professor, Toulouse School of Economics, Professor, Institute for Advanced Study in Toulouse.

E-mail address: daniel.chen@iast.fr (D.L. Chen).

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confirm. Therefore, defendant birthdays present a good setting for measuring if and how professional norms mute social norms.

Using two different countries, France and the U.S., we show that deciding cases on defendant birthdays is likely to be effectively random. The two countries provide independent evidence across a large sample size of decisions. Each country offers unique advantages for exploring mechanisms in terms of data analysis that taken together portray a picture of judicial leniency on defendant birthdays.

First, we test whether French judges are more lenient on defendant birthdays. The French court setting offers administrative data on 4.2 million decisions, where proceedings begin with opening statements by the judge stating the identity and birthday of the defendant. The setting is also convenient because there are no sentencing guidelines (only a maximum far above the promulgated sentences) and they are usually decided through trial (there is a limited plea-bargaining mechanism). We estimate that judges are 1% less likely to assign any form of prison sentence to defendants on their birthday if they appear in court. This effect is observed at the threshold margin of positive sentence length as well as at almost every other threshold across the distribution of sentence lengths. Having a decision on one's birthday reduces the sentence by around 6%. The effect seems at least partly driven by the fact that the birthday defendants are convicted of a less severe crime, a proxy for re-qualification in court, effectively amounting to a shorter maximum sentence length of 27 days out of 1283 (a 2% reduction).

Second, we test whether U.S. judges are also more lenient on defendant birthdays. In the federal district courts, we observe 600,000 decisions between 1991 and 2003. Judges must report the number of months and the number of additional days of the sentence (i.e., "3 months and 2 days"). In this setting where judges have limited discretion because of sentencing guideline restrictions, we interpret the "day component" of the sentence as a way to modulate the severity of the relatively constrained "month part". We find that defendants judged on their birthday are sentenced to the same number of months in prison but are less likely to receive prison days on top of it. The day component of federal sentences is reduced by 33% (0.13 days out of an average 0.36 days) on defendant birthdays, mostly by assigning 0s. We also leverage a feature of the district courts as a mechanism check: judicial sentences of more than a year are eligible for sentencing reduction for good behavior, which effectively reduces sentences to under a year. We find that defendant birthdays decrease the day component of federal sentences when the month component is 12.

Third, the characteristics of the samples allow us to further dig into the mechanisms at play. In U.S. federal district courts where we observe race, birthday leniency is elevated if the judge and defendant share the same race. In this setting, where we observe judicial writing in unrelated cases, we can see that judges who emphasize the deterrent effect of criminal sentences, as reflected by the frequency of the term "deterrence" in their civil case writings, are less affected by defendant birthdays.

Altogether, we show that birthdays can bias high-stakes decision-making in real-world or field settings such as those involving judges making decisions in their primary occupations. Our research contributes to the sizable psychology literature using vignette studies of small samples of judges that suggest unconscious heuristics (e.g., anchoring, status quo bias, availability) play a role in decision-making (e.g., Guthrie et al. 2007). In addition, our results contribute to the theoretical literature on decision-making (e.g., Bordalo et al. 2015), which models how judges can be biased by legally irrelevant information.[1] Our analysis differs from the existing literature on extraneous factors in legal outcomes in that our setting offers greater control over omitted case characteristics (Danziger et al., 2011; Weinshall-Margel et al., 2011) and isolates mechanisms *via* the judicial decision-maker rather than the lawyers, litigants (Eren and Mocan, 2018), or jurors (Anwar et al., 2012; Philippe and Ouss, 2018), and does so with a sample size larger than previous studies of behavioral judging.

These effects are significant for the affected defendants, which raises questions about other margins of behavioral change not observed by econometricians and about the efficacy of professional norms to mute social norms. Whether society wants judges to be lenient on defendant birthdays is an open question, though gift giving to defendants who share the same race is arguably already prohibited. The rest of the paper is organized as follows: Section 2 presents the data and setting, Section 3 presents the identification strategy, Section 4 presents the results in France, Section 5 presents the results in the US, and Section 6 concludes.

2. Data and setting

2.1. France

We focus on crimes that can be punished by prison sentences of up to ten years.[2] This criminal category – called "délits" in French – contains the vast majority of crimes: theft, violence, drug consumption or drug dealing, and road-related

[1] See also research on the effect of football games and weather (Chen, 2017; Eren and Mocan, 2018), on the effect of political orientation of the judges (Anwar et al., 2019), examining the effect of presidential elections (Berdejo and Chen, 2017), and examining the effect of the gambler's fallacy (Chen et al., 2016).

[2] There are two additional categories: minor infractions that cannot be punished by prison (e.g., parking infractions) and the most severe crimes ("felonies") – e.g., murder and rape – that can be punished by up to life imprisonment and are judged by specific courts.

offenses. Our time frame, 2003–2014, covers 320,000 and 500,000 convictions per year in the 186 courts of first instance (non-appeals).[3]

When defendants are found guilty, French judges promulgate prison sentences. Contrarily to some other countries, the French criminal code does not define active prison, probation, and suspended prison as three different sentences. It only defines one sentence, prison, that could come with a probation period or a suspension[4]. While, in practice, it is possible to distinguish between "active" prison, probation, and suspended prison, this legal setting affects the way sentences are regulated, presented, and eventually amended.

Indeed, the French criminal code only regulates total "prison" time (i.e. the sum of active prison, prison with probation, and suspended prison). It sets the maximum number of months or years that could be decided for a crime type but it remains silent on the decomposition. If the maximum is set to 5 years, the sum of active prison, probation, and suspended prison should not exceed this threshold, but each subcategory could represent any proportion of the total (from 0% to 100%). For this reason, when reading a verdict, the court announces the total "prison" time, first, before eventually giving the decomposition.[5] The aggregated prison sentence is also what is usually mentioned in the media when a case is covered.

Moreover, the differences between the three subcategories are less strict than what it sounds. In practice, active prison time could be fully transformed into prison with probation time by another judge after the trial ("juge d'application des peines")[6]. This is quite common (around one-third of the cases[7]) and, in that case, offenders are not incarcerated at all for the crime.

For those reasons, we will primarily focus on the aggregate quantity as an outcome. To avoid confusion, we will refer to "any prison time" when talking about the sum, and to "active prison", "prison with probation", and "suspended prison" when talking about the sub-categories.

Most sentences are decided after a trial. Plea-bargaining can only be used for a subset of crimes – those with a maximum prison sentence below or equal to five years – and sentences cannot exceed one year. Plea-bargaining has never exceeded 12.5% of case resolutions in a year since its introduction.

Judges in correctional courts (for misdemeanor) have no control over their schedule. For each case, when the investigations are finished, the prosecutor in charge chooses the type of procedure (accelerated/normal) and, based on this, picks the next session of the relevant type. The weekly schedule of the sessions is fixed and decided at the beginning of the year by the head of the court with little discretion to select trial dates on defendant birthdays. Our balance checks confirm that birthday assignment is uncorrelated to case and defendant characteristics.

The original dataset is a compilation of criminal records from the statistics service of the French Ministry of Justice (Sous Direction de la Statistique et des Etudes). It contains a detailed description of every criminal case judged each year, including the date, place, and procedural detail of the trials, the date the defendant is notified of the sentencing decision (frequently identical to the trial date if the defendant is present), the date of the crime (if known), its exact category based on the criminal code, the sentence decided (e.g., prison, probation, and suspended prison), and sex, nationality, and birth date of the defendant. Acquittals are not recorded.

We use the years 2003–2014 and our final dataset is composed of 4,608,209 observations.[8] The descriptive statistics of this data set are presented in the first two columns of Table 1. Defendants are mainly male (90%), French (83%), and relatively young (33 years old on average). Plea-bargaining is rare (only 12% of the cases) and defendants are usually present at trial (78% of the cases). Road-related infractions are the most frequent crimes (31%) followed by property crimes (27%), violence (21%), and drug offenses (9%). Sentences are short compared to those in the U.S. — they are on average equal to 125.2 days of any prison type (56.4 active prison days, 36.1 prison days with probation, and 32.7 suspended prison days). 72% get sentences that could lead to prison (by opposition to fines). Lastly, people have trials on their birthday 0.27% of the time (1 out of 365), which is what we would expect with an even distribution of trial days across birthdays.

2.2. U.S

The United States District Courts (USDC) are the judicial backbone for hearing and sentencing federal crimes in the U.S. Federal crimes include illegal activity committed on federal land, crimes committed by or against federal employees in particular roles, matters involving federal government regulations (e.g., illegal immigration, federal tax fraud, counterfeiting), or crimes against the U.S. that occur outside of its territory, such as terrorism. Federal crimes comprise 8% of the U.S.

[3] Juveniles are judged by specific courts. They are dropped in the analysis.

[4] See for example Criminal code, Article 131-3.

[5] For example, a decision like "one year of prison and two years of suspended prison" is presented as a "three years in prison, two of which are suspended".

