Extraneous factors in judicial decisions

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Are judicial rulings based solely on laws and facts? Legal formalism holds that judges apply legal reasons to the facts of a case in a rational, mechanical, and deliberative manner. In contrast, legal realists argue that the rational application of legal reasons does not sufficiently explain the decisions of judges and that psychological, political, and social factors influence judicial rulings. We test the common caricature of realism that justice is "what the judge ate for breakfast" in sequential parole decisions made by experienced judges. We record the judges' two daily food breaks, which result in segmenting the deliberations of the day into three distinct "decision sessions." We find that the percentage of favorable rulings drops gradually from ≈65% to nearly zero within each decision session and returns abruptly to ≈65% after a break. Our findings suggest that judicial rulings can be swayed by extraneous variables that should have no bearing on legal decisions.

decisionmaking | legal realism | mental depletion | expert decisionmaking | ego depletion

Does the outcome of legal cases depend solely on laws and facts? Legal formalism holds that judges apply legal reasons to the facts of a case in a rational, mechanical, and deliberative manner (1, 2). An alternative view of the law—encapsulated in the highly influential 20th century legal realist movement—is rooted in the observation of US Supreme Court Justice Oliver Wendell Holmes that "the life of the law has not been logic; it has been experience" (3). Realists argue that the rational application of legal reasons does not sufficiently explain judicial decisions and that psychological, political, and social factors influence rulings as well (4). The realist view is commonly caricaturized by the trope that justice is "what the judge ate for breakfast" (5). We empirically test this caricature in the context of sequences of parole decisions made by experienced judges (mean experience = 22.5 y, SD = 2.5) and, in so doing, demonstrate how extraneous factors can sway highly consequential decisions of expert decision makers.

Prior research suggests that making repeated judgments or decisions depletes individuals' executive function and mental resources (6), which can, in turn, influence their subsequent decisions. For instance, sequential choices between consumer goods can lead to an increase in intuitive decisionmaking (7) as well as a reduced tolerance for pain in a subsequent task (8). Sequential choices and the apparent mental depletion that they evoke also increase people's tendency to simplify decisions by accepting the status quo. German car buyers, for instance, were more likely to accept the default attribute level offered by a manufacturer later in a sequence of attribute decisions than earlier, particularly when these choices followed decisions between many alternatives that had required more mental resources to evaluate (9). These studies hint that making repeated rulings can increase the likelihood of judges to simplify their decisions. We speculate that as judges advance through the sequence of cases (whose order appears to be exogenously determined; see below for a detailed discussion), they will be more likely to accept the default, status quo outcome: deny a prisoner's request.

Materials and Methods

Our data consist of 1,112 judicial rulings, collected over 50 d in a 10-mo period, by eight Jewish-Israeli judges (two females) who preside over two different parole boards that serve four major prisons in Israel. Our prisoner sample consisted of 727 Jewish-Israeli males (65.3%), 326 Arab-Israeli males (29.3%), 50 Jewish-Israeli females (4.5%), and 9 Arab-Israeli females (0.9%). The two parole boards process ∼40% of all parole requests in the country. The prisons house felons convicted of crimes such as embezzlement, assault, theft, murder, and rape. Each parole board is composed of one judge, as well as a criminologist and a social worker who provide the judge with professional advice. For each day we obtained the entire set of rulings. The majority of the decisions in our sample (78.2%) consist of parole requests; the remainder consist of parolee requests to change the terms of their parole (e.g., a request to remove a tracking device) or requests by parole candidates to change the terms of their incarceration (e.g., a request for prison relocation). Our database includes the legal variables that appear in the case file: number of previous incarcerations, gravity of crime committed, months served, and whether a rehabilitation program would be available should the prisoner be granted parole (98.3% of prisoners had such a program in place). [A judge with 40 years of experience on the bench, two criminal attorneys, and two prison wardens with 10 years experience serving on the parole board, independently ordered the gravity of offense for the 7 classes of crimes committed. Ordering was identical for the five experts, and ranged from misdemeanor (1) to felony (7).] The judge was not provided these details in advance; the information was provided by a clerk only when the prisoner (and his or her attorney) appeared before the parole board. Every day a judge considered 14–35 cases (see *SI Materials and Methods, S1* for details) in succession (M = 22.58, SD = 4.67), and each case deliberation lasted ≈6 min (M = 5.98, SD = 5.13, Max = 40.00). Our data include the time of day in which the prisoner's request was considered and its ordinal position in the sequence of decisions for that day.

Executive function can be restored and mental fatigue overcome, in part, by interventions such as viewing scenes of nature (10), short rest (11), experiencing positive mood (12), and increasing glucose levels in the body (ref. 13; for a review see ref. 14). In our data, we record the two daily food breaks that the judge takes—a late morning snack and lunch—which serve to break up the day's deliberations into three distinct "decision sessions." Such a break may replenish mental resources by providing rest, improving mood, or by increasing glucose levels in the body. The meal is typically served to the judge at the bench and its timing, which is determined by the judge, varies by day. In our sample, the start time of the morning food break ranged between 9:49 and 10:27 AM (snack consisting of a sandwich and fruit) and lasted an average of 38.48 min (SD = 20.50, min = 6, max = 106); the start time of the afternoon (lunch) break ranged between 12:46 and 2:10 PM and lasted an average of 57.37 min (SD = 22.00, min = 15, max = 110). The breaks were taken after an average of 7.8 cases (SD = 4.51, min = 2, max = 28) in the morning session and 11.4 cases (SD = 5.14, min = 2, max = 25) in the postsnack/prelunch session. Thus, our data enable us to test the effect of the ordinal position of a case on the judge's decision and the effect of the judge having taken a break to eat.

The judges' decisions are classified into two categories, "accept request" and "reject request." Under the reject category, we include both final rejections as well as rejections that include a stipulation for review at a later date (such delay decisions constitute 48.4% of the reject category). On average, such reviews occur ≈1 mo after the initial parole board review. Thus, a decision to delay effectively maintains the status quo for the prisoner. Overall, 64.2% of prisoner requests in our sample were rejected.

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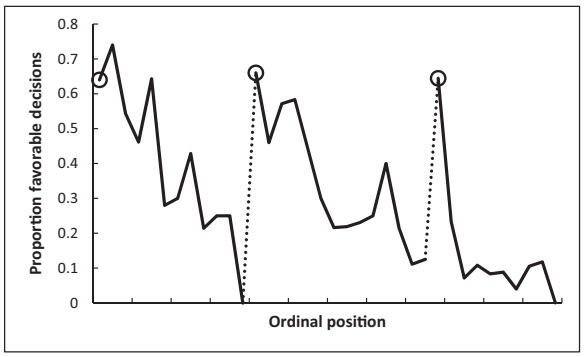

Fig. 1. Proportion of rulings in favor of the prisoners by ordinal position. Circled points indicate the first decision in each of the three decision sessions; tick marks on *x* axis denote every third case; dotted line denotes food break. Because unequal session lengths resulted in a low number of cases for some of the later ordinal positions, the graph is based on the first 95% of the data from each session.

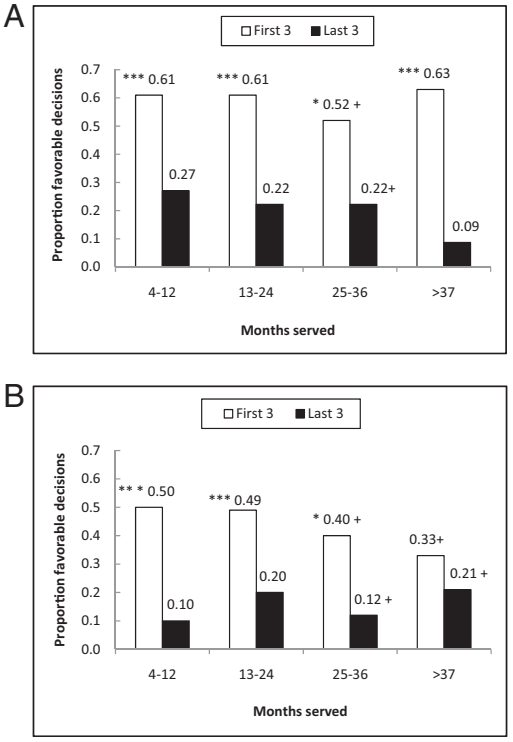

Fig. 2. Proportion of favorable decisions for male felons with a rehabilitation program as a function of ordinal position, months served, and previous incarcerations. These histograms reflect the first three versus the last three decisions collapsed over the three decisions sessions. They are for illustrative purposes and are based on a subsample of the data. Plus signs (+) indicate cell sizes of <20. (*A*) Data for prisoners with no previous incarcerations. (*B*) Data for prisoners with one previous incarceration. Asterisks indicate results of a difference between proportions test. *$P < 0.1$, **$P < 0.05$, ***$P < 0.01$.

