

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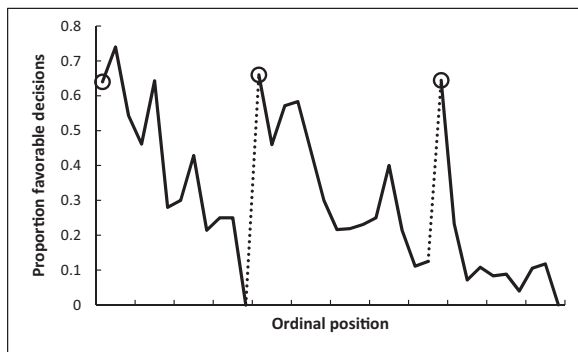
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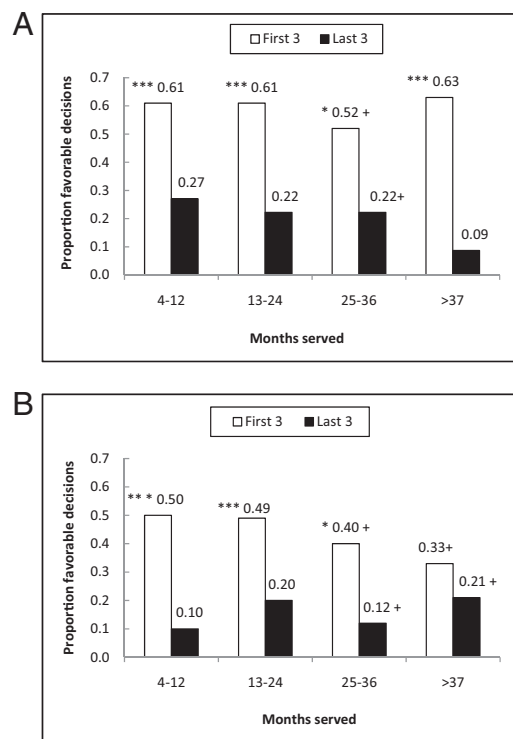
**Fig. 1.** Proportion of rulings in favor of the prisoners by ordinal position. Circled points indicate the first decision in each of the three decision sessions; tick marks on x axis denote every third case; dotted line denotes food break. Because unequal session lengths resulted in a low number of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

## 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  $\approx 0.65$  to nearly zero and jumps back up to  $\approx 0.65$  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



**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. \* $P < 0.1$ , \*\* $P < 0.05$ , \*\*\* $P < 0.01$ .

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

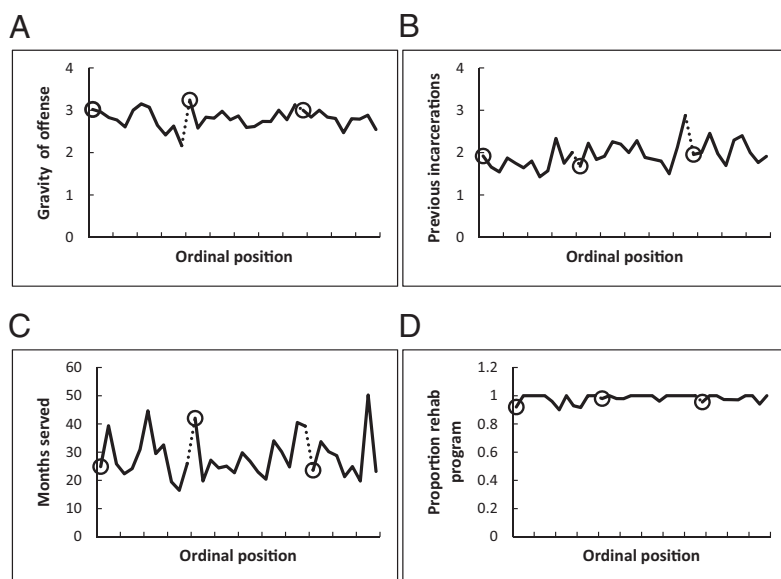
This table presents various fixed effects logistic regression specifications. The session  $\times$  decision  $y$  parameters are dummy variables that indicate the first three decisions in each of the three sessions. Note that in specifications 3 and 4 there is no value for the very first decision of 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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