[6] See Criminal Procedure Code, Book 5, Title 2, Chapter 2

[7] According to the official statistics (Camus et al., 2013), in 2010, around 125,000 persons received an active prison sentence but "only" 83,000 persons were incarcerated.

[8] 1.5 million cases are excluded from the analysis as they could not lead to any prison time ("compositions pénales" and "procedures simplifiées").

Table 1
Descriptive statistics.

	France Mean	Sd	U.S. Mean	Sd
Male	.9	.3	.85	.36
Age	32.94	11.96	35.2	11.6
Citizen	.83	.37	.70	.46
White			.35	.48
Hispanic			.27	.44
Black			.35	.48
Plea bargaining	.12	.32	.93	.26
Present at trial	.78	.41		
Investigation length	358.2	521.52		
Time pre trial detention	7.26	52.26		
Crime				
Property	.27	.44	.29	.45
Road	.31	.46		
Violence	.21	.4	.1	.30
Drug	.09	.28	.41	.49
Max. possible sentence	1293.31	884.91		
Sentence				
Any prison sentence (Dummy)	.72	.45		
Any prison sentence (Number of days)	125.22	217.49		
Prison (USA number of months)			45.9	64.4
Prison (USA number of days out of 31)			.36	2.4
Bday	.0027	.0520	.0028	.0528
N	4,261,039		602,908	

Columns 1 and 2 present the statistics for French criminal courts while columns 3 and 4 present statistics for U.S. District courts.

prison population and constitute the most serious crimes. Among federal crimes, the most frequently heard cases involve immigration, drug trafficking, firearms, and fraud. In almost every case, the defendant enters a plea agreement with the prosecutor, which is then approved or denied by the judge.

Judges in the U.S. have more control over their schedule than their French counterparts. They mainly determine the days when they want to hear cases or discuss plea agreements. Once the schedule is determined, their courtroom deputies fill the calendar with cases.[9] Then, if selection based on birthday is, in theory, possible, the schedule is strongly constrained – postponing a case means a delay of several weeks – and the concrete allocation of the case is not done by the judges themselves. This organization makes the selection on birthdays unlikely.

Importantly for our study, offenders are eligible for good time credit if they are sentenced to more than a year (i.e., to at least one year and one day). Then, one-year-plus-one-day sentences could be considered as less severe than one-year sentences, as the maximum amount of good time earned can reduce a one-year-and-one-day sentence by 54 days.

There are 94 district courts in the U.S. There is at least one district court in each state or U.S. territory. States that are large or have a large population have sub-state regional courts. Cases are randomly assigned to a single judge. The United States Sentencing Commission (USSC) produces sentencing guidelines for federal judges. The judges are given a guideline range for the criminal sentence that is based on the severity of the crime and the defendant's criminal history. Due to these guidelines, the largest factor determining sentence range is the criminal charges brought to the judge by the prosecutor. Therefore, we expect the effect of a birthday to be more limited than in France, where judges have more discretion.

We use the period from October 1991 to September 2003 and our final dataset is composed of 602,908 observations.[10] Descriptive statistics are presented in the last two columns of Table 1. Offenders are 35 years old on average and are mainly male (85%) and U.S. citizens (70%). Black and white offenders are equally numerous – around 34% – while Hispanics are slightly less numerous (29%). Only 7% of defendants go to trial.

[9] According to a judge we talked to: "Most judges will set a bunch of things back to back on a given day – guilty plea, sentencing, supervised release or probation violations, etc. One judge hears criminal matters only 1–2 days a month. Others have criminal calendars much more regularly. The judges set things according to their own calendars and then their courtroom deputies notify us of the dates. (If we have a conflict, we have to file a motion to continue.)"

[10] Unfortunately, while district courts decisions are available over a longer time period, the exact date of birth is not available outside the studied sample.

Prison sentences are decided as a number of months eventually expanded with additional days. On average the month component is equal to 45 months. Roughly 6% of cases have sentencing days exceeding 0. About 80% of those "one-day parts" are associated with 12-month sentences leading to one-year-plus-one-day sentences — the minimum sentences that make offenders eligible for good time credits. In a context where sentences are constrained by sentencing guidelines, and where months represent fairly large discrete changes, we interpret the day component of the sentence as a way to modulate sentences more finely. Lastly, offenders are sentenced on their birthday 0.28% of the time, again roughly 1 in 365.

3. Identification strategy

3.1. Specification

In order to measure the effect of defendant birthdays we use regressions of the form:

$$Sent_{i,t} = \beta_0 + \beta_1 1_{bday=t} + \beta_2 1_{|Bday-t|=1} + \beta_3 1_{|Bday-t|=2} + \beta_4 1_{WeekBday} + X_i + \epsilon_{i,t}$$

where:

- $Sent_{i,t}$ is the sentence promulgated against i at t, measured as the total sentence (in days, day winsorized,[11] logarithm of days plus one, or with threshold dummies) in France; the number of months, number of days, or departure from guidelines in the U.S. federal district courts.
- $1_{bday=t}$ is a dummy equal to one if the decision is taken on a defendant's birthday.
- $1_{|Bday-t|=1}$ and $1_{|Bday-t|=2}$ are dummies equal to one if the decision is taken on one (respectively, two) day before or after the defendant's birthday.
- $1_{WeekBday}$ is a dummy equal to one if the decision is taken in the week of a defendant's birthday.
- X_i is a set of control variables (used in the robustness checks): crime category, gender, citizenship, plea, recidivist. In the French data and the U.S. federal district data, we can add day-of-year fixed effects. In the latter, we can also add education, age, race, and judge as dummy indicators.

In this regression, β_1 is the parameter of interest. β_2, β_3 and β_4 are expected to be 0.

3.2. Threat to the identification strategy

The strategy presented above rests on at least two assumptions. First, it is only valid if birthdays are orthogonal to decisions. In Section 2, we argued that it is most likely true for procedural reasons. Second, in the case of France, the effect on *sentences* could only be measured if *convictions* are not affected. Indeed, as acquittals are not recorded, if judges are less likely to convict defendants who are judged on their birthday, we will only observe the most severe criminals and the effect of birthdays on sentences will be biased upward.

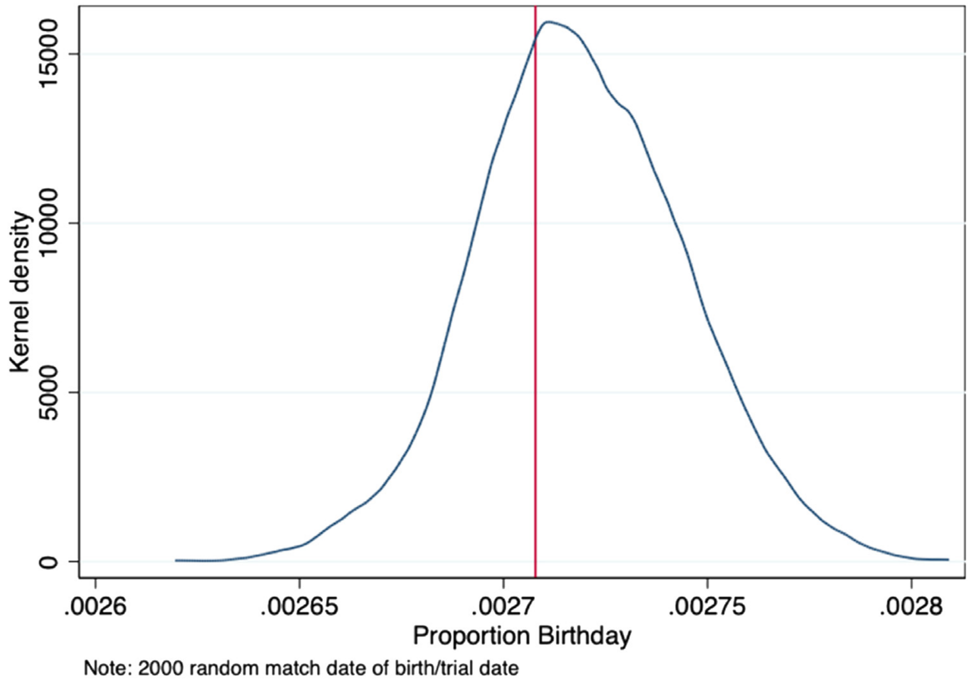
In practice, those two issues have similar consequences. If one is true, defendants judged on their birthday will be abnormally rare (or numerous) and will likely have particular characteristics. To test those hypotheses in a formal way, we run two sets of exercises. First, we compare the proportion of decisions taken on defendants' birthdays to the same proportion in several random reshuffles of our datasets. In practice, we use real dates of birth and real dates of trial and merge the two randomly 2000 times. While we already mentioned that the proportion of defendants judged on their birthday is roughly equal to 1/365, this procedure presents the advantage of taking into account the fact that birthdays and trials are unevenly distributed across the year.