Results

We find that the likelihood of a favorable ruling is greater at the very beginning of the work day or after a food break than later in the sequence of cases. This pattern is readily evident in Fig. 1, which plots the proportion of favorable rulings by ordinal position for 95% of the observations in each decision session. The plot shows that the likelihood of a ruling in favor of a prisoner spikes at the beginning of each session—the probability of a favorable ruling steadily declines from ≈0.65 to nearly zero and jumps back up to ≈0.65 after a break for a meal. Fig. 2 *A* and *B* presents a histogram of the probability of a favorable ruling for cases of similar legal characteristics that appeared in one of the three ordinal positions at the beginning versus at the end of a decision session; from the perspective of the prisoner, there is a clear advantage to appearing at the beginning of the session (i.e., either at the beginning of the day or immediately following the break).

To account for the possible role of covariates in the patterns depicted in Figs. 1 and 2, we used a logistic regression with rulings as the dependent variable and a judge-specific fixed effect to control for the idiosyncratic tendencies of each judge (Table 1). The key predictors were several different indicators of a case's ordinal position: (*i*) dummy variables indicating the first three cases in a session, included to examine how judgments immediately after a break differ from those that preceded or succeeded them; (*ii*) dummies indicating in which of the three daily sessions the case had appeared; and (*iii*) two types of ordinal position counters (one indicating the ordinal position within the session and the other indicating the ordinal position within the day, each used in a different regression specification). The covariates included all of the legal attributes of the case that were available in the case file (severity of crime, months served, previous incarcerations, and rehabilitation program), prisoner demographics (sex, nationality), and the proportion of favorable rulings to that point in the day. The purpose of the latter was to control for the possibility that the judges have a daily "quota" of favorable decisions that they expect to render, which, once filled, are followed by unfavorable decisions.

The positive sign and significance of the dummy variables indicating the first three cases in each session confirms that the pattern in Fig. 1 holds even while controlling for the legal attributes of the case and for the overall tendency of the judges to rule against the prisoner as the number of cases before them mounts (i.e., the main effect of making repeated decisions). The results are nearly identical when we restrict our analysis only to parole requests (Table S1) and in analyses where we drop the two most frequently occurring judges (Table S2) and each of the judges in our sample (Tables S3–S10). In addition, a plot similar to Fig. 2 for each judge shows that every judge in our sample was more likely to rule in favor of a prisoner at the beginning of a session than at the end of a session (Fig. S1). Nested model tests indicate that adding the ordinal position variables leads to better model fit (Table S11). Therefore, although our data do not allow us to test directly whether justice is what the judge had for breakfast, they do suggest that judicial decisions can be influenced by whether the judge took a break to eat.

We conducted an additional analysis to test the statistical robustness of the linear trend that is apparent between breaks in Fig. 1; regardless of the ordinal position counter we used, the trend was significant and negative (Table S12). We also conducted an analysis using cumulative minutes elapsed in a session in lieu of the ordinal position dummies as a predictor, as well as our control variables. Cumulative minutes serve as a proxy for mental fatigue among the judges. Similar to the results presented in Table 1, this analysis shows that as cumulative time within a session increases, the likelihood of a favorable ruling decreases (Table S13 and Fig. S2). However, note that in an analysis that included both the cumulative minutes variable and the ordinal position counter, only the latter was significant (Table S14). This analysis hints that the apparent depletion exhibited by the judges is due to the act of making decisions rather than simply elapsed time (this interpretation should be viewed in light of the high correlation between cumulative minutes and ordinal position, $r = 0.72$, $P < 0.0001$). Two indicators support our view that rejecting requests is an easier decision—and, thus, a more likely outcome—when judges are mentally depleted: (*i*) favorable rulings took significantly longer ($M = 7.37$ min, SD = 5.11) than unfavorable rulings ($M = 5.21$, SD = 4.97), $t = 6.86$, $P < 0.01$, and (*ii*) written verdicts

Table 1. Results of analysis using dummies for the first three decisions in a session

Variable	Specification 1	2	3	4
Overall decision count	−0.078*** (0.020)	—	−0.080*** (0.021)	—
Overall count including nondecisions	—	−0.111*** (0.018)	—	−0.111*** (0.019)
Session 1/decision 1	0.850** (0.377)	0.670* (0.370)	—	—
Session 1/decision 2	1.366*** (0.383)	1.236*** (0.381)	1.409*** (0.387)	1.268*** (0.383)
Session 1/decision 3	0.374 (0.351)	0.270 (0.351)	0.336 (0.354)	0.261 (0.353)
Session 2/decision 1	1.055*** (0.355)	0.789** (0.359)	1.064*** (0.358)	0.809** (0.362)
Session 2/decision 2	0.259 (0.337)	0.042 (0.341)	0.221 (0.339)	0.026 (0.343)
Session 2/decision 3	0.761** (0.337)	0.592* (0.339)	0.735** (0.339)	0.583* (0.340)
Session 3/decision 1	2.873*** (0.425)	2.677*** (0.431)	2.805*** (0.425)	2.642*** (0.431)
Session 3/decision 2	0.888** (0.453)	0.677 (0.460)	0.818* (0.456)	0.644 (0.462)
Session 3/decision 3	−0.340 (0.660)	−0.520 (0.666)	−0.410 (0.662)	−0.555 (0.667)
Session 1	−0.341 (0.247)	−0.788*** (0.263)	−0.478* (0.253)	−0.874*** (0.265)
Session 3	−1.064*** (0.321)	−0.608* (0.334)	−0.943*** (0.326)	−0.542 (0.338)
Severity of offense	0.051 (0.096)	0.068 (0.097)	0.018 (0.099)	0.039 (0.101)
Previous imprisonments	−0.241*** (0.059)	−0.234*** (0.059)	−0.228*** (0.061)	−0.222*** (0.062)
Months served	−0.004 (0.003)	−0.004 (0.003)	−0.004 (0.003)	−0.004 (0.003)
Rehabilitation program	2.465*** (0.809)	2.415*** (0.825)	1.974** (0.845)	1.907** (0.862)
Ethnicity (0 = Jew, 1 = Arab)	−0.204 (0.156)	−0.227 (0.157)	−0.177 (0.160)	−0.198 (0.161)
Sex (0 = male, 1 = female)	−0.201 (0.299)	−0.218 (0.301)	−0.158 (0.305)	−0.172 (0.307)
Proportion favorable decisions	—	—	0.937*** (0.333)	0.631* (0.339)
−2 Log likelihood	1135.215	1110.609	1067.232	1045.706

This table presents various fixed effects logistic regression specifications. The session x/decision y parameters are dummy variables that indicate the first three decisions in each of the three sessions. Note that in specifications 3 and 4 there is no value for the very first decision of the day because the regression includes a term for proportion of favorable decisions, which requires there to have been at least one other decision that day. Ethnicity and sex are dummy variables. SEs appear in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

of favorable rulings were significantly longer (M = 89.61 words, SD = 65.46) than written verdicts of unfavorable rulings (M = 47.36 words, SD = 43.99), $t = 12.82$, $P < 0.01$.

Of the legally relevant control variables entered in the regressions, only the prior number of incarcerations of the prisoner and the presence of a rehabilitation program consistently exerted a statistically significant influence on the judges' rulings. Prisoners who displayed a tendency toward recidivism were less likely to receive favorable judgments, as were prisoners who lacked a planned rehabilitation program. The severity of the prisoner's crime and prison time served tended not to exert an effect on rulings, nor did sex and ethnicity. The lack of a significant effect of prisoner ethnicity indicates that the Jewish-Israeli judges in our sample treated prisoners equally regardless of ethnicity. Although previous research does hint at the presence of effects of prisoners' and judges' race on sentencing decisions, in some cases, as in ours, such effects are weak or absent (15–18).

