

Even Laypeople Use Legalese

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Abstract

Whereas principles of communicative efficiency and legal doctrine dictate that laws be comprehensible to the common world, empirical evidence suggests legal documents are largely incomprehensible to lawyers and laypeople alike. Here, a corpus analysis ($n = 59$ million words) first replicated and extended prior work revealing laws to contain strikingly higher rates of complex syntactic structures relative to six baseline genres of English.

Next, two pre-registered text generation experiments ($n = 280$) tested two leading hypotheses regarding how these complex structures enter into legal documents in the first place. In line with the *magic spell hypothesis*, we found people tasked with writing official laws wrote in a more convoluted manner than when tasked with writing unofficial legal texts of equivalent conceptual complexity. Contrary to the *copy-and-edit hypothesis*, we did not find evidence that people editing a legal document wrote in a more convoluted manner than when writing the same document from scratch.

From a cognitive perspective, these results suggest law to be a rare exception to the general tendency in human language towards communicative efficiency. In particular, these findings indicate law's complexity to be derived from its performativity, whereby low-frequency structures may be inserted to signal law's authoritative, world-state-altering nature, at the cost of increased processing demands on readers. From a law and policy perspective, these results suggest that the tension between the ubiquity and impenetrability of the law is not an inherent one, and that laws can be simplified without a loss or distortion of communicative content.

Since the dawn of modern civilization, humankind has codified and communicated societal norms and rules largely in the form of written laws. In order for people to understand and comply with social norms and rules, it follows that legal content must be drafted in a way such that people can ultimately understand and comply with it.

Indeed, the principle that law should provide such “fair notice” to the general public is a core tenet of modern legal doctrine, which mandates that laws provide proper warning of prohibited conduct “in language that the common world will understand,” (*McBoyle v. United States*, 1931; *Moskal v. United States*, 1990) to “give the person of ordinary intelligence a reasonable opportunity to know what is prohibited, so that he may act accordingly.” (*Grayned v. City of Rockford*, 1972; *Hoffman Estates v. Flipside, Hoffman Estates, Inc.*, 1982).

In addition to legal doctrine, principles of communicative efficiency likewise suggest that laws should be understandable. For example, a burgeoning psycholinguistics literature has uncovered various properties of human language that appear optimized for easing the communicative burden on speakers and listeners (Gibson et al., 2019; Piantadosi, Tily, & Gibson, 2011, 2012; Piantadosi, 2014; Mahowald, Fedorenko, Piantadosi, & Gibson, 2013; Mahowald, Dautriche, Gibson, & Piantadosi, 2018; Futrell & Gibson, 2017; Futrell & Levy, 2017; Ryskin, Futrell, Kiran, & Gibson, 2018; Zhang, Ryskin, & Gibson, 2023; Gibson, Piantadosi, et al., 2013; Gibson, Bergen, & Piantadosi, 2013), such as (a) syntactic dependency length minimization (Futrell, Mahowald, & Gibson, 2015), and (b) a preference for shorter words over longer words in everyday speech (Zipf, 1949).

These principles notwithstanding, legal documents have long been observed to be notoriously difficult to understand (P. M. Tiersma, 1993; P. Tiersma, 2005, 2008; Masson & Waldron, 1994). In particular, recent work has revealed legal documents, including both private contracts and federal legislation, to be laden with center-embedded clauses at a rate twice as high as other genres of texts, including those aimed at an educated audience (Martínez, Mollica, & Gibson, 2022; Martínez, Mollica, & Gibson, in press).

Moreover, legal documents containing these features have been shown to cause processing difficulty relative to legal documents without these features, even for lawyers and experienced lay readers (Martínez et al., 2022; Martínez, Mollica, & Gibson, 2023).

The mismatch between the ubiquity and impenetrability of legal documents has long been acknowledged not just by those tasked with reading legal documents but those tasked with promulgating them, as well (Adler, 2012). In the United States, policy efforts to simplify laws have been advocated for decades (Plain Language Action Information Network, 2011; Exec. Order No. 13648, 1979; Plain Writing Act of 2010, n.d.), with little to no success (Martínez et al., in press).