The densities of the proportion of trials on birthdays in the two datasets are presented in Fig. 1 (1.a for France, 1.b. for the U.S.). In both cases, the true proportion is located in the middle of the distribution. This confirms that trials' dates are not manipulated by actors to coincide or differ from birthdays. In the case of France, Fig. 1.a. also indicates that convictions are not less frequent on birthdays. Indeed, if it were to be the case, as acquittals are not recorded in the dataset, we would observe fewer trials on birthdays.

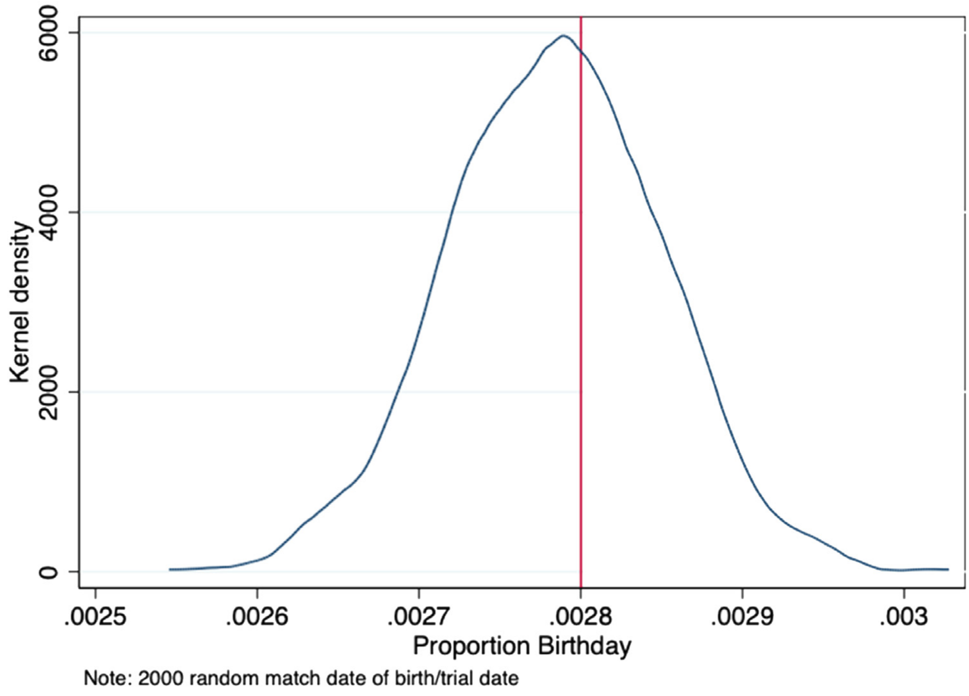
Second, we run balancing checks (i.e., regressions) of the form presented in Eq. (1) with socio-demographic characteristics or procedural variables as outcomes. Those exercises are presented for both France and the U.S. in Table 2. They confirm that birthdays are not correlated with observable characteristics. Panel A shows that 1 out of 8 tests are significant at the 10% level for France and Panel B shows that 0 of the 7 tests are significant at conventional levels.

In the case of France, it is important to note that the number of charges is not correlated with birthdays. It means that defendants judged on their birthday are no more (or less) likely to have some charges dropped at trial. This result could be interpreted as a null effect on "partial acquittal" and reinforce our claim that convictions are not affected by birthdays.

[11] We winsorize at the 1% or 5% level, meaning we replace the outliers exceeding the top 1% or 5% with the 1% or 5% threshold value.



(a : France)



(b : U.S.)

Fig. 1. Proportion of defendants judged on their birthday: comparison between real numbers (red bars) and distributions of proportions in 2000 random matches between date of birth and trial dates.

Table 2
Balancing checks.

	(1) Male	(2) Citizen	(3) Age	(4) Black	(5) Property crimes	(6) Road crimes	(7) Violence	(8) Drug crimes	(9) Invest. Length	(10) Nb. Of Charges
Panel A: France										
Birthday	0.0040	0.0011	0.23*		-0.000091	-0.00053	-0.0017	0.00089	3.41	-0.020
	(0.0034)	(0.0042)	(0.13)		(0.0050)	(0.0053)	(0.0046)	(0.0032)	(6.00)	(0.012)
1 day	-0.00014	0.0083**	0.14		-0.0014	0.0019	0.0017	0.0013	3.60	0.0047
before/after	(0.0028)	(0.0034)	(0.11)		(0.0041)	(0.0043)	(0.0038)	(0.0026)	(4.83)	(0.010)
2 days	0.00012	0.0022	0.19*		0.0024	0.00051	0.00038	-0.0034	-0.78	-0.0015
before/after	(0.0028)	(0.0035)	(0.11)		(0.0041)	(0.0043)	(0.0038)	(0.0026)	(4.82)	(0.010)
Bday's week	-0.0013	-0.00039	-0.16**		-0.0040	0.0023	0.0034	-0.00045	-1.21	-0.00041
	(0.0020)	(0.0025)	(0.077)		(0.0029)	(0.0031)	(0.0027)	(0.0018)	(3.39)	(0.0072)
Obs	4,261,039	4,261,039	4,261,039		4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039
Panel B: USDC										
Birthday	-0.0098	0.0082	0.30	-0.0068	-0.0042		0.0038	0.00077		
	(0.011)	(0.014)	(0.33)	(0.014)	(0.013)		(0.0090)	(0.015)		
1 day	-0.0076	-0.00037	0.45*	-0.014	0.012		-0.0029	-0.013		
before/after	(0.0087)	(0.011)	(0.27)	(0.012)	(0.011)		(0.0073)	(0.012)		
2 days	-0.024***	0.0095	0.28	-0.022*	0.0072		0.0012	-0.0038		
before/after	(0.0088)	(0.011)	(0.27)	(0.012)	(0.011)		(0.0073)	(0.012)		
Bday's week	0.0077	-0.0032	-0.52***	0.010	-0.0025		-0.0019	0.0013		
	(0.0061)	(0.0081)	(0.19)	(0.0084)	(0.0079)		(0.0052)	(0.0086)		
Obs	602,113	585,199	602,79	593,238	602,804		602,804	602,804		

All columns present the effect on the variable mentioned in the header. Panel A presents the results for France while Panel B presents the result for the US. Birthday is a dummy equal to one if the decision is taken on the defendant's birthday. The second and third explanatory variables are dummies equal to one if the decision is taken one day (respectively, two days) before or after the defendant's birthday. The fourth dependent variable is a dummy equal to one if the decision is taken between three days before and three days after the defendant's birthday.

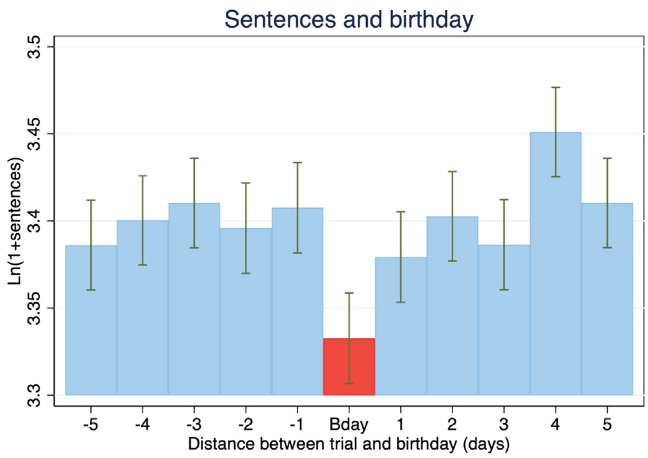


Fig. 2. Main results, France, visual.

4. France

4.1. Main results

We start by presenting the evolution of punishment around birthdays. Fig. 2 shows the average logarithm of sentences by the distance between trial and birthday. There is a clear drop at 0 and no clear effect on other days[12].

Table 3 presents a more precise quantification of the effect using our baseline specification. Column 1 indicates that the likelihood of receiving any prison sentences (either active prison, suspended prison, or prison with probation) on defendants' birthdays falls by 1 percentage point. Columns 2, 3, and 4 present the effects on the promulgated number of days (going

[12] Appendix Fig. A1 presents a more systematic version of this exercise. It shows the density of the average logarithm of sentences for all distances between birthday and judgment (from -180 to +180 days). The average when distance is zero is in the bottom 2.5% of the distribution.