A key aspect for interpreting the association between the ordinal position of a case and parole decisions is whether an unobserved factor determines case order in such a way that yields the pattern of results we obtain. For instance, if prisoners without a rehabilitation program or recidivists were somehow more likely

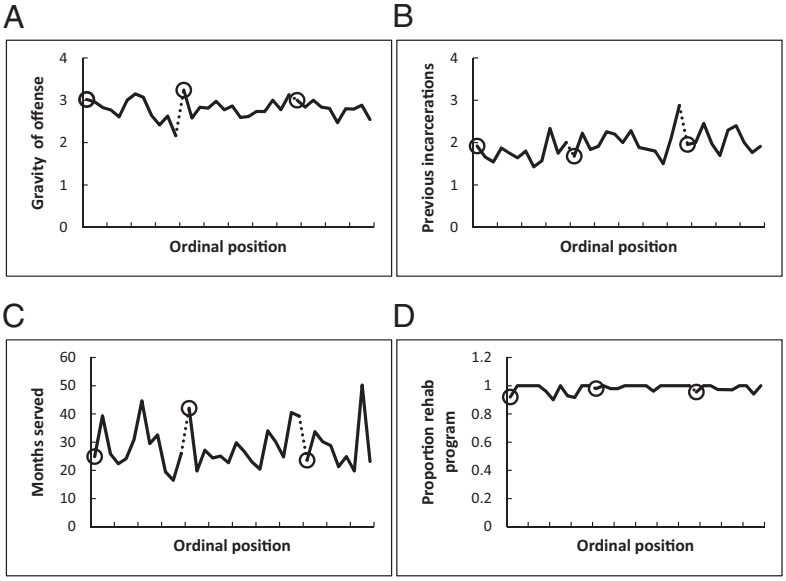

Fig. 3. Mean level of control variables by ordinal position. Circled points indicate the first decision in each of the three sessions; tick marks on x axis denote every third case; dotted lines denote food break. (*A*) Data for gravity of offense. (*B*) Data for previous incarcerations. (*C*) Data for months served. (*D*) Data reflecting the proportion of prisoners with a rehabilitation program. Because unequal session lengths resulted in a low number of cases for some of the later ordinal positions, the graphs are based on the first 95% of the data from each session.

to appear before a food break, we would naturally find a greater proportion of rejections occurring before the food break as well. A number of procedural factors preclude this possibility.

First and most critically, the judge both determines when the break will occur during the course of the day's proceedings and is unaware of the details of the upcoming cases. Thus, the judge cannot decide when to take a break based on information related to the nature of the upcoming cases. So, in the example above, a judge cannot decide to take a break because he or she knows that prisoners after the break will have no previous incarceration record. Relatedly, the type of case (e.g., severity of the crime) that the judge had just ruled on exerted no significant effect on the likelihood of taking a break (Table S15). Furthermore, the large variability in break start times and durations attests to the fact that their occurrence would be nearly impossible to predict by any of the prison staff involved in the parole proceedings.

Second, the ordinal position of cases is, with rare exception, determined by the arrival time of the prisoner's attorney. The attorneys are sequestered in a room where they are unable to view the proceedings of the board and, therefore, are unaware of any of the rulings of the judge, how many prisoners preceded their client's case, or when and whether the food break occurred (after the board's deliberations, attorneys exit through a different door). Thus, by design they cannot learn about the advantage of appearing after a break. Indeed, a survey administered to a sample of these attorneys after the primary data collection period indicated that they were unaware of the effect of ordinal position on rulings (see *SI Materials and Methods, S2* for details). A similar survey administered to parole board members (judges, criminologists, and social workers) revealed the same results (see *SI Materials and Methods, S3* for details).

Because of the factors discussed above, we did not expect significant correlations between ordinal position within either the day or the session and the control variables in our data (*SI Materials and Methods, S4* and Table S16). Consistent with our expectations, there does not appear to be a deliberate ordering based on the characteristics of the prisoners (Fig. 3 *A–D* and *SI Materials and Methods, S4*); certainly there appears to be no effect of a food break on the type of prisoner appearing before the judge. Note that although there was a slight but significant correlation between recidivism and ordinal position in the day, this correlation was not significant within a decision session, i.e., between breaks. Thus, it cannot explain the spikes in favorable decisions after breaks.

Another factor that can plausibly explain our effect is that judges might have a certain proportion of decisions that they expect to be favorable, and once this "quota" is filled, then unfavorable decisions follow. As we explain earlier, we tested this possibility empirically by including a variable that computed the proportion of favorable decisions up to that point in the day (Table 1, specifications 3 and 4). Regardless of the analysis we conducted, the parameter estimate was positive and significant, suggesting that a judge who made a large proportion of favorable rulings up to a certain point was, in fact, more likely to rule favorably in a subsequent case.

Discussion

We have presented evidence suggesting that when judges make repeated rulings, they show an increased tendency to rule in favor of the status quo. This tendency can be overcome by taking a break to eat a meal, consistent with previous research demonstrating the effects of a short rest, positive mood, and glucose on mental resource replenishment (11–13). However, we cannot unequivocally determine whether simply resting or eating restores the judges' mental resources because each of the breaks was taken for the purpose of eating a meal. We also cannot ascertain whether taking a break improved the judges' mood because mood was not measured in our study. Furthermore, although we interpret our findings through the lens of mental depletion, we do not have a direct measure of the judges' mental resources and, thus, cannot assess whether these change over time. Nevertheless, our results do indicate that extraneous variables can influence judicial decisions, which bolsters the growing body of evidence that points to the susceptibility of experienced judges to psychological biases (19, 20; for a review, see ref. 21). Finally, our findings support the view that the law is indeterminate by showing that legally irrelevant situational determinants—in this case, merely taking a food break—may lead a judge to rule differently in cases with similar legal characteristics.

Although our focus has been on expert legal decisions, we suspect the presence of other forms of decision simplification strategies for experts in other important sequential decisions or judgments, such as legislative decisions, medical decisions, financial decisions, and university admissions decisions. Our findings add to the literature that documents how experts are not immune to the influence of extraneous irrelevant information (22–24). Indeed, the caricature that justice is what the judge ate for breakfast might be an appropriate caricature for human decisionmaking in general.