And although recent work has revealed that even lawyers prefer simplified legal documents over complex legal documents (Martínez et al., 2023), it remains an open question how complex features such as center-embedding make their

way into legal documents in the first place.

To answer this question, we conducted two high-powered pre-registered experiments testing two leading hypotheses for why lawyers write the way that they do, including: (a) the magic spell hypothesis, according to which lawyers and lawmakers write in a convoluted manner in order to lend legal documents a ritualistic, spell-like element; and (b) the copy-and-edit hypothesis, according to which conditions and specifications are often considered only after the creation of an initial draft and are more easily embedded into the center of existing sentences as opposed to being written-out into separate sentences.

In line with the magic spell hypothesis, we found that people tasked with writing laws wrote in a more convoluted manner (i.e. more center-embedding) than when tasked with writing control texts of plausibly equivalent conceptual complexity. Contrary to the copy-and-edit hypothesis, we did not find evidence that people editing a legal document wrote in a more convoluted manner than when writing the document from scratch.

These findings suggest that lawyers and lawmakers write in a complex manner in order to confer legal documents a ritualistic, spell-like element, presenting broad-ranging implications for law, policy and human cognition.

Law's Syntactic Complexity

Perhaps the most distinctive feature of *legalese* is center-embedded syntax, in which clausal content is embedded within the center of another clause as opposed to being edge-embedded or written as a separate sentence. Prior work has found that legal documents contain strikingly higher rates of center-embedded syntax relative to other genres of English, including those aimed at an educated audience (Martínez et al., 2022; Martinez et al., in press).

For robustness purposes, here we first sought to replicate and extend these results using a more direct method of detecting center-embedded syntax compared to prior work (see methods), in which we used state-of-the-art natural language processing tools to detect the number of center-embedded verbs in a sentence in (a) the United States Code (*United States Code*, 2021); and (b) six baseline genres in the Corpus of Contemporary American English (Davies, 2009): academic texts, fiction, newspaper articles, magazine articles, spoken transcripts, and TV/Movie scripts.

Results are visualized in Figure 1. Consistent with prior work, laws contained several times more center-embedded clauses than any of the baseline genres of English. When looking at the percentage of sentences with center-embedded clauses, laws likewise contained strikingly higher rates than any other genre.

In addition, prior analyses have also indicated that center-embedded syntax disproportionately contributes to the higher difficulty in recalling *legalese* vs plain-English compared to other markers of *legalese*, such as passive voice and non-standard capitalization (Martínez et al., 2022). The increased

processing difficulty associated with center-embedded syntax in legal texts and non-legal texts has been hypothesized to be associated with increased demands on working memory capacity resulting from long-distance syntactic dependencies (Gibson, 1998; Martínez et al., 2022). However, it remains an open question to what extent legal texts have longer syntactic dependencies relative to baseline texts.

To answer this question, we also compared the syntactic dependency length in our legal vs non-legal corpora. As with center-embedded syntax, and consistent with the predictions of the theoretical literature, laws contained strikingly longer dependencies than any of the other baseline genres. Full results reported in SI.

Hypotheses

Having replicated and extended prior work demonstrating the prevalence of complex syntactic structures in legal texts, we next turned to testing two leading hypotheses proposed in previous literature for how such features enter into legal documents in the first place. Below we briefly present each of these hypotheses in turn, as well as the associated predictions of these hypotheses that we preregistered for our experiments.

Magic Spell Hypothesis. Some have posited that lawyers and lawmakers write in a convoluted manner in order to lend legal documents a ritualistic, spell-like element (Martinez et al., in press; P. Tiersma, 2008). These ritualistic types of language are often referred to as performative utterances (Austin, 1961), which unlike descriptive utterances, not only describe the state of the world but change the state of the world they are describing.