Table 3
Main results, France.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Any prison type (active, suspended with probation, suspended)					Active	Suspended with probation	Suspended
	non 0	Number of days	Winsorize 1%	Winsorize 5%	ln(1+ Number of days)	ln(1+ Number of days)	ln(1+ Number of days)	ln(1+ Number of days)
Birthday	-0.0099*	-4.16*	-4.26**	-4.09***	-0.062**	-0.044*	-0.025	-0.0022
	(0.0051)	(2.52)	(2.17)	(1.54)	(0.026)	(0.025)	(0.023)	(0.023)
1 day before/after	-0.0023	0.21	-0.24	-0.46	-0.0047	0.00048	-0.0044	0.012
	(0.0042)	(2.08)	(1.78)	(1.27)	(0.021)	(0.021)	(0.019)	(0.019)
2 days before/after	0.0012	-2.31	-1.10	-0.42	-0.00015	0.025	-0.0016	-0.0090
	(0.0041)	(2.02)	(1.77)	(1.27)	(0.021)	(0.021)	(0.019)	(0.019)
Bday's week	0.0013	2.48*	2.12*	1.41	0.013	0.0094	0.018	-0.015
	(0.0029)	(1.46)	(1.26)	(0.90)	(0.015)	(0.015)	(0.013)	(0.014)
Constant	0.72***	125***	121***	108***	3.38***	1.33***	0.98***	1.37***
Observations	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039

The columns present results for French criminal courts. The dependent variable in column 1 is a dummy equal to one if the defendant gets any prison time. Columns 2 to 5 present the effect on the total number of days promulgated, winsorized at the 1% (Column 3) or 5% (Column 4) level or log-transformed plus one (Column 4). Columns 6 to 8 present the effect on the log-transformed number of active prison time, probation time or suspended prison time (plus one). Birthday is a dummy equal to one if the decision is taken on the defendant's birthday. The second and third explanatory variables are dummies equal to one if the decision is taken one day (respectively, two days) before or after the defendant's birthday. The fourth dependent variable is a dummy equal to one if the decision is taken between three days before and three days after the defendant's birthday.

from 0 to 10 years) after winsorizing it to reduce the effect of long tails[13]. Results are consistent and indicate that sentences are reduced by roughly four days. Column 5 presents the effect when using the logarithm of the number of days (plus 1). On average, sentences are up to 6.2% shorter on defendant birthdays. No significant impact appears for the placebos. The standard errors indicate that these coefficients are similarly precisely estimated, but the point estimates are a magnitude smaller than the birthday effect.

In appendix Table A1, we show that the results are robust to perturbations of the main specification. Indeed, removing controls, adding controls for case and defendant characteristics, dropping crimes conducted on defendant birthdays, adding day-fixed effects, clustering standard errors by courts or by day, or using arc-sinh transformation of sentences do not affect the main results.

4.2. Mechanism and heterogeneity

We then explore the heterogeneity of the effect to understand the main mechanisms.

First, Table 3, columns 6 to 8 indicate that birthdays mainly affect the number of active prison days. The length of suspended prison time and prison with probation time are negatively affected but the point estimates are small and non-significant. This is important as it means that the effect is concentrated on the part that is most likely to result in incarceration.[14]

Second, the effect is concentrated among moderately severe crimes. This is visible in Fig. 3, which presents the cumulative distribution of sentences. Consistent with the preceding, we see that the density is shifted upward for defendants judged on their birthday. This is particularly true in the beginning and the middle of the distribution. The probabilities to receive sentences above 4, 8, or 12 months are reduced by 1.6%, 0.84%, and 0.64% respectively for defendants judged on their birthday[15]. On the contrary, the probability to get more than a year of any prison sentence is not affected. No change in the distributions is observed if we run the same exercise comparing individuals judged one or two days before/after their birthday (see appendix Fig. A2).

Third, we only observe shorter sentences on defendants' birthdays when offenders attend their trial (as obliged). The first four columns of Table 4 document this. Column 1 first indicates that defendants are more likely to attend their trial when it happens to occur on their birthday. This could be due to their higher availability on that day – e.g., if they usually take a day off for their birthday – or to the fact that the date is easier to remember. Even if being present at trial is associated with shorter sentences, the effect on attendance is not an important driver of the birthday effect. Indeed, Column 2 shows that

[13] Winsorizing at the 1% level cap the sentences at 3 years. Winsorizing at the 5% level cap the sentences at 1.5 year.
[14] The robustness of the effect per prison types are presented in appendix Table A2.
[15] The coefficients of the effect at various cutoffs are presented in appendix Table A3.

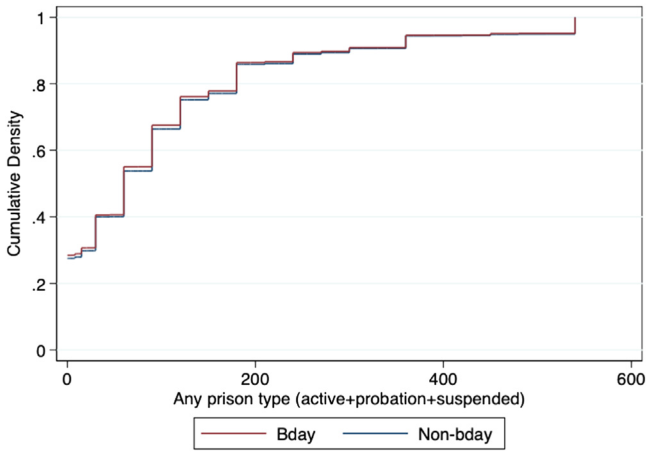


Fig. 3. Effects of being judged on birthdays across the distribution.

Table 4
France, mechanisms.

	(1) Present	(2) ln(1+ any prison type)	(3)	(4)	(5) Severity of charges	(6) ln(1+ any prison type)
	All	All	Present	Absent	All	All
Birthday	0.015***	-0.061**	-0.068**	-0.030	-27.1***	-0.038
	(0.0046)	(0.026)	(0.029)	(0.050)	(9.95)	(0.024)
1 day before/after	0.0026	-0.0046	-0.0035	-0.0080	3.16	-0.0074
	(0.0038)	(0.021)	(0.024)	(0.040)	(8.25)	(0.020)
2 days before/after	-0.0012	-0.00022	0.016	-0.061	-5.86	0.0049
	(0.0038)	(0.021)	(0.024)	(0.040)	(8.20)	(0.019)
Bday's week	0.0061**	0.014	0.0083	0.033	0.99	0.012
	(0.0027)	(0.015)	(0.017)	(0.028)	(5.81)	(0.014)
Present		-0.056***				
		(0.0024)				
Severity of the charges						0.00086***
						(1.1e-06)
Constant	0.78***	3.42***	3.36***	3.42***	1,293***	2.26***
Observations	4,261,039	4,261,039	3,320,901	940,138	4,261,039	4,261,039

The columns present results for French criminal courts. The dependent variable in column 1 is a dummy equal to one if the defendant attends his trial. In Columns 2–4, and 6 the outcome is the log-transformed number of days (plus one) of any prison type. In Column 5, the dependent variable is the maximum possible sentence (in days) of the main charge convicted. In Column 3 (respectively 4) the sample is restricted to offenders who attended (respectively missed) their trial. Birthday is a dummy equal to one if the decision is taken on the defendant's birthday. The second and third explanatory variables are dummies equal to one if the decision is taken one day (respectively, two days) before or after the defendant's birthday. The fourth dependent variable is a dummy equal to one if the decision is taken between three days before and three days after the defendant's birthday.

controlling for attendance does not affect the main results. Columns 3 and 4 indicate that birthday is only associated with shorter sentences when defendants are present. This heterogeneity could have two origins. A straightforward interpretation is that there is no reason to make a gift to somebody who is absent. It is also possible that judges are less likely to notice the peculiarity of the date when the defendant does not answer the court's summons.

Fourth, Table 4 documents the effect of birthdays on the severity of the charges. Column 5 indicates that they are found guilty of a crime that has on average 27 days shorter maximum sentence length (as defined in the criminal code). The average is 1293 days and the coefficient represents a 2% decrease. This effect on charges is an important driver of the effect on sentences. Indeed, Column 6 shows that the correlation between birthdays and prison days is twice as small and non-significant when controls for maximum sentence length are added.

Lastly, appendix Tables A4 and A5 explore the heterogeneity of the results per offense type and defendants' characteristics. Drug offenses seem to be the most affected and we report larger effects for male defendants and non-citizens.

Table 5
Main results, U.S. District Courts.

	(1)	(2)	(3)	(4)	(5)	(6)
		Prison				
	Downward departure from guideline	Month component	Day component	Day >0	Day component	Day >0
Birthday	-0.00096	-0.66	-0.13**	-0.0049	-0.14***	-0.011**
	(0.015)	(1.86)	(0.053)	(0.0066)	(0.054)	(0.0050)
Birthday*12-month sentence					0.17**	0.089
					(0.067)	(0.056)
1 day before/after	0.0073	-0.81	0.020	0.0033	0.018	-0.0018
	(0.013)	(1.58)	(0.056)	(0.0057)	(0.056)	(0.0049)
2 days before/after	-0.0033	-0.19	0.037	0.0039	0.036	0.0019
	(0.012)	(1.62)	(0.056)	(0.0057)	(0.056)	(0.0050)
Birthday week	0.0049	0.043	-0.036	-0.0032	-0.035	-0.000063
	(0.0089)	(1.10)	(0.039)	(0.0040)	(0.039)	(0.0034)
12-month sentence					0.30***	0.54***
					(0.0083)	(0.0030)
Constant	0.39***	45.9***	0.37***	0.058***	0.35***	0.033***
Observations	558,261	592,844	592,844	592,844	592,844	592,844

The columns present results for U.S. federal district courts. In column 1, the dependent variable is a dummy equal to one if the judge decides for a downward departure from sentencing guidelines. In column 2, the outcome variable is the month part of the sentences. In columns 3 and 5 the outcome variable is the day part of the sentences. In columns 4 and 6 the dependent variable is a dummy equal to one if the day part of the sentence is greater than zero. Birthday is a dummy equal to one if the decision is taken on the defendant's birthday. "12-month sentence" is a dummy equal to one if the month component of the sentence is equal to twelve. The third and fourth explanatory variables are dummies equal to one if the decision is taken one day (respectively, two days) before or after the defendant's birthday. The fifth dependent variable is a dummy equal to one if the decision is taken between three days before and three days after the defendant's birthday.