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1. Leiter B (2005) *The Blackwell Guide to Philosophy of Law and Legal Theory*, eds Edmundson W, Golding M (Blackwell, Oxford), pp 50–66.
2. Neuborne B (1992) Of sausage factories and syllogism machines: Formalism, realism and exclusionary selection techniques. *NYU L Rev.* 67:419–449.
3. Holmes OW (1881) *The Common Law* (Little, Brown, Boston).
4. Frank J (1930) *Law and the Modern Mind* (Brentano's, New York).
5. Kozinski A (1993) What I ate for breakfast and other mysteries of judicial decision making. *Loyola LA L Rev* 26:993.
6. Muraven M, Baumeister RF (2000) Self-regulation and depletion of limited resources: Does self-control resemble a muscle? *Psychol Bull* 126:247–259.
7. Pocheptsova A, Amir O, Dhar R, Baumeister RF (2009) Deciding without resources: Resource depletion and choice in context. *J Mkt Res* 46:344–355.
8. Vohs KD, et al. (2008) Making choices impairs subsequent self-control: A limited-resource account of decision making, self-regulation, and active initiative. *J Pers Soc Psychol* 94:883–898.
9. Levav J, Heitmann H, Herrmann A, Iyengar SS (2010) Order in product customization decisions: Evidence from field experiments. *J Polit Econ* 118:274–299.
10. Kaplan R, Kaplan S (1989) *The Experience of Nature: A Psychological Perspective* (Cambridge Univ Press, New York).
11. Tyler JM, Burns KC (2008) After depletion: The replenishment of the self's regulatory resources. *Self Ident* 7:305–321.
12. Tice DM, Baumeister RF, Shmueli D, Muraven M (2007) Restoring the self: Positive affect helps improve self-regulation following ego depletion. *J Exp Soc Psychol* 43:379–384.
13. Gailliot MT, Baumeister RF (2007) The physiology of willpower: Linking blood glucose to self-control. *Pers Soc Psychol Rev* 11:303–327.
14. Hagger MS, Wood C, Stiff C, Chatzisarantis NLD (2010) Ego depletion and the strength model of self-control: a meta-analysis. *Psychol Bull* 136:495–525.
15. Steffensmeier D, Britt CL (2001) Judges'race and judicial decision making: Do black judges sentence differently. *Soc Sci Q* 82:749–764.
16. Gazal-Eyal O, Sulitzeanu-Kenan R (2010) Let my people go: Ethnic in-group bias in judicial decisions-Evidence from a randomized natural experiment. *Journal of Empir Leg Stud* 7:403–428.
17. Blair IV, Judd CM, Chapleau KM (2004) The influence of Afrocentric facial features in criminal sentencing. *Psychol Sci* 15:674–679.
18. Spohn C.C (2000) *Criminal Justice 2000: Vol. 3. Policies, Processes, and Decisions of the Criminal Justice System*, ed Horney J (US Department of Justice, Washington, DC), pp 427–501.
19. Guthrie C, Rachlinski JJ, Wistrich AJ (2001) Inside the judicial mind. *Cornell Law Rev* 86:777–830.
20. Guthrie C, Rachlinski JJ, Wistrich AJ (2007) Blinking on the bench: How judges decide cases. *Cornell Law Rev* 93:1–44.
21. Vidmar N (2011) The psychology of trial judging. *Curr Dir Psychol Sci* 20:58–62.
22. Northcraft GB, Neale MA (1987) Experts, amateurs, and real estate: An anchoring-and-adjustment perspective on property pricing decisions. *Organ Behav Hum Decis Process* 39:228–241.
23. Englich B, Mussweiler T, Strack F (2006) Playing dice with criminal sentences: The influence of irrelevant anchors on experts' judicial decision making. *Pers Soc Psychol Bull* 32: 188–200.
24. Dhami MK (2003) Psychological models of professional decision making. *Psychol Sci* 14:175–180.

Supporting Information

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SI Materials and Methods

S1. Number of Cases Viewed by the Judge. The total number of cases the judge viewed in a day was greater than what we report in the main text ($M = 27.86$, SD = 4.43). The reason for the discrepancy is that some cases are brought before the judge after the state prosecutor and defense attorney had already come to a resolution regarding the prisoner's request and were simply presenting the agreement to the judge for final approval. In our sample, the judge approved every agreement. This situation is almost universally the case also outside our sample. Thus, we omit these cases because they do not represent actual decisions by the judge about which party to favor and, hence, cannot be used in our empirical test.

S2. Survey of Attorneys. To ascertain whether the criminal defense attorneys who represent the prison population in our study were aware of a possible effect of order on judicial decisions, we distributed a survey among 23 lawyers of varying levels of experience ($M = 9.8$ y experience, SD = 8.3). They were asked to indicate the factors they thought influence a decision by a judge to grant/deny parole. The four most frequently mentioned factors were having a rehabilitation program in place ($n = 22$, 95.6%), the number of previous incarcerations ($n = 17$, 73.9%), severity of the offense ($n = 13$, 56.5%), and prisoner behavior during the incarceration ($n = 10$, 43.4%). No other factor was mentioned by more than 6 lawyers (26%). None of the lawyers mentioned ordinal position.

Next, on a 1–7 scale ranging from 'not at all' (1) to 'to a large degree' (7), the lawyers were asked to rate the extent to which severity of offense, prisoner ethnicity, prisoner sex, months incarcerated, number of previous incarcerations, having a rehabilitation program in place, the ordinal position of the case in the case sequence, prisoner age, prisoner health, sex of the judge, and the marital status of the prisoner influences the decision of the judge to grant/deny parole. Number of previous incarcerations ($M = 6.13$, SD = 0.91), having an approved rehabilitation program ($M = 6.0$, SD = 1.17), severity of offense ($M = 5.65$, SD = 1.33), and months in prison ($M = 5.21$, SD = 1.34) were rated as the most influential factors. The least influential factors were ordinal case position ($M = 2.78$, SD = 1.44) and prisoner ethnicity ($M = 2.65$, SD = 1.36). The importance score for ordinal case position was significantly lower (all P values <0.0001) than that of each of the four most influential factors.

In summary, using two different measures, we do not find evidence to suggest that a sample of the lawyers present at the parole hearings are aware of the strong effect that ordinal case position can have on rulings.

S3. Survey of Parole Board Members. In addition to surveying the lawyers, we also investigated whether members of the parole board were aware of the effect of order. Sixteen parole board members were asked to rate the extent to which severity of offense, prisoner ethnicity, prisoner sex, months incarcerated, number of previous incarcerations, having a rehabilitation program in place, the ordinal position of the case in the case sequence, prisoner age, prisoner health, the quality of the lawyer, the mood of the judge, prison location, the season in the year and the marital status of the prisoner influences the decision of the judges to grant/deny parole. Fourteeen members completed this part of the survey. Having an approved rehabilitation program ($M = 6.50$, SD = 0.65), number of previous incarcerations ($M = 5.85$, SD = 0.86), severity of offense ($M = 5.14$, SD = 1.23), and months in prison ($M = 4.07$, SD = 1.49) were rated as the most influential factors. The least influential factors were the prison location ($M = 1.53$, SD = 1.66), prisoner ethnicity ($M = 1.57$, SD = 0.93), the season in the year ($M = 2.00$, SD = 1.68), ordinal case position ($M = 2.00$, SD = 1.10), the mood of the judge ($M = 2.07$, SD = 1.03) and prisoner sex ($M = 2.28$, SD = 1.48). The importance score for ordinal case position was significantly lower (all P values <0.001) than that of each of the four most influential factors. Furthermore, the importance score of ordinal position did not differ from any of the unimportant factors (all P values >0.27).

Next, we presented the 16 parole board members with three written descriptions of possible relations between the decision of the judge to grant/deny parole and ordinal case position. We asked them to select the one that they believed best represented the judge's decisions as a function of ordinal case position. The first description was one in which there is no relation between the order of cases and the judge's decision to grant/deny parole. The second description was one in which the probability of release increased from the first case to the last case in each of the three decision sessions in the day. The third description was one that matched the pattern we find in our data. None of the parole board members indicated that the third description fit the decision pattern of the judges. Fifteen of 16 indicated that there was no relation between ordinal case position and decisions, and one member indicated that the second description fit the decision pattern of the judges.

In summary, using two different measures, we do not find evidence to suggest that a sample of the parole board members are aware of the strong effect that ordinal case position can have on rulings. Although this lack of awareness might seem surprising at first blush, it is worth noting that, even though the drop in prisoner releases is dramatic, in most cases it is not quite as dramatic as presented in Fig. 1. For instance, if one were to examine only 80% of the cases before the judge in each decision session, the drop in probability of release is around 45% rather than 65%, as is evident when one plots 95% of the cases (i.e., Fig. 1). This drop is precipitous, but perhaps the fact that in most cases the probability does not drop to zero reduces the likelihood that the judges will perceive the presence of an order effect.

S4. Correlations Between Ordinal Position Indicators and Variables Reflecting Case Severity. We tested whether order of cases was random by calculating the correlation between various indicators of ordinal position in a decision session and variables that reflect the severity of the prisoners' crimes (severity of crime, months in prison) as well as his or her history of recidivism (previous incarcerations). The ordinal position measures that we used in our analysis were as follows: (*i*) a simple counter that increased for each decision in the session; (*ii*) a counter that corresponded to the overall number of cases brought before the judge within the session, including those that had been agreed upon between the prosecution and defense (*SI Materials and Methods, S1*); (*iii*) the cumulative number of minutes spent deliberating within the session up to that case; (*iv*) a counter that corresponded to the overall number of decisions made in the day; and (*v*) an indicator of which of the daily sessions the case appeared in. Table S16 presents the 20 correlations that we calculated; in the vast majority of cases, they are not statistically significant. There was a very mild negative correlation between two of the ordinal position measures and severity of crime, such that prisoners convicted of more severe crimes were slightly more likely to appear before the judge earlier in each session. Note that this correlation predicts that rulings early in the sequence would be less likely to favor the

felon, which is the opposite of what we find. A very mild positive correlation emerged between two other ordinal position measures and recidivism, indicating that recidivists were slightly more likely to appear later in the day. In this regard, several points are noteworthy. First, the correlations with recidivism are small and are only significant for the overall day ordinal position counter but not the session ordinal position counter; thus, they cannot explain the spikes in favorable decisions after a break. Second, note that the 4 (of 20) significant correlations are small and in opposite directions of each other—they are not consistent and, thus, do not appear to indicate a pattern of systematic ordering of the cases that might be giving rise to our findings.