In order to effectively convey performativity, such utterances have been attested to contain distinctive, low-frequency structures, as in the case of magic spells, which are characterized by such features as rhyming (e.g. “Double, double toil and trouble; Fire burn, and cauldron bubble”: (Shakespeare, 2024)) and foreign-sounding jargon (“wingardium leviosa” (Rowling, 2015)). Indeed, in a pilot experiment we found that participants tasked with writing a magic spell rhymed in 58.8% of sentences, as compared to 1.8% of sentences when tasked with writing a mere recollection of a fantastical event involving a magic spell (see SI).

Given that legal documents, like spells and other performative utterances: (a) have been shown to possess low-frequency structures (such as center-embedded syntax), at several times the rate of standard texts (Martínez et al., 2022; Martinez et al., in press), and (b) are meant not only to describe the state of the world but also change the state of the world (by establishing, eliminating and/or modifying legally binding social rules), one might similarly hypothesize that such low-frequency structures are inserted so as to signal a legal document's authoritative nature.

If this hypothesis were true, one would predict that people tasked with writing an official legal document would write in a more convoluted manner (including more center-embedded syntax) than when writing a non-performative law-related

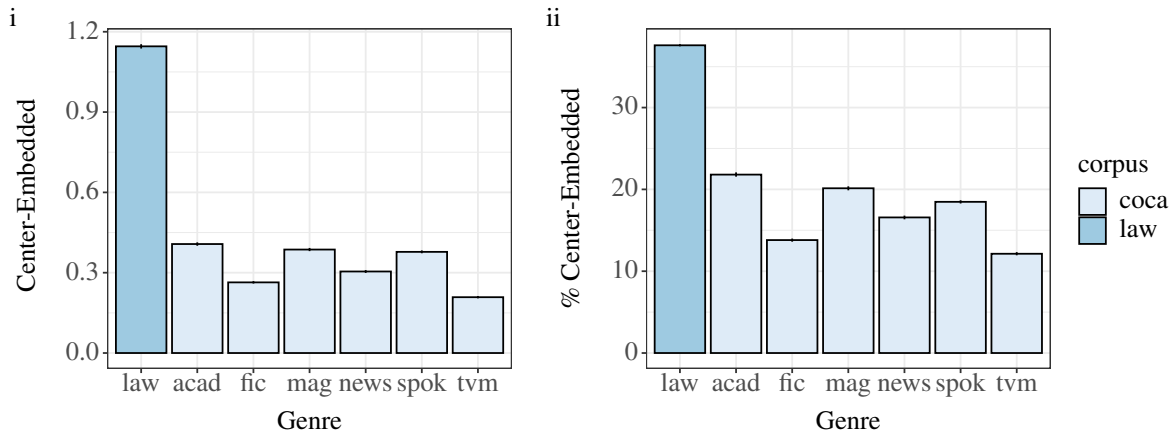


Figure 1: Number of center-embedded clauses per sentence (i) and percentage of sentences with center-embedded syntax (ii) in laws compared to six baseline genres of written and spoken English: academic texts, fiction, magazine articles, newspaper articles, and TV/Movies. Laws were taken from the 2021 edition of the United States Code, the official compilation of all federal laws currently in force. Baseline genres were taken from the most recent year (2019) of the Corpus of Contemporary American English. Error bars represent 95% bootstrapped confidence intervals.

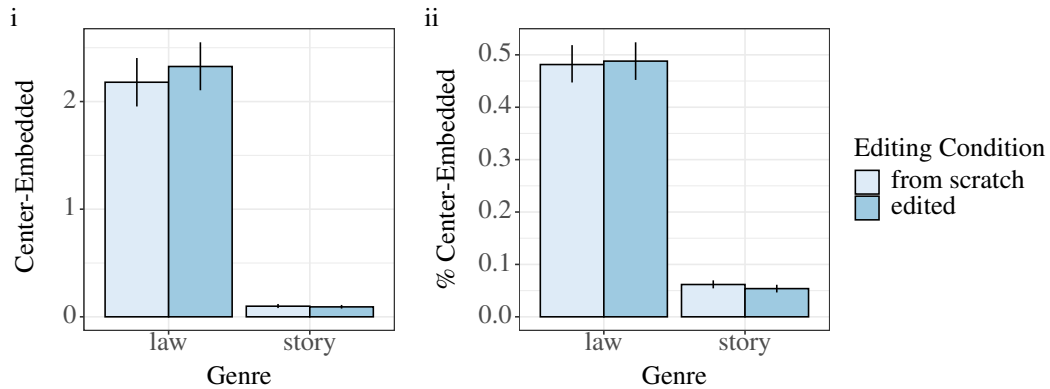


Figure 2: Number of center-embedded clauses per sentence (i) and percentage of sentences with center-embedded syntax (ii) in criminal laws versus crime stories. Error bars represent 95% bootstrapped confidence intervals.