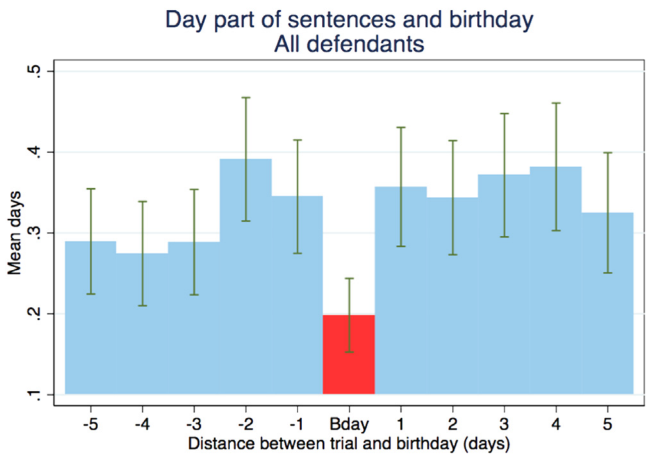


Fig. 4. Main results, USA, visual.

5. U.S

5.1. Main results

We now turn to the effect of birthdays in the United States District Courts. In Table 5, we start by measuring the effect on downward departure from guidelines and on the month component of sentences. We find no effect on those outcomes. This null result may be explained by the constraint imposed by guidelines (our period is before Booker and guidelines were mandatory).

Fig. 4 shows that the number of days in a federal sentence declines on defendant birthdays, but not on the days before or after birthdays. This is confirmed in Table 5, Column 3, where we present the results for the baseline specification. We find that judges assign 0.13 fewer days if the decision occurs on the defendant's birthday, all else equal. The effect is about one-third of the average number of days (0.36). We also see no impact on the days before or after the birthday. In the appendix Table B1, we show the results are robust perturbations of the main specification, removing controls or adding controls for case and defendant characteristics, judge fixed effects, or day fixed effects.

Table 6
Mechanisms – judges' characteristics.

	(1)	(2)	(3)
		USA	
		Day component	
Bday	-0.018	-0.12**	-0.17***
	(0.057)	(0.052)	(0.053)
Bday*Same race	-0.061		
	(0.038)		
Same race	-0.017		
	(0.011)		
Black defendant	-0.050***		
	(0.011)		
Black Judge	0.021*		
	(0.011)		
Bday*Same sex		0.047	
		(0.046)	
Same sex		0.0010	
		(0.015)	
Female judge		-0.0085	
		(0.015)	
Female defendant		0.024	
		(0.015)	
Bday*econ training			0.15**
			(0.065)
Econ training			-0.061***
			(0.0082)
1 day	0.014	0.049	0.038
before/after	(0.063)	(0.074)	(0.075)
2 days	0.021	0.12	0.11
before/after	(0.069)	(0.083)	(0.084)
Bday's week	0.0011	-0.032	-0.022
	(0.044)	(0.051)	(0.052)
Constant	0.11***	0.17***	0.20***
Observations	103,177	172,789	167,404

The columns present results for U.S. federal district courts. The outcome variable is the day part of the sentences. In column 1, the sample is restricted to Black and white defendants. In columns 2, the sample is restricted to decisions for which the gender is known. Birthday is a dummy equal to one if the decision is taken on the defendant's birthday. The second and third explanatory variables are dummies equal to one if the decision is taken one day (respectively, two days) before or after the defendant's birthday. The fourth dependent variable is a dummy equal to one if the decision is taken between three days before and three days after the defendant's birthday.

However, as we previously mentioned, the meaning of the day component of the sentence differs depending on the month component it is associated with. While having some days in addition to the months is usually harsher, it is not the case if the month part is equal to one year, when having one day instead of zero makes offenders eligible for good time credit. To further investigate the effect of birthdays on the day component of the sentences, regressions presented in Columns 5 and 6 include the interaction between birthday and a dummy equal to one if the month part is equal to one year. A clearer pattern emerges. While the average day component or the probability to get any days are smaller when the month component is not equal to 12, the effect is canceled when the month part is equal to twelve. The placebo coefficients are again far smaller and insignificant. In Table B2 we show that the differential effect of birthday when the month component is equal to 12 months is robust to perturbations of the main specification.

5.2. Mechanisms

The USDC data present the interesting advantage of including an identifier and some socio-demographic characteristics of the judges. We take advantage of this to explore the heterogeneity of the birthday effect.

First, Table 6, Columns 1 and 2 examine the role of in-group bias. Column 1 explores the birthday effect when individuals share the same race as the judge. The sample size is much smaller in this exercise (because the biographical data is often missing) and the results are only marginally significant, but coefficients seem to indicate that the effect is largely driven by same-race gift-giving. Column 2 finds no in-group effects when it comes to gender.

Second, in Column 3 of Table 6, we measure how judicial thinking changes the effect of birthdays. We follow Ash et al. (2017) and investigate this question by using the vocabulary used by judges in their civil case opinions. We measure judges' use of deterrence language and consider it as a proxy for "economic reasoning".[16] We find that judges

[16] Data on deterrence language comes from Ash et al. (2017), which documents the spread of the concept of deterrence in the federal judiciary. A description of how the measure is constructed is in the Appendix C.

below-median in economic thinking are affected by birthdays, decreasing the day component by 0.17, while those above-median in economic thinking are essentially unaffected by birthdays. This result is consistent with the idea that judges are responsible for lower sentences on birthdays. Indeed, if the effect was driven by a change in defendants' behavior on that day we would not see differences based on economic-thinking.

Lastly, Appendix Tables B3 and B4 explore the heterogeneity of the results along cases' and defendants' characteristics (respectively). We show that property offenses—but not drug offenses—benefit from judicial leniency. We also report larger effects for those who undergo the normal procedure and plead guilty, as well as for those who are male (Table B3).

6. Conclusion

We document a birthday effect on decision-makers, unrelated to the quality of cases, in French and U.S. courts. We find consistent evidence with many common links across the two countries. The judges are finding ways to be more lenient on defendant birthdays, consistent with gift giving. Beyond the two court settings we study, our findings could have broader implications. Almost all individuals make decisions embedded in everyday life. Our results suggest that social norms transmitted through rituals can lead to unfair or incorrect decisions in important situations even when professional norms have been designed to mute them.

Declaration of Competing Interest

The author declares that he has no relevant or material financial interests that relate to the research described in this paper.

Data availability

We have attached a cover letter to explain why data cannot be made available in the public domain.