In a related analysis we examined the mean level of prisoner characteristics for the three prisoners that appeared before and after each of the two daily breaks. This analysis leads to similar conclusions as the ones indicated by the correlations. There were no significant differences between the first three cases and the last three cases in a session with regard to the percentage of prisoners with a rehabilitation plan ($P = 0.675$; first three: 98.1%; last three: 98.5%), months of incarceration ($P = 0.24$; first three: $M = 31.43$; SD = 40.41; last three: $M = 28.2$; SD = 31.99), and number of previous incarcerations ($P = 0.695$; first three: $M = 1.91$; SD = 1.53; last three: $M = 1.95$; SD = 1.51). Finally, crime severity was higher ($P = 0.04$) in the first three cases ($M = 2.92$; SD = 1.03) than the last three cases in a session ($M = 2.77$; SD = 0.91), a pattern that predicts the opposite of the effect we find because presumably crime severity should decrease likelihood of release.

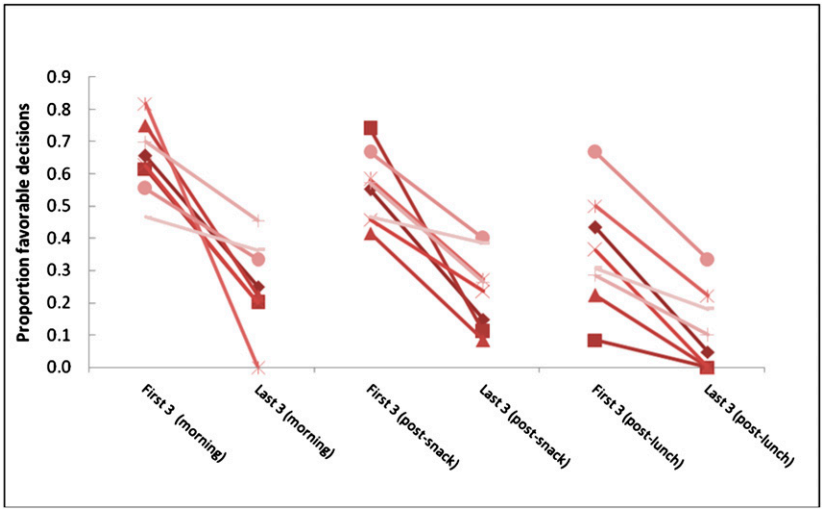

Fig. S1. The proportion of favorable decisions as a function of judge and ordinal position within a session. The data points reflect proportions for the first three versus last three decisions in each of the three sessions, for each judge. On average a data point reflects 16.00 decisions (min = 3, max = 27, SD = 7.12).

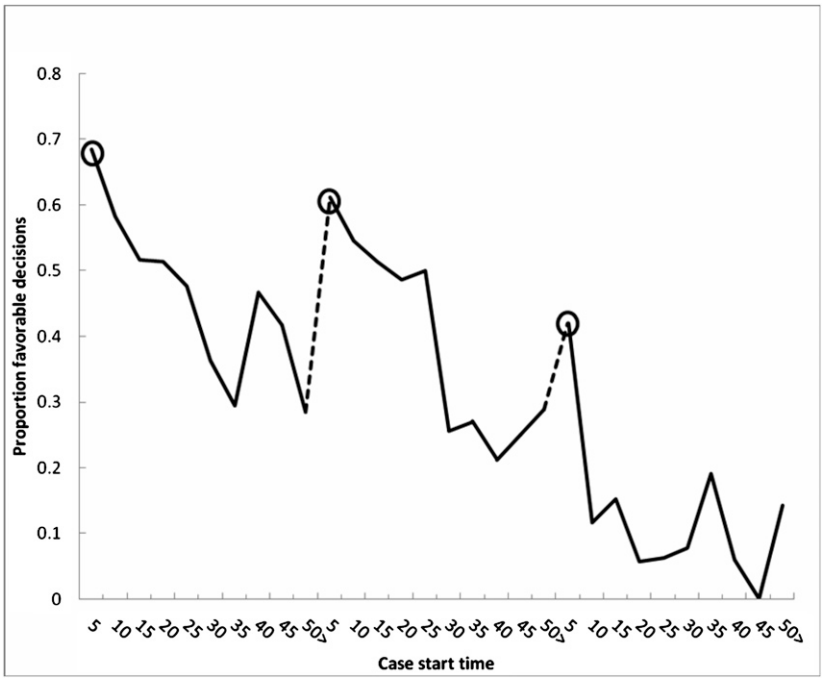

Fig. S2. Proportion of rulings in favor of prisoners by cumulative minutes of deliberation. Circled points indicate cases that commenced in the first 5 min of each of the three decision sessions; tick marks on the *x* axis denote 5-min intervals save for the last tick mark, which represents all cases that began after more than 50 min; the dotted lines denote food breaks. We combined all of the cases that began after more than 50 min so that each data point would reflect at least 10 cases.

Table S1. Results of analysis that includes only parole requests

	Specification			
Variable	1	2	3	4
Overall decision count	−0.075*** (0.025)	—	−0.080*** (0.026)	—
Overall count including nondecisions	—	−0.101*** (0.022)	—	−0.106*** (0.023)
Session 1/decision 1	1.016** (0.435)	0.876** (0.433)	—	—
Session 1/decision 2	1.444*** (0.451)	1.359*** (0.449)	1.480*** (0.458)	1.389*** (0.448)
Session 1/decision 3	−0.007 (0.454)	−0.088 (0.452)	−0.076 (0.460)	−0.117 (0.457)
Session 2/decision 1	1.310*** (0.403)	1.063*** (0.407)	1.288*** (0.407)	1.051** (0.410)
Session 2/decision 2	0.042 (0.411)	−0.181 (0.416)	−0.031 (0.414)	−0.234 (0.417)
Session 2/decision 3	1.035** (0.411)	0.833** (0.415)	0.960** (0.413)	0.780* (0.416)
Session 3/decision 1	3.079*** (0.474)	2.947*** (0.479)	3.001*** (0.475)	2.894*** (0.480)
Session 3/decision 2	1.035** (0.535)	0.859 (0.543)	0.972* (0.538)	0.817 (0.546)
Session 3/decision 3	−0.196 (0.800)	−0.322 (0.805)	−0.286 (0.803)	−0.379 (0.807)
Session 1	−0.373 (0.309)	−0.757** (0.322)	−0.526* (0.317)	−0.874*** (0.327)
Session 3	−1.119*** (0.392)	−0.771* (0.403)	−0.998** (0.397)	−0.681* (0.408)
Severity of offense	0.017 (0.111)	0.030 (0.112)	−0.037 (0.117)	−0.014 (0.118)
Previous imprisonments	−0.193*** (0.063)	−0.186*** (0.064)	−0.184*** (0.066)	−0.176*** (0.066)
Months served	−0.003 (0.003)	−0.003 (0.003)	−0.003 (0.003)	−0.003 (0.003)
Rehabilitation program	2.971*** (1.085)	2.944*** (1.098)	2.387** (1.107)	2.372** (1.134)
Ethnicity (0 = Jew, 1 = Arab)	−0.182 (0.186)	−0.207 (0.187)	−0.136 (0.191)	−0.158 (0.192)
Sex (0 = male, 1 = female)	−0.528 (0.340)	−0.532 (0.341)	−0.510 (0.345)	−0.523 (0.412)
Proportion favorable decisions	—	—	0.704* (0.407)	0.423 (0.411)
−2 Log likelihood	794.519	781.166	745.042	732.443

This table is analogous to Table 1, but with a restricted sample size in which only parole requests were included. The results of this fixed-effect logistic regression analysis are very similar to those presented in Table 1. SEs in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S2. Results of the analysis in which the two judges who most frequently occurred in the sample are excluded