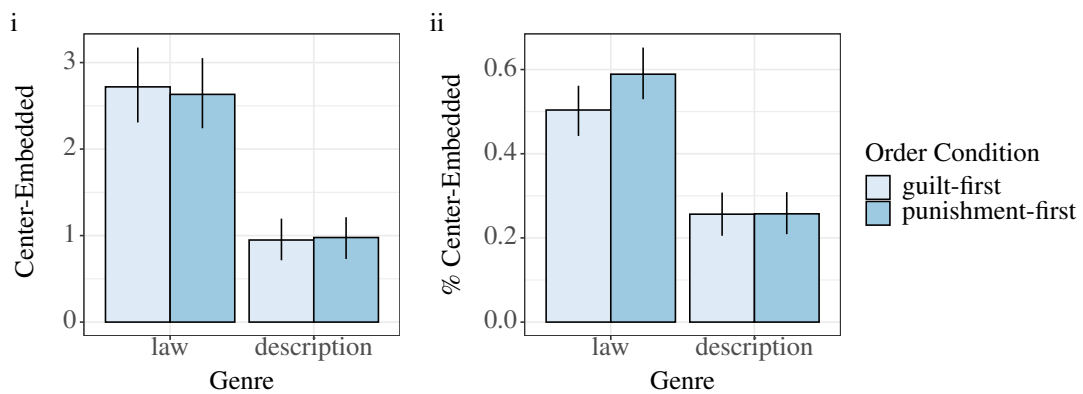


Figure 3: Number of center-embedded clauses per sentence (i) and percentage of sentences with center-embedded syntax (ii) in participant-drafted laws versus unofficial descriptions of laws. Error bars represent 95% bootstrapped confidence intervals.

document of equivalent conceptual complexity.

Copy-and-Edit Hypothesis. Recent work has speculated that convoluted legal language may be a result of an iterative drafting process, in which conditions and specifications are often thought of only after the creation of an initial draft or template and are more easily embedded into the center of existing sentences as opposed to being written-out into separate sentences (Martinez et al., in press). Given the observed reliance of lawyers and lawmakers on templates and “boilerplate provisions” in the drafting of legal documents (Nyarko, 2021; Anderson IV, 2020), this would explain why the prevalence of structures such as center-embedded syntax are so much higher in legal documents than other genres where the drafting process is less path-dependent and drawn-out (Martínez et al., 2022; Martinez et al., in press). If this hypothesis were true, one would predict that people tasked with editing a legal document will write in a more convoluted manner (including more center-embedded clauses) than when tasked with writing a legal document of equivalent semantic content from scratch.

Methods

Experiment 1

In Experiment 1,¹ we evaluated both the Magic Spell Hypothesis and Copy-and-Edit Hypothesis. To evaluate the predictions of these hypotheses, we conducted a preregistered experiment in which we asked participants (n=200) to write either a (a) legal provision prohibiting a crime; or (b) a story describing someone committing that crime.

In half of the trials (*from-scratch condition*, participants were initially given all of the details of the crime and were tasked with writing their law or story all at once. In the other half of trials (*editing condition*, participants were first given details of a paired-down version of the crime and were asked to write their law or story based on that version. After completing their draft, participants in these trials were then presented with additional details of the crime and were asked to revise their draft to incorporate these additional details.

Here we lay out in greater detail the materials, participants and procedure of Experiment 1.