Appendix A. France

Fig. A1, Fig. A2
Table A1, Table A2, Table A3, Table A4, Table A5

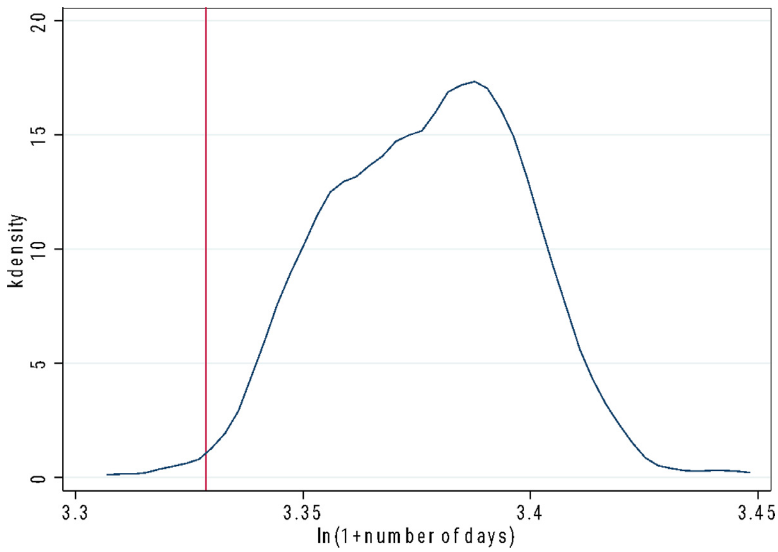
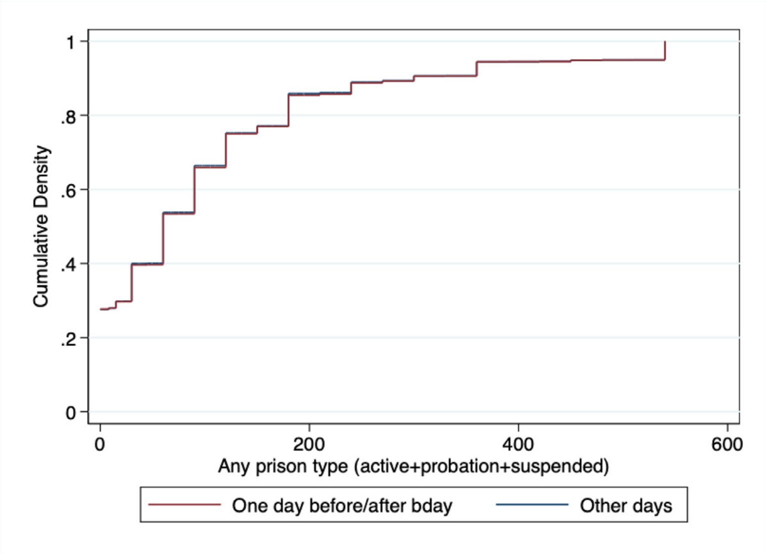
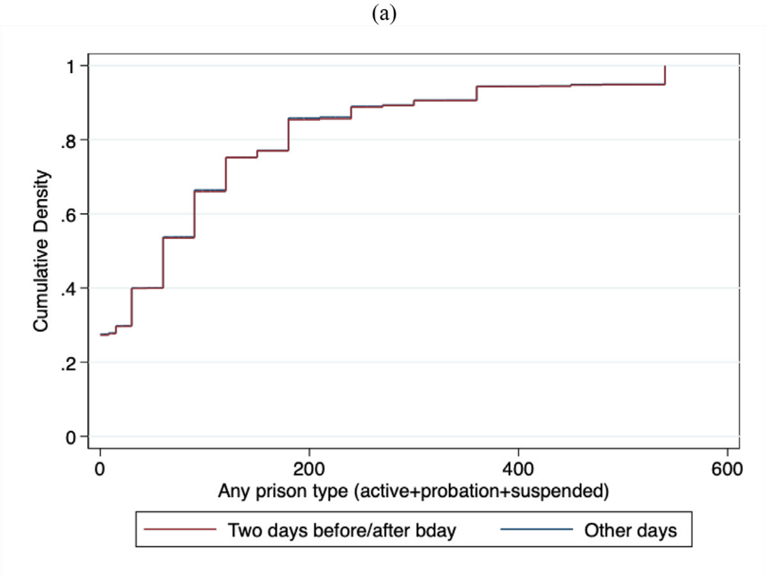


Fig. A1. Distribution of average log-transformed number of days for any prison type for all distances between trial and birthday.
The Figure presents results for French criminal courts. The line presents the distribution for 360 average log-transform number of days. Distances between trials and birthdays go from -180 to +180 days. The grey zones indicate the top and bottom 2.5% of the distribution. The average sentence on birthday is represented by the vertical red line.



(a)



(b)

Fig. A2. Effects of being judged one day (sub-figure a) or two days (sub-figure b) before/after birthday (French criminal courts data).

Table A1
Robustness checks of the effect on any prison type.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	ln(1+ number of days)							ln(1+ number of months)	arc-sinh transform
	Control for case and defendant characteristics	Including day fixed effects	No control	Cluster by court	Cluster by day	Excluding bday on the 1st of the month	Excluding crimes on bday		
Birthday	-0.059**	-0.062**	-0.049**	-0.062***	-0.062**	-0.064**	-0.050*	-0.028***	-0.069**
	(0.024)	(0.025)	(0.021)	(0.023)	(0.026)	(0.026)	(0.026)	(0.011)	(0.029)
1 day	0.0026	-0.0069		-0.0047	-0.0047	-0.0077	-0.0068	-0.00040	-0.0060
before/after	(0.019)	(0.021)		(0.022)	(0.021)	(0.021)	(0.021)	(0.0088)	(0.023)
2 days	0.0058	-0.0013		-0.00015	-0.00015	0.0011	-0.016	-0.0029	0.00062
before/after	(0.019)	(0.021)		(0.018)	(0.021)	(0.021)	(0.021)	(0.0088)	(0.024)
Birthday	0.0069	0.015		0.013	0.013	0.013	0.00088	0.0084	0.014
week	(0.014)	(0.015)		(0.015)	(0.015)	(0.015)	(0.015)	(0.0062)	(0.017)
Constant	3.27***	3.38***	3.38***	3.38***	3.38***	3.38***	3.38***	1.14***	3.87***
Obs	4,261,038	4,261,039	4,261,039	4,261,039	4,261,039	4,090,393	4,235,896	4,261,039	4,261,039

The columns present results for French criminal courts. The dependent variable in Columns 1 to 7 is the log-transformed number of days (plus one) of any prison type. It is the log-transformed number of months of any prison type in Column 8 and the hyperbolic arcsine transform number of days in Column 9. Regression in Column 1 includes control for case (crime types, plea bargaining dummy, time between crime and trial, and court fixed effects) and defendant characteristics (age, sex, French citizenship, and criminal career). Regression in Column 2 includes day fixed effects. Regression in Column 3 only includes the Birthday dummy. In Columns 4 and 5, standard errors are clustered at the court or day level respectively. The sample used in Column 6 excludes defendants who are born on the first of the month (this could reflect ignorance of the real day). The sample used in Column 7 excludes defendants who committed a crime on their birthday.

Table A2
Robustness checks of the effect on active prison (Panel A), probation (Panel B), or suspended prison (Panel C).

	(1) ln(1+ number of days)	(2)	(3)	(4)	(5)	(6) Non 0	(7) Number of days, winsorize 5%	(8) ln(1+ number of months)	(9) arc-sinh transform
	Control for case and defendant characteristics	Including day fixed effects	No control	Cluster by court	Cluster by day				
Panel A: effect on active prison time									
Birthday	-0.037*	-0.044*	-0.035*	-0.044	-0.044*	-0.0082	-1.88**	-0.017*	-0.050*
	(0.022)	(0.025)	(0.020)	(0.031)	(0.025)	(0.0051)	(0.92)	(0.0098)	(0.029)
Constant	1.28***	1.33***	1.33***	1.33***	1.33***	0.28***	39.6***	0.47***	1.52***
Panel B: effect on suspended prison time with probation									
Birthday	-0.022	-0.025	-0.0071	-0.025	-0.025	-0.0037	-0.81	-0.013	-0.028
	(0.022)	(0.023)	(0.018)	(0.021)	(0.022)	(0.0045)	(0.64)	(0.0085)	(0.026)
Constant	0.99***	0.98***	0.98***	0.98***	0.98***	0.20***	25.5***	0.35***	1.11***
Panel C: effect on suspended prison time									
Birthday	-0.0031	-0.0027	-0.017	-0.0022	-0.0022	0.000032	-0.25	-0.0018	-0.0023
	(0.023)	(0.023)	(0.019)	(0.022)	(0.023)	(0.0053)	(0.57)	(0.0078)	(0.027)
Constant	1.26***	1.37***	1.37***	1.37***	1.37***	0.32***	27.6***	0.41***	1.58***
Obs	4,261,038	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039

The columns present results for French criminal courts. The dependent variable in Columns 1 to 5 is the log-transformed number of days (plus one) of the relevant sentence. In Column 6 it is a dummy equal to one if this number is above 0. In Column 7 the outcome is the number of days (not transformed) and in Column 8 the number of days winsorized at the 5% level. It is the log-transformed number of months in Column 8 and the hyperbolic arcsine transform number of days in Column 9. Regression in Column 1 includes control for case (crime types, plea bargaining dummy, time between crime and trial, and criminal career) and defendant characteristics (age, sex, and French citizenship). Regression in Column 2 includes day fixed effects. Regression in Column 3 only includes the Birthday dummy. In Columns 4 and 5, standard errors are clustered at the court or day level respectively.