	Specification	
Variable	1	2
Overall decision count	−0.034 (0.028)	−0.043 (0.029)
Session 1/decision 1	0.783* (0.467)	—
Session 1/decision 2	1.484*** (0.492)	1.563*** (0.496)
Session 1/decision 3	0.789* (0.453)	0.788* (0.456)
Session 2/decision 1	1.071** (0.459)	1.005** (0.458)
Session 2/decision 2	0.339 (0.448)	0.270 (0.449)
Session 2/decision 3	0.739* (0.432)	0.690 (0.433)
Session 3/decision 1	3.000*** (0.526)	2.899*** (0.526)
Session 3/decision 2	0.913* (0.539)	0.807 (0.544)
Session 3/decision 3	0.024 (0.687)	−0.083 (0.690)
Session 1	0.018 (0.351)	−0.169 (0.357)
Session 3	−1.176*** (0.380)	−1.012*** (0.386)
Severity of offense	0.249* (0.134)	0.245* (0.137)
Previous imprisonments	−0.212*** (0.076)	−0.177** (0.076)
Months served	−0.008** (0.004)	−0.008** (0.003)
Rehabilitation program	2.322*** (0.828)	1.863** (0.877)
Ethnicity (0 = Jew, 1 = Arab)	−0.126 (0.199)	−0.067 (0.205)
Sex (0 = male, 1 = female)	0.043 (0.349)	0.045 (0.362)
Proportion favorable decisions	—	0.880** (0.430)
−2 Log likelihood	670.646	629.118

Note that this table is based on a smaller sample size (n = 653). We chose to drop these two specific judges and not others because, due to their relative frequency, they were overrepresented in our sample. SEs in parentheses. *P < 0.10, **P < 0.05, ***P < 0.01.

Table S3. Results of the analysis presented in which each of the eight judges are excluded one at a time (excludes Judge 1):

	Specification	
Variable	1	2
Overall decision count	−0.070*** (0.025)	−0.080*** (0.026)
Session 1/decision 1	0.636* (0.407)	—
Session 1/decision 2	1.382*** (0.432)	1.443*** (0.435)
Session 1/decision 3	0.414 (0.390)	0.397 (0.393)
Session 2/decision 1	1.162*** (0.407)	1.144*** (0.407)
Session 2/decision 2	0.288 (0.387)	0.249 (0.387)
Session 2/decision 3	0.835** (0.380)	0.808** (0.380)
Session 3/decision 1	2.465*** (0.455)	2.378*** (0.454)
Session 3/decision 2	0.813* (0.500)	0.732 (0.503)
Session 3/decision 3	−0.238 (0.673)	−0.317 (0.675)
Session 1	−0.186 (0.296)	−0.326 (0.300)
Session 3	−1.042*** (0.349)	−0.904** (0.354)
Severity of offense	0.163 (0.111)	0.161 (0.113)
Previous imprisonments	−0.228*** (0.066)	−0.185*** (0.065)
Months served	−0.005*(0.003)	−0.005(0.003)
Rehabilitation program	2.276 (0.813)	1.798** (0.848)
Ethnicity (0 = Jew, 1 = Arab)	−0.145 (0.170)	−0.136 (0.175)
Sex (0 = male, 1 = female)	−0.166 (0.331)	−0.098 (0.340)
Proportion favorable decisions	—	0.843** (0.376)
−2 Log likelihood	898.328	845.734

Each table S3–S10 presents the results of a fixed-effect logistic regression analysis for seven rather than eight judges. SEs in parentheses. *P < 0.10, **P < 0.05, ***P < 0.01.

Table S4. Results of the analysis excluding Judge 2:

	Specification	
Variable	1	2
Overall decision count	−0.059*** (0.022)	−0.062*** (0.023)
Session 1/decision 1	1.015** (0.419)	—
Session 1/decision 2	1.445*** (0.425)	1.492*** (0.430)
Session 1/decision 3	0.665* (0.393)	0.644* (0.397)
Session 2/decision 1	0.941** (0.386)	0.921** (0.390)
Session 2/decision 2	0.274 (0.374)	0.228 (0.378)
Session 2/decision 3	0.653* (0.371)	0.607* (0.374)
Session 3/decision 1	3.410*** (0.493)	3.340*** (0.494)
Session 3/decision 2	0.949** (0.480)	0.867* (0.484)
Session 3/decision 3	−0.150 (0.669)	−0.237 (0.673)
Session 1	−0.287 (0.275)	−0.452 (0.284)
Session 3	−1.142*** (0.341)	−1.013*** (0.347)
Severity of offense	0.080 (0.109)	0.039 (0.115)
Previous imprisonments	−0.233*** (0.067)	−0.237*** (0.071)
Months served	−0.007**(0.003)	−0.007**(0.003)
Rehabilitation program	2.572*** (0.830)	2.083** (0.879)
Ethnicity (0 = Jew, 1 = Arab)	−0.205 (0.177)	−0.136 (0.182)
Sex (0 = male, 1 = female)	−0.100 (0.312)	−0.030 (0.322)
Proportion favorable decisions	—	0.979*** (0.368)
−2 Log likelihood	906.889	849.150

SEs in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S5. Results of the analysis excluding Judge 3:

	Specification	
Variable	1	2
Overall decision count	−0.076*** (0.021)	−0.079*** (0.021)
Session 1/decision 1	0.892** (0.389)	—
Session 1/decision 2	1.250*** (0.392)	1.276*** (0.396)
Session 1/decision 3	0.294 (0.365)	0.252 (0.370)
Session 2/decision 1	0.996*** (0.370)	1.018*** (0.374)
Session 2/decision 2	0.272 (0.349)	0.238 (0.352)
Session 2/decision 3	0.671** (0.351)	0.650* (0.353)
Session 3/decision 1	2.813*** (0.435)	2.735*** (0.435)
Session 3/decision 2	0.937** (0.457)	0.863* (0.460)
Session 3/decision 3	−0.330 (0.662)	−0.403 (0.664)
Session 1	−0.422* (0.254)	−0.561** (0.260)
Session 3	−1.120*** (0.324)	−0.981*** (0.329)
Severity of offense	0.068 (0.098)	0.024 (0.102)
Previous imprisonments	−0.236*** (0.061)	−0.226*** (0.063)
Months served	−0.004 (0.003)	−0.003 (0.003)
Rehabilitation program	2.419*** (0.812)	1.897** (0.846)
Ethnicity (0 = Jew, 1 = Arab)	−0.209 (0.160)	−0.203 (0.165)
Sex (0 = male, 1 = female)	−0.044 (0.318)	−0.040 (0.323)
Proportion favorable decisions	—	0.995*** (0.341)
−2 Log likelihood	1064.794	1000.208

SEs in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S6. Results of the analysis excluding Judge 4:

	Specification	
Variable	1	2
Overall decision count	−0.077*** (0.022)	−0.077*** (0.022)
Session 1/decision 1	0.704* (0.397)	—
Session 1/decision 2	1.342*** (0.415)	1.383*** (0.421)
Session 1/decision 3	0.493 (0.385)	0.446 (0.389)
Session 2/decision 1	0.908** (0.380)	0.921** (0.383)
Session 2/decision 2	0.286 (0.364)	0.253 (0.367)
Session 2/decision 3	0.929** (0.370)	0.904** (0.371)
Session 3/decision 1	2.495*** (0.461)	2.424*** (0.461)
Session 3/decision 2	1.088** (0.480)	1.038** (0.482)
Session 3/decision 3	−0.179 (0.676)	−0.243 (0.679)
Session 1	−0.373 (0.261)	−0.509* (0.267)
Session 3	−1.079*** (0.351)	−0.963*** (0.356)
Severity of offense	0.039 (0.100)	−0.004 (0.105)
Previous imprisonments	−0.260*** (0.065)	−0.255*** (0.069)
Months served	−0.003 (0.003)	−0.003(0.003)
Rehabilitation program	2.105** (0.828)	1.684** (0.862)
Ethnicity (0 = Jew, 1 = Arab)	−0.282** (0.165)	−0.243 (0.170)
Sex (0 = male, 1 = female)	−0.421 (0.341)	−0.417 (0.346)
Proportion favorable decisions	—	1.058*** (0.360)
−2 Log likelihood	996.649	936.619