Materials The primary materials consisted of eight items, with each item consisting of sets of instructions to write a passage relating to (respectively) the commission of a legally prohibited criminal offense (i.e. a crime), such as arson, bribery, or drunk driving. Each item consisted of 4 conditions (2 manipulations with 2 conditions each). The first manipulation was genre, which consisted of a *legal* condition and a *story* condition. In the legal condition, the materials consisted of instructions asking participants to write a law prohibiting a crime. In the story condition, participants were asked to write a story involving someone committing a crime. Both

conditions had an associated cover story explaining the motivation behind the task. In the legal condition, participants were told that they were a “lawmaker” who was “tasked with writing a law that prohibits a certain crime, and specifies the punishment for that crime if the crime is committed.” In the story condition, participants were told that they were a “fiction writer” who was “tasked with writing a story about someone who commits a crime and is punished for committing the crime.”

The second manipulation was sequencing, whose conditions consisted of a *from-scratch* condition and an *editing* condition. In the from-scratch condition, the details and specifications of the crime were presented all at once. In the editing condition, in contrast, the specifications were presented in two stages. In Stage 1, the version of the crime included within the instructions was paired-down and did not contain all of the specifications. In Stage 2, the version of the crime included all of the specifications, and the instructions directed participants to edit their text so as to include all of the additional instructions.

Participants and Procedure Participants (n=200) were recruited via the online platform Prolific. This sample size was based on a power analysis, which determined the number of participants that would give us an 80% chance to detect an effect size that was at least half as large as the effect of the interaction between genre + sequencing obtained in a pilot experiment (this was smallest effect of any predictor variable in our pilot experiment). Participants were eligible if they resided in the United States, were 18 years or older, and native speakers of English. Each participant completed 8 trials of the same series of tasks.

On a given trial, participants would be presented with materials in one of the four conditions, and asked to write either a law or story in accordance with the material’s instructions. As noted above, when in the from-scratch condition, participants were asked to draft their text all-at-once, whereas in the editing condition, participants were first asked to write an initial draft based on a paired-down version of the crime described, and then subsequently presented with the full version of the crime and asked to edit their draft to incorporate the additional details associated with that version. Across the 8 trials, each participant was presented with 2 items in each of the 4 conditions, never seeing the same item more than once.

Prior to each trial, participants were given a comprehension check question where they were (a) told which of the two genres they would be asked to write (a law or a story), and (b) asked to confirm which of the two genres they would be asked to write. Participants were not allowed to proceed to the trial until answering the comprehension check correctly.

Prior to completing the first trial, participants were asked to promise that they would not use a language model (such as GPT) to complete the task. After completing the last trial, they were prompted with a similar message asking to promise that they did not use a language model (such as GPT) to complete the task.

¹All data, code, and pre-registrations available at the following link: https://osf.io/p64h2/?view_only=95f1031413b14825aaef3b8b2d3e9617here.

Participants were retained in the analysis if they completed all trials and were determined not to use a language model in their responses.

Analysis Plan To evaluate participant responses, responses were separated into sentences using an automatic parser—in particular, the tokenizers package in R. The tokenized sentences were spot-checked by a human and corrected for errors. After tokenization, sentences were hand-coded for center-embedding, both in terms of (a) the degree of center-embedding (defined as the number of center-embedded verbs); and (b) the binary presence of center-embedding (i.e. were any verbs in the sentence center-embedded).

Following our preregistration, we then analyzed the effect of our two manipulations on the prevalence of center-embedding by conducting two separate regressions for each of the two operationalizations of center-embedding, including (a) a mixed-effects binary logistic regression with the binary presence of center-embedding (in a given sentence) as the outcome variable; and (b) a mixed-effects poisson regression with degree of center-embedding as the outcome variable. Both regressions featured (a) genre, sequencing condition and their interaction as fixed-effects; and (b) genre, sequencing condition, item and participant as random effects. Results did not qualitatively change for either regression. We report both in the text.

Experiment 2

Materials Similar to Experiment 1, the primary materials of Experiment 2 consisted of eight items, each of which consisted of 4 conditions (2 manipulations with 2 conditions each). The first manipulation was genre, which consisted of a *law* condition and a *description* condition. The law condition was identical to the law condition in Experiment 1, and consisted of instructions asking participants to write a law prohibiting a crime. In the description condition, participants were asked to write an unofficial description of of a law prohibiting a crime.