Table A3
Birthday effect at different cutoffs.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
	Dummies, prison time (any type) equal or above…														
	1 month	2 months	3 months	4 months	5 months	6 months	7 months	8 months	9 months	10 months	11 months	12 months	14 months	16 months	18 months
Birthday	-0.0086	-0.0078	-0.015***	-0.016***	-0.013***	-0.011**	-0.0089**	-0.0084**	-0.0081**	-0.0077**	-0.0064*	-0.0063*	-0.0027	-0.0033	-0.0035
	(0.0052)	(0.0056)	(0.0057)	(0.0054)	(0.0049)	(0.0048)	(0.0039)	(0.0039)	(0.0035)	(0.0035)	(0.0033)	(0.0033)	(0.0026)	(0.0025)	(0.0025)
1 day	0.0011	0.0019	0.0018	0.00016	-0.0015	-0.0019	0.00066	0.00090	-0.0013	-0.0025	-0.0031	-0.0032	-0.0013	-0.00097	-0.0012
before/after	(0.0043)	(0.0045)	(0.0046)	(0.0044)	(0.0040)	(0.0039)	(0.0033)	(0.0032)	(0.0029)	(0.0029)	(0.0027)	(0.0027)	(0.0021)	(0.0021)	(0.0021)
2 days	0.0015	-0.0011	0.00062	-0.0013	-0.0035	-0.0026	0.0011	0.0018	-0.0019	-0.0023	-0.0030	-0.0030	-5.0e-06	0.00019	-0.00024
before/after	(0.0042)	(0.0046)	(0.0046)	(0.0044)	(0.0040)	(0.0039)	(0.0033)	(0.0033)	(0.0029)	(0.0029)	(0.0027)	(0.0027)	(0.0021)	(0.0021)	(0.0021)
Birthday	0.00034	0.0022	0.0022	0.0050	0.0037	0.0037	0.0036	0.0029	0.0038*	0.0038*	0.0039**	0.0039**	0.0012	0.0013	0.0015
week	(0.0030)	(0.0032)	(0.0033)	(0.0031)	(0.0029)	(0.0028)	(0.0023)	(0.0023)	(0.0021)	(0.0021)	(0.0020)	(0.0020)	(0.0015)	(0.0015)	(0.0015)
Constant	0.70***	0.60***	0.46***	0.34***	0.25***	0.23***	0.14***	0.14***	0.11***	0.11***	0.093***	0.093***	0.055***	0.051***	0.050***
Obs	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039	4,261,039

The columns present results for French criminal courts. Birthday is a dummy equal to one if the decision is taken on the defendant's birthday. The second and third explanatory variables are dummies equal to one if the decision is taken one day (respectively, two days) before or after the defendant's birthday. The fourth dependent variable is a dummy equal to one if the decision is taken between three days before and three days after the defendant's birthday.

Table A4
Heterogeneity, crime types.

	(1) Property	(2) Road related crime	(3) Violence	(4) Drug	(5) Verbal assault of a policeman	(6) All except drug
Birthday	-0.0375	-0.0281	-0.0602	-0.163*	-0.106	-0.0525**
	(0.0531)	(0.0431)	(0.0642)	(0.0944)	(0.103)	(0.0264)
1 day	-0.0319	0.00272	0.0213	0.0610	-0.102	-0.0117
before/after	(0.0437)	(0.0351)	(0.0511)	(0.0760)	(0.0853)	(0.0215)
2 days	-0.0342	0.0477	0.00279	0.0205	-0.0756	0.000502
before/after	(0.0433)	(0.0350)	(0.0516)	(0.0778)	(0.0842)	(0.0214)
Birthday	0.0507	-0.0268	0.0264	0.0202	0.0925	0.0128
week	(0.0308)	(0.0249)	(0.0364)	(0.0545)	(0.0604)	(0.0152)
Constant	3.813***	2.805***	4.096***	3.939***	2.780***	3.324***
Observations	861,436	1,318,847	517,048	365,127	239,331	3,895,912

All columns present the effect on the logarithm of the overall number of days plus 1. Birthday is a dummy equal to one if the decision is taken on the defendant's birthday. The second and third explanatory variables are dummies equal to one if the decision is taken one day (respectively, two days) before or after the defendant's birthday. The fourth dependent variable is a dummy equal to one if the decision is taken between three days before and three days after the defendant's birthday. Samples are restricted to the categories mentioned in the header.

Table A5
Heterogeneity, socio-demographic characteristics, and procedure.

	(1) Men	(2) Women	(3) French	(4) Non citizen	(5) Plea	(6) Trial
Birthday	-0.0760***	0.0547	-0.0498*	-0.120*	-0.0457	-0.0644**
	(0.0268)	(0.0829)	(0.0280)	(0.0616)	(0.0692)	(0.0271)
1 day	-0.0256	0.187***	0.000256	-0.0157	0.0723	-0.0161
before/after	(0.0219)	(0.0668)	(0.0228)	(0.0506)	(0.0562)	(0.0221)
2 days	0.00157	-0.0166	0.01000	-0.0480	-0.0104	-0.00108
before/after	(0.0218)	(0.0671)	(0.0228)	(0.0497)	(0.0563)	(0.0220)
Birthday	0.0222	-0.0625	0.00633	0.0478	-0.0210	0.0191
week	(0.0154)	(0.0476)	(0.0162)	(0.0352)	(0.0397)	(0.0156)
Constant	3.417***	3.004***	3.335***	3.587***	2.534***	3.490***
Observations	3,846,740	414,299	3,554,796	706,243	502,468	3,758,571

All columns present the effect on the logarithm of the overall number of days plus 1. Birthday is a dummy equal to one if the decision is taken on the defendant's birthday. The second and third explanatory variables are dummies equal to one if the decision is taken one day (respectively, two days) before or after the defendant's birthday. The fourth dependent variable is a dummy equal to one if the decision is taken between three days before and three days after the defendant's birthday. Samples are restricted to the categories mentioned in the header.

Appendix B. U.S

Fig. B1, Fig. B2, Fig. B3
Table B1, Table B2, Table B3, Table B4

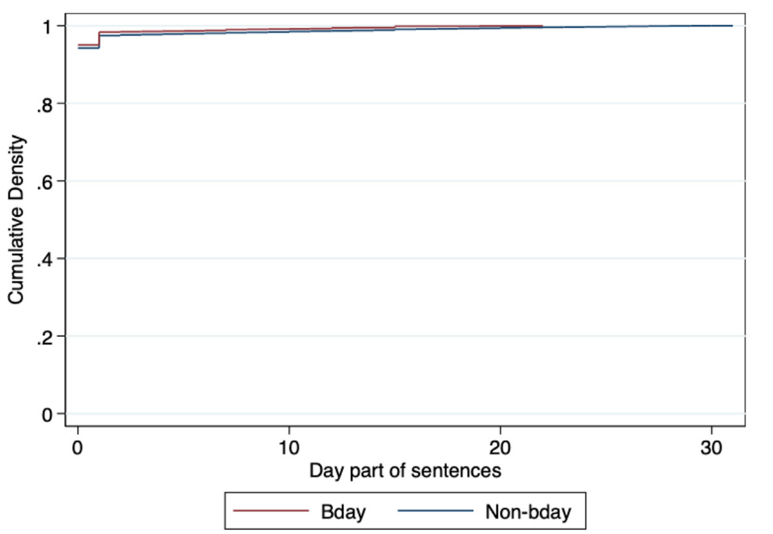
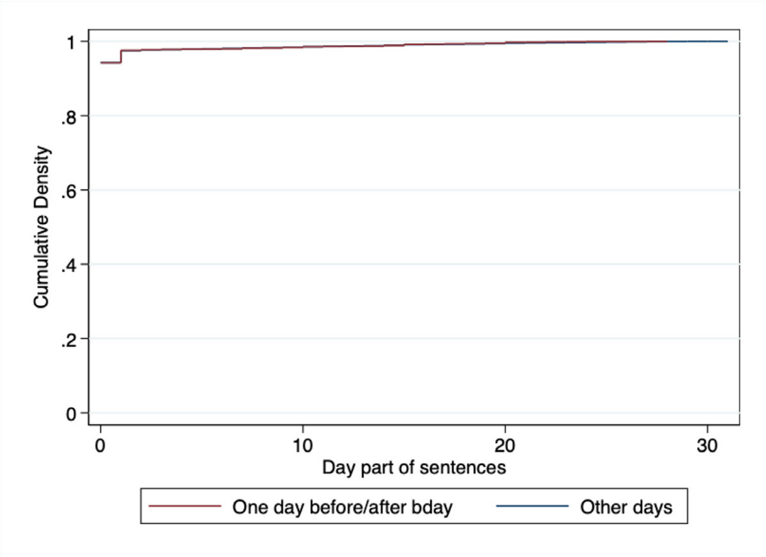
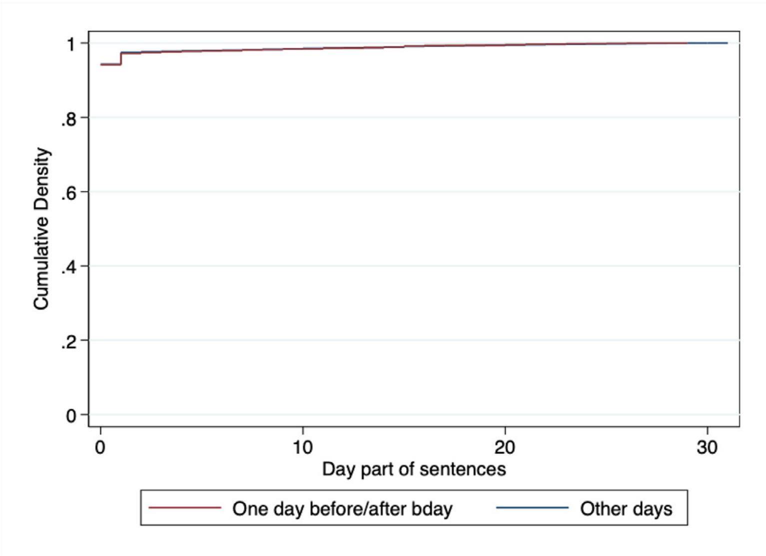


Fig. B1. Effects of being judged on birthdays across the distribution (U.S. federal district courts data).