SEs in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S7. Results of the analysis excluding Judge 5:

	Specification	
Variable	1	2
Overall decision count	−0.076*** (0.021)	−0.077*** (0.021)
Session 1/decision 1	0.701* (0.387)	—
Session 1/decision 2	1.260*** (0.395)	1.330*** (0.401)
Session 1/decision 3	0.267 (0.362)	0.244 (0.365)
Session 2/decision 1	1.037*** (0.369)	1.051*** (0.372)
Session 2/decision 2	0.210 (0.350)	0.180 (0.352)
Session 2/decision 3	0.796** (0.354)	0.775** (0.355)
Session 3/decision 1	3.021*** (0.456)	2.965*** (0.456)
Session 3/decision 2	0.703 (0.514)	0.638 (0.516)
Session 3/decision 3	−0.097 (0.674)	−0.152 (0.676)
Session 1	−0.286 (0.252)	−0.393 (0.257)
Session 3	−1.227*** (0.345)	−1.124*** (0.350)
Severity of offense	0.009 (0.099)	−0.029 (0.103)
Previous imprisonments	−0.246*** (0.061)	−0.234*** (0.063)
Months served	−0.004(0.003)	−0.004(0.003)
Rehabilitation program	3.123*** (1.080)	2.600** (1.109)
Ethnicity (0 = Jew, 1 = Arab)	−0.219 (0.162)	−0.206 (0.167)
Sex (0 = male, 1 = female)	−0.192 (0.301)	−0.146 (0.307)
Proportion favorable decisions	—	0.836** (0.345)
−2 Log likelihood	1054.537	991.893

SEs in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S8. Results of the analysis excluding Judge 6:

	Specification	
Variable	1	2
Overall decision count	−0.080*** (0.021)	−0.081*** (0.021)
Session 1/decision 1	0.913** (0.388)	—
Session 1/decision 2	1.541*** (0.407)	1.571*** (0.411)
Session 1/decision 3	0.277 (0.362)	0.221 (0.367)
Session 2/decision 1	1.054*** (0.365)	1.075*** (0.368)
Session 2/decision 2	0.309 (0.346)	0.280 (0.348)
Session 2/decision 3	0.663* (0.346)	0.640* (0.347)
Session 3/decision 1	2.890*** (0.436)	2.807*** (0.436)
Session 3/decision 2	0.913** (0.474)	0.831* (0.475)
Session 3/decision 3	−0.654 (0.782)	−0.728 (0.783)
Session 1	−0.342 (0.253)	−0.461* (0.258)
Session 3	−1.113*** (0.334)	−0.977*** (0.340)
Severity of offense	0.070 (0.101)	0.033 (0.105)
Previous imprisonments	−0.240*** (0.060)	−0.227*** (0.062)
Months served	−0.005*(0.003)	−0.005*(0.003)
Rehabilitation program	2.224*** (0.830)	1.895** (0.869)
Ethnicity (0 = Jew, 1 = Arab)	−0.178 (0.161)	−0.155 (0.166)
Sex (0 = male, 1 = female)	−0.142 (0.304)	−0.097 (0.310)
Proportion favorable decisions	—	0.856** (0.352)
−2 Log likelihood	1065.101	1003.123

SEs in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S9. Results of the analysis excluding Judge 7:

	Specification	
Variable	1	2
Overall decision count	−0.078*** (0.022)	−0.079*** (0.022)
Session 1/decision 1	0.973** (0.402)	—
Session 1/decision 2	1.448*** (0.412)	1.480*** (0.416)
Session 1/decision 3	0.280 (0.375)	0.224 (0.379)
Session 2/decision 1	1.219*** (0.383)	1.234*** (0.386)
Session 2/decision 2	0.258 (0.362)	0.210 (0.365)
Session 2/decision 3	0.837** (0.364)	0.805** (0.366)
Session 3/decision 1	2.890*** (0.467)	2.863*** (0.469)
Session 3/decision 2	0.967** (0.490)	0.913* (0.493)
Session 3/decision 3	−1.297 (1.060)	−1.371 (1.062)
Session 1	−0.355 (0.263)	−0.511* (0.269)
Session 3	−0.905** (0.354)	−0.809** (0.359)
Severity of offense	−0.040 (0.102)	−0.073 (0.107)
Previous imprisonments	−0.225*** (0.063)	−0.215*** (0.066)
Months served	−0.003(0.003)	−0.003 (0.003)
Rehabilitation program	1.791** (0.848)	1.174 (0.872)
Ethnicity (0 = Jew, 1 = Arab)	−0.216 (0.170)	−0.169 (0.174)
Sex (0 = male, 1 = female)	−0.363 (0.334)	−0.302 (0.343)
Proportion favorable decisions	—	0.973*** (0.369)
−2 Log likelihood	970.604	910.261

SEs in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S10. Results of the analysis excluding Judge 8:

	Specification	
Variable	1	2
Overall decision count	−0.113*** (0.024)	−0.112*** (0.025)
Session 1/decision 1	1.001** (0.423)	—
Session 1/decision 2	1.246*** (0.411)	1.283*** (0.417)
Session 1/decision 3	0.356 (0.378)	0.321 (0.382)
Session 2/decision 1	1.151*** (0.390)	1.167*** (0.393)
Session 2/decision 2	0.197 (0.360)	0.169 (0.362)
Session 2/decision 3	0.723** (0.362)	0.705** (0.364)
Session 3/decision 1	3.100*** (0.475)	3.050*** (0.474)
Session 3/decision 2	0.700 (0.501)	0.635 (0.504)
Session 3/decision 3	−0.194 (0.676)	−0.250 (0.679)
Session 1	−0.462* (0.273)	−0.596**(0.280)
Session 3	−0.829** (0.362)	−0.728** (0.367)
Severity of offense	0.041 (0.103)	0.019 (0.107)
Previous imprisonments	−0.262*** (0.064)	−0.256*** (0.068)
Months served	−0.004(0.003)	−0.004(0.003)
Rehabilitation program	3.457*** (1.094)	2.940*** (1.139)
Ethnicity (0 = Jew, 1 = Arab)	−0.174 (0.169)	−0.162 (0.174)
Sex (0 = male, 1 = female)	−0.210 (0.330)	−0.176 (0.337)
Proportion favorable decisions		0.970*** (0.355)
−2 Log likelihood	965.293	909.818

SEs in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S11. Nested model comparison tests

	Specification			
Variable	1	2	3	4
Within session decision count	−0.217*** (0.023)	−0.201*** (0.024)	—	—
Severity of offense	0.062 (0.089)	0.029 (0.093)	0.094 (0.085)	0.041 (0.090)
Previous imprisonments	−0.250*** (0.056)	−0.231*** (0.058)	−0.250*** (0.055)	−0.231*** (0.057)
Months served	−0.002 (0.002)	−0.002 (0.002)	−0.002 (0.002)	−0.001 (0.002)
Rehabilitation program	1.931** (0.773)	1.471* (0.784)	1.681** (0.756)	1.371* (0.774)
Ethnicity (0 = Jew, 1 = Arab)	−0.131 (0.146)	−0.112 (0.151)	−0.053 (0.139)	−0.027 (0.145)
Sex (0 = male, 1 = female)	−0.443 (0.292)	−0.353 (0.301)	−0.391 (0.278)	−0.306 (0.291)
Proportion favorable decisions	—	1.400*** (0.304)	—	1.664*** (0.297)
−2 Log likelihood	1239.434	1156.380	1351.338	1241.543

We conducted our fixed-effect logistic regression analysis with and without an ordinal position variable and without any of the session or session/position dummies to ascertain whether adding these variables increased model fit using a likelihood ratio test. In all cases, adding variables that denote ordinal position yield a significantly better fitting model (e.g., compare specifications 3 and 4 above with the regressions presented in Table 1; all $\chi^2 > 10$, $P < 0.001$). *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S12. Analysis of linear trend between breaks