As in Experiment 1, both conditions had an associated cover story explaining the motivation behind the task. As in Experiment 1, participants in the law condition were told that they were a “lawmaker” who was “tasked with writing a law that prohibits a certain crime, and specifies the punishment for that crime if the crime is committed.” In the description condition, participants were told that they were a “tour guide” working in a country with strict crime laws. In order to raise awareness among foreign customers of the crime laws, they were “tasked with writing a description of the preconditions for a particular crime in your country, as well as the punishment for committing that crime.”

In order to control for potential order effects, the second manipulation was ordering, whose conditions consisted of a *guilt-first* condition and an *punishment-first* condition. In the guilt-first condition, the details of the crime in question were presented such that the requirements of guilt for the offense were presented first, followed by the punishment of

the offense. In the punishment-first condition, the ordering was reversed, such that the punishment of the offense was presented first, followed by the requirements of guilt. Unlike Experiment 1, there was no sequencing manipulation—across all conditions, the materials asked participants to write their law or description all-at-once from scratch instead of in stages.

Participants and Procedure Participants (n=80) were recruited via the online platform Prolific. This sample size was based on a power analysis, which determined the number of participants that would give us an approximately 80% chance to detect an effect size that was at least 1/5 as large as the effect of genre obtained in Experiment 1. Participants were eligible if they resided in the United States, were 18 years or older, and native speakers of English. Each participant completed 8 trials of the same series of tasks.

On a given trial, participants were presented with materials in one of the four conditions, and asked to write a text of the appropriate genre. Across the 8 trials, each participant was presented with 2 items in each of the 4 conditions, never seeing the same item more than once. As in Experiment 1, participants were given a comprehension check prior to each trial, were asked before and after the experiment to promise to not use / have used a language model to generate their responses, and were retained according to the same exclusion criteria.

Analysis Plan Responses were tokenized and coded for center-embedding following the same procedure as in Experiment 1. As in Experiment 1, we analyzed the effect of our two manipulations on the prevalence of center-embedding by conducting two separate regressions for each of the two operationalizations of center-embedding, including (a) a mixed-effects binary logistic regression with the binary presence of center-embedding (in a given sentence) as the outcome variable; and (b) a mixed-effects Poisson regression with degree of center-embedding as the outcome variable. Both regressions featured (a) genre, ordering and their interaction as fixed-effects; and (b) genre, ordering, item and participant as random effects. Results did not qualitatively change for either regression. We therefore report both in the text.

Results

Experiment 1

Results are visualized in Figure 1. In line with the predictions of the magic spell hypothesis, participants’ responses contained a higher percentage of sentences with center-embedding in the law condition (48.1%; 95% CI: 46.0 to 51.1) compared to responses in the story condition (5.8%; 95% CI: 5.2 to 6.2). The difference was striking [OR: 8.3], and significant ($\beta = 2.859, SE = .113, p < .0001$), and held true when looking at the number of center-embedded clauses per sentence ($\beta = 3.126, SE = .204, p < .0001$) as opposed to just the percentage of sentences with center-embedded clauses.

Contrary to the predictions of the copy-and-edit hypothe-

sis, participants in the editing condition were not significantly more likely to center-embed than in the from-scratch condition ($p=.262$), nor was there an interaction between genre and editing manipulations ($p=.244$). This was true both when looking at the number of center-embedded clauses per sentence and when examining the percentage of sentences with center-embedded clauses ($p=.755$ for editing manipulation; $p=.165$ for interaction between editing and genre manipulations).

Experiment 2

Results are visualized in Figure 2. As in Experiment 1, in line with the magic spell hypothesis, participants were more likely to produce sentences containing center-embedded clauses in the law condition (54.6%; 95% CI: 50.3 to 59.1) than in the control condition (25.7%; 95% CI: 22.5 to 28.9). The difference was significant both when looking at the number of center-embedded clauses per sentence ($\beta =1.391, SE=.184, p<.0001$) as well as the percentage of sentences with center-embedded clauses ($\beta =1.552, SE=.227, p<.0001$).