(a)



(b)

Fig. B2. Effects of being judged one day (sub-figure a) or two days (sub-figure b) before/after birthday (U.S. federal district courts data).

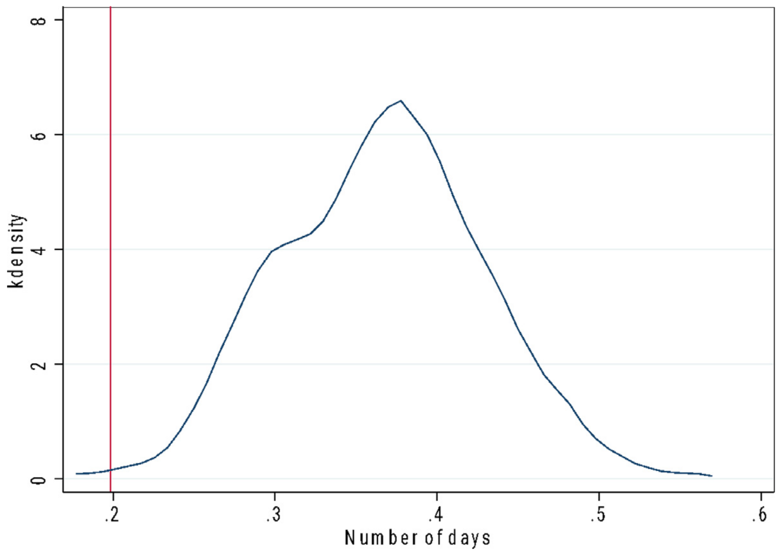


Fig. B3. Distribution of average log-transformed number of days for any prison type for all distances between trial and birthday.
The Figure presents results for U.S. federal district courts. The line presents the distribution for 360 average log-transform number of days. Distances between trials and birthdays go from -180 to +180 days. The grey zones indicate the top and bottom 2.5% of the distribution. The average sentence on birthday is represented by the vertical red line.

Table B1
Robustness checks of the main effect.

	(1) Day component	(2)	(3)	(4)	(5)	(6)
	Control for case and defendant characteristics	Including day fixed effects	Including judge fixed effects	No control	Cluster by court	Cluster by day
Birthday	-0.11**	-0.15***	-0.081	-0.17***	-0.13***	-0.13**
	(0.053)	(0.053)	(0.060)	(0.036)	(0.040)	(0.053)
1 day	0.022	0.020	0.050		0.020	0.020
before/after	(0.055)	(0.056)	(0.073)		(0.030)	(0.056)
2 days	0.063	0.033	0.12		0.037	0.037
before/after	(0.057)	(0.057)	(0.081)		(0.057)	(0.057)
Birthday	-0.043	-0.032	-0.027		-0.036	-0.036
week	(0.039)	(0.040)	(0.050)		(0.025)	(0.039)
Constant	0.42***	0.37***	0.20***	0.37***	0.37***	0.37***
Observations	574,785	592,418	178,830	592,844	592,844	592,844

The columns present results for U.S. federal district courts. The outcome variable is the day part of the sentences. Regression in Column 1 includes control for case (crime type and year and month of the decision) and defendant characteristics (age, sex, race, and education). Regressions in Columns 2 and 3 include day or judged fixed effects respectively. Regression in Column 4 only includes the Birthday dummy. In Columns 5 and 6, standard errors are clustered at the court or day level respectively.

Table B2
Robustness checks of the deferential effect when the month component is equal to 12 months.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Day component						
		Control for case and defendant characteristics	Including day fixed effects	Including judge fixed effects	No control	Cluster by court	Cluster by day
Birthday	-0.13**	-0.11**	-0.15***	-0.084	-0.18***	-0.14***	-0.14***
	(0.055)	(0.054)	(0.054)	(0.060)	(0.037)	(0.040)	(0.054)
Birthday *12-month	0.012	0.13*	0.12	0.063	0.17**	0.17**	0.17***
sentence	(0.13)	(0.073)	(0.076)	(0.12)	(0.067)	(0.061)	(0.065)
1 day	0.023	0.020	0.017	0.048		0.018	0.018
before/after	(0.058)	(0.055)	(0.056)	(0.073)		(0.030)	(0.056)
2 days	0.041	0.062	0.032	0.12		0.036	0.036
before/after	(0.058)	(0.057)	(0.057)	(0.081)		(0.057)	(0.057)
Birthday	-0.041	-0.042	-0.030	-0.025		-0.035	-0.035
week	(0.041)	(0.039)	(0.040)	(0.050)		(0.025)	(0.039)
12-month	0.30***	0.25***	0.30***	0.46***	0.30***	0.30***	0.30***
sentence	(0.0083)	(0.0089)	(0.0084)	(0.011)	(0.0083)	(0.040)	(0.0094)
1 day before/after	-0.14						
* 12 months sentence	(0.16)						
2 days before/after	-0.14						
* 12 months sentence	(0.18)						
Birthday week	0.16						
* 12 months sentence	(0.11)						
Constant	0.35***	0.41***	0.35***	0.18***	0.35***	0.35***	0.35***
Observations	592,844	574,785	592,418	178,830	592,844	592,844	592,844

The columns present results for U.S. federal district courts. The outcome variable is the day part of the sentences. Regression in Column 1 includes control for case (crime type and year and month of the decision) and defendant characteristics (age, sex, race, and education). Regressions in Columns 2 and 3 include day or judged fixed effects respectively. Regression in Column 4 only includes the Birthday dummy. In Columns 5 and 6, standard errors are clustered at the court or day level respectively.

Table B3
Heterogeneity, crime types and procedure.

	(1)	(2)	(3)	(4)	(5)
	Day component without 12-month sentences				
	Property	Violence	Drug	Plea bargaining	Trial
Birthday	-0.17	-0.18	-0.048	-0.14*	-0.025
	(0.11)	(0.14)	(0.087)	(0.077)	(0.16)
1 day	-0.013	0.12	0.014	0.021	0.019
before/after	(0.093)	(0.12)	(0.073)	(0.063)	(0.13)
2 days	0.021	-0.11	0.035	0.041	0.015
before/after	(0.093)	(0.12)	(0.072)	(0.063)	(0.13)
Birthday	0.016	0.082	-0.048	-0.035	-0.091
week	(0.066)	(0.085)	(0.051)	(0.045)	(0.096)
Constant	0.28***	0.15***	0.23***	0.39***	0.12***
Observations	170,899	59,237	244,384	551,511	41,333

The columns present results for U.S. federal district courts. The outcome variable is the day part of the sentences. Birthday is a dummy equal to one if the decision is taken on the defendant's birthday. The second and third explanatory variables are dummies equal to one if the decision is taken one day (respectively, two days) before or after the defendant's birthday. The fourth dependent variable is a dummy equal to one if the decision is taken between three days before and three days after the defendant's birthday. Samples are restricted to the categories mentioned in the header.

Table B4
Heterogeneity: socio-demographic characteristics.

	(1)	(2)	(3)	(4)	(5)	(6)
	Day component without 12-month sentences					
	Men	Women	US citizen	Non citizen	No education	Some education
Birthday	-0.16**	0.023	-0.064	-0.25	-0.089	-0.12
	(0.079)	(0.19)	(0.058)	(0.20)	(0.13)	(0.079)
1 day before/after	0.025	-0.0053	-0.0041	0.048	-0.0027	0.036
	(0.064)	(0.16)	(0.048)	(0.16)	(0.10)	(0.065)
2 days before/after	-0.013	0.30*	0.0085	0.16	0.14	-0.0065
	(0.065)	(0.15)	(0.048)	(0.16)	(0.10)	(0.065)
Birthday week	-0.016	-0.15	0.0012	-0.12	-0.076	0.0090
	(0.046)	(0.11)	(0.034)	(0.12)	(0.073)	(0.046)
Constant	0.36***	0.40***	0.18***	0.78***	0.44***	0.24***
Observations	503,999	88,019	405,091	171,066	241,182	316,193

The columns present results for U.S. federal district courts. The outcome variable is the day part of the sentences. Birthday is a dummy equal to one if the decision is taken on defendant's birthday. The second and third explanatory variables are dummies equal to one if the decision is taken one day (respectively, two days) before or after the defendant's birthday. The fourth dependent variable is a dummy equal to one if the decision is taken between three days before and three days after the defendant's birthday. Samples are restricted to the categories mentioned in the header.

Appendix C. Economics language in judicial opinions

To score judges, Ash et al. (2017) calculate the relative frequency of deterrence in each opinion of a judge. As normalization steps, they remove punctuation, capitalization, functional stop words, numbers, and word endings. Then, for each opinion i, they have a frequency F_i. One potential concern is that the measure may simply pick up public discourse within that year, so they normalize this by the relative word frequency of deterrence in Google Books. Then, they take the average deterrence score for judges in a year to get a deterrence style, which is then demeaned by the district-year average of that year to calculate the relative intensity of deterrence language relative to other judges. Finally, they take the average score across years of a judge's career.

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