Variable	Specification					
	1	2	3	4	5	6
Within session decision count	−0.205*** (0.032)	−0.202*** (0.032)	—	—	−0.194*** (0.050)	−0.193*** (0.050)
Within session decision count including nondecisions	—	—	−0.202*** (0.028)	−0.200*** (0.028)	—	—
Session 1	0.285 (0.291)	0.255 (0.339)	0.191 (0.292)	0.224 (0.340)	0.438 (0.390)	0.642 (0.453)
Session 3	−0.749** (0.342)	−0.711** (0.343)	−0.959*** (0.331)	−0.921*** (0.332)	−0.536 (0.425)	−0.525 (0.427)
Session 1 × Within session count	−0.022 (0.052)	−0.030 (0.057)	−0.020 (0.048)	−0.036 (0.054)	−0.016 (0.074)	−0.057 (0.082)
Session 3 × Within session count	−0.167** (0.080)	−0.162** (0.080)	−0.101 (0.065)	−0.098 (0.066)	−0.120 (0.092)	−0.111 (0.092)
Severity of offense	0.035 (0.093)	0.008 (0.096)	0.042 (0.094)	0.015 (0.097)	0.248* (0.130)	0.253* (0.133)
Previous imprisonments	−0.244*** (0.057)	−0.233*** (0.059)	−0.244*** (0.057)	−0.234*** (0.060)	−0.237*** (0.074)	−0.207*** (0.073)
Months served	−0.002 (0.003)	−0.002 (0.003)	−0.002 (0.002)	−0.002 (0.003)	−0.007** (0.003)	−0.007* (0.003)
Rehabilitation program	2.114*** (0.791)	1.520* (0.796)	2.052*** (0.797)	1.380* (0.795)	2.048*** (0.801)	1.421* (0.811)
Ethnicity (0 = Jew, 1 = Arab)	−0.171 (0.151)	−0.146 (0.155)	−0.179 (0.153)	−0.155 (0.157)	−0.151 (0.194)	−0.100 (0.199)
Sex (0 = male, 1 = female)	−0.122 (0.299)	0.070 (0.306)	−0.120 (0.303)	0.056 (0.310)	0.129 (0.346)	0.256 (0.358)
Proportion favorable decisions	—	0.643** (0.324)	—	0.554* (0.328)	—	0.584 (0.416)
−2 Log likelihood	1153.638	1090.567	1133.735	1073.548	687.343	647.001

This fixed-effect logistic regression analysis tests the robustness of a variable that indicates the ordinal position of a case within a decision session (e.g., after breakfast snack and until lunch), while controlling for case characteristics. The variables Session 1, Session 3, Rehabilitation Program, Ethnicity, and Sex are dummy variables as in previous analyses. The negative parameter estimate on the ordinal position variable indicates that the trend(s) apparent in Fig. 1 are statistically significant. Specifications 5 and 6 drop the two judges with the most observations as in Table S2. SEs in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S13. Results of analysis using cumulative minutes elapsed in a session

Variable	Specification	
	1	2
Cumulative minutes in session	−0.021*** (0.005)	−0.021*** (0.005)
Session 1	0.223 (0.287)	0.070 (0.294)
Session 3	−2.176*** (0.392)	−2.008*** (0.395)
Session 1 × Cumulative minutes	0.002 (0.007)	0.002 (0.007)
Session 3 × Cumulative minutes	0.015 (0.013)	0.012 (0.013)
Severity of offense	0.014 (0.103)	0.006 (0.103)
Previous imprisonments	−0.214*** (0.063)	−0.206*** (0.062)
Months served	−0.002 (0.003)	−0.002 (0.003)
Rehabilitation program	1.920* (1.085)	1.826* (1.087)
Ethnicity (0 = Jew, 1 = Arab)	−0.110 (0.166)	−0.107 (0.167)
Sex (0 = male, 1 = female)	−0.179 (0.321)	−0.179 (0.323)
Proportion favorable decisions	—	1.050*** (0.335)
−2 Log likelihood	987.238	976.434

The table presents fixed effects logistic regression specifications that were conducted to test the effect of cumulative minutes passed in a decision session on the likelihood of a favorable ruling. The negative and significant parameters for cumulative minutes suggest that as session times lengthened, judges were more likely to rule against the prisoner. Note that the second specification controls for the proportion of favorable decisions in the day (this specification drops the very first decision of the day). Ethnicity and sex are dummy variables. SEs in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S14. Results of analysis using both cumulative minutes and elapsed time in a session

	Specification	
Variable	1	2
Cumulative minutes in session	0.003 (0.005)	0.002 (0.005)
Within session decision count	−0.219*** (0.037)	−0.207*** (0.037)
Session 1	0.202 (0.174)	0.117 (0.179)
Session 3	−1.810*** (0.233)	−1.746*** (0.235)
Severity of offense	0.020 (0.105)	0.015 (0.105)
Previous imprisonments	−0.222*** (0.064)	−0.215*** (0.063)
Months served	−0.003 (0.003)	−0.002 (0.003)
Rehabilitation program	1.694 (1.081)	1.660 (1.083)
Ethnicity (0 = Jew, 1 = Arab)	−0.108 (0.168)	−0.105 (0.169)
Sex (0 = male, 1 = female)	−0.011 (0.324)	−0.024 (0.325)
Proportion favorable decisions	—	0.717** (0.342)
−2 Log likelihood	948.572	943.428

The table presents fixed-effects logistic regression specifications that were conducted to test the combined effect of cumulative minutes elapsed in a decision session and within session decision count on the likelihood of a favorable ruling. The negative and significant parameter for decision count, coupled with the nonsignificant parameter for cumulative minutes, suggests that the critical factor in evoking our order effect is the number of decisions made rather than the time elapsed. Note that the second specification controls for the proportion of favorable decisions in the day (this specification drops the very first decision of the day). Ethnicity and sex are dummy variables. SEs in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S15. Analysis of causal factors in judge's decision to take a break

	Specification	
Variable	1	2
Within session decision count	0.144*** (0.025)	0.152*** (0.027)
Severity of offense	0.053 (0.148)	0.053 (0.149)
Previous imprisonments	−0.018 (0.078)	−0.013 (0.078)
Months served	0.002 (0.004)	0.003 (0.004)
Rehabilitation program	−0.954 (0.649)	−1.126 (0.667)
Ethnicity (0 = Jew, 1 = Arab)	0.345 (0.233)	0.341 (0.234)
Sex (0 = male, 1 = female)	−0.258 (0.461)	−0.164 (0.466)
Proportion favorable decisions	—	1.284** (0.518)
−2 Log likelihood	569.651	558.792

The table presents fixed-effects logistic regression specifications that were conducted to test determinants of a judge's decision to take a break. None of the variables related to a prisoner's case were significant; that is, whatever type of case a judge had seen did not prompt his or her desire to take a break. Within session decision count and a variable that controls for the proportion of favorable decisions in the day (this specification drops the very first decision of the day) were significant. Note that the latter was positive, meaning that as a judge had made more favorable decisions, he or she was more likely to take a break. Ethnicity and sex are dummy variables. SEs in parentheses. *$P < 0.10$, **$P < 0.05$, ***$P < 0.01$.

Table S16. Correlations between control variables and ordinal position indicators

Ordinal position variable	Severity of offense	Previous imprisonments	Months served to date	Rehabilitation program
Session decision count	−0.053 ($P = 0.077$)	0.027 ($P = 0.371$)	−0.029 ($P = 0.340$)	0.028 ($P = 0.346$)
Session count including nondecisions	−0.033 ($P = 0.274$)	0.035 ($P = 0.242$)	−0.010 ($P = 0.734$)	0.015 ($P = 0.615$)
Cumulative minutes in session	−0.035 ($P = 0.280$)	0.013 ($P = 0.682$)	−0.004 ($P = 0.905$)	−0.022 ($P = 0.491$)
Overall decision count	−0.081 ($P = 0.007$)	0.062 ($P = 0.038$)	−0.047 ($P = 0.115$)	0.017 ($P = 0.570$)
Overall count including nondecisions	−0.047 ($P = 0.117$)	0.075 ($P = 0.012$)	−0.012 ($P = 0.692$)	0.011 ($P = 0.719$)

Pearson correlation coefficients between the ordinal position variables and the control variables used in our regressions (P values appear in parentheses). Columns refer to the different control variables used in our subsequent regression analyses. Rows refer to different representations of ordinal position.