The results of the ordering manipulation were also consistent with the magic spell hypothesis, as participants were not significantly more likely to produce sentences with center-embedding in the guilt-first condition ($p=.613$) than in the punishment-first condition, nor was there an interaction between genre and ordering manipulation ($p=.414$). Converging results were found when analyzing the the number of center-embedded clauses per sentence ($p=.362$ for ordering manipulation; $p=.274$ for interaction between ordering and genre manipulations).

Discussion

This paper has empirically investigated the long-puzzling question of why laws are written in a complex manner, testing two leading hypotheses across two well-powered, pre-registered experiments.

In line with the magic spell hypothesis, we found that people tasked with drafting laws wrote in a more convoluted manner than when tasked with drafting various control texts of plausibly equivalent conceptual complexity. Contrary to the copy-and-edit hypothesis, we did not find evidence that people editing a legal document wrote in a more convoluted manner than when writing the document from scratch.

These lines of evidence were robust to various control attempts, including (a) comparing laws to different genres (stories and descriptions of laws) to serve as control texts; and (b) manipulating the order in which specifications of a given law were presented (requirements of guilt first vs punishment first).

Answering this question is relevant to advancing long-standing questions of both cognitive science and legal doctrine / public policy.

On the cognitive science side, as documented above, there is a burgeoning psycholinguistics literature documenting the various domains in which communicative efficiency shapes

human language (Gibson et al., 2019; Piantadosi et al., 2011, 2012; Piantadosi, 2014; Mahowald et al., 2013, 2018; Futrell & Gibson, 2017; Futrell & Levy, 2017; Ryskin et al., 2018; Zhang et al., 2023; Gibson, Piantadosi, et al., 2013; Gibson, Bergen, & Piantadosi, 2013). Given that law stands as an attested exception to this observed efficiency, uncovering the cognitive factors giving rise to the processing difficulties of legal documents can help inform the degree and domains in which human language is optimized for communicative efficiency, as well as the factors giving rise to said (in)efficiency.

In particular, these results suggest law to be a type of performative utterance (Austin, 2013), meant not just to communicate states of the world but to explicitly alter the state of the world. In such instances, distinctive low-frequency structures may be inserted in order to effectively signal the performative nature of the utterance, which in turn might increase processing demands on readers. In the case of other types of performative language, such as “actual” magic spells, such structures may include rhyming (e.g. “Double, double toil and trouble; Fire burn, and cauldron bubble” (Shakespeare, 2024)) or foreign-sounding terminology (e.g. “Wingardium Leviosa” (Rowling, 2015)). In the case of laws, this deviation may come largely in the form of altering the syntactic structure of the clausal material from right-branching to center-embedded, creating as a byproduct an overload on a reader’s working memory capacity.

On the law and policy side, these results add to an emerging body of literature demonstrating that the language of legal documents can be simplified without a loss or distortion of legal content (Martínez et al., 2022; Martinez et al., 2023; Martinez et al., in press), which might provide a source of optimism to efforts to simplify legal documents (which have been advocated for for decades (Blasie, 2021), to no avail (Martinez et al., in press)). These findings also shed insight into debates related to the aforementioned legal doctrines that expressly assert or implicitly assume that laws be understandable to the public at-large. Jurists have long acknowledged the tension between the doctrinal mandate that laws be understandable to the common person and the observation that laws are not understandable to the common person (*McBoyle v. United States*, 1931; *Moskal v. United States*, 1990; *Grayned v. City of Rockford*, 1972; *Hoffman Estates v. Flipside, Hoffman Estates, Inc.*, 1982). Whereas recent proposals to resolve this tension have taken for granted the necessity of law’s complexity and have called for scaling back the mandate that laws be accessible to the common person (Cross, 2023), our results suggest such compromises may not be necessary. Instead, our results indicate that lawmakers can faithfully comply with this mandate while simultaneously preserving the desired level of conceptual complexity

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