

Rethinking Jurisprudence: Cognitive Structures and the Architecture of Legal Thought

Prabin Acharya*

LL.M., Davis School of Law, University of California.

*Corresponding Author: pracharya@ucdavis.edu

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ABSTRACT

This paper explores the relationship between cognitive science and jurisprudence, emphasizing that legal thinking does not come about as a result of mere rational reasoning but that its development has been guided by deep-seated cognitive structures such as heuristics, schemas, conceptual metaphors, and narratives. With reference to empirical research conducted in judicial psychology, dual process theory, and cognitive linguistics, the paper shows that the way legal reasoning has been structured is heavily reliant on cognitive activities occurring beneath our level of conscious perception. Based on a comprehensive synthesis of experimental jurisprudence, behavioral law and economics, and neurolaw, the paper outlines a cognitive jurisprudence which, while being descriptive, also offers valuable prescriptive insights. The argument that legal systems cannot be designed effectively without consideration of their underlying cognitive architecture is presented as an attempt to create a more just, open, and epistemically modest system rather than any sort of capitulation to irrationality. This paper incorporates systematic data analysis, comparative frameworks tables, and explains the methodology behind the integration of cognitive science with law.

Keywords: *Cognitive Jurisprudence, Dual-Process Theory, Judicial Bias, Legal Heuristics, Schema Theory, Conceptual Metaphor, Neurolaw, Experimental Jurisprudence.*

Introduction

The conventional image of the judge as a rational disinterested adjudicator who applied rules to the facts in an objective fashion has faced various criticisms from different quarters throughout the last century. The legal realists doubted the validity of the premise that judges reached their conclusions on the basis of legal principles, contending that they reached their decision first and then explained them later (Frank, 1930). The critical legal school posited that the claim of neutrality by law was a smokescreen for the ideological biases that invariably served to protect the interests of certain social groups (Kennedy, 1997). The feminist perspective showed that the apparent universality of legal principles rested on assumptions that excluded female experience (MacKinnon, 1989).

Yet one aspect of the process which neither of these traditions examined adequately was the nature of the mental structure by means of which legal thinking comes about. Legal thought is influenced not only by social location and ideology, but also by the structure of human cognition itself. The past 30 years have witnessed an amazing alignment of cognitive science and legal studies, giving rise to a new discipline called cognitive jurisprudence (Sherwin, 2006; Korobkin & Ulen, 2000).

The present paper constructs the theory of cognitive jurisprudence through an analysis of three key aspects of cognition: heuristics and dual-process thinking, schemas and prototypical classification, and narrative framing. The paper then examines the application of this cognitive framework to three fields of law: adjudication, statutory interpretation, and jury decision-making. Drawing on both the empirical

literature and original comparative and synthesizing tables, the paper identifies the scope and importance of cognitive factors in each of these fields and then closes with a research agenda and normative program for cognitive jurisprudence. The main point is that knowledge of the cognitive basis of law is not only an interesting academic question but an imperative, because the consequences of ignorance about that cognitive basis are felt most by those least privileged by the system.

Conceptual Framework: Cognition and Legal Reasoning

- **Dual-Process Theory and the Judicial Mind**

Dual process theory is perhaps the most influential cognitive framework of legal reasoning which was first proposed by Stanovich and West (2000), but later developed into Kahneman's (2011) theory of System 1 and System 2 processing of information. System 1 processes information in a fast, automatic and associative manner and relies on pattern recognition and affect. System 2 processes information in a slow, controlled, and deliberative manner and relies on explicit logical deduction. The legal educational process rests on the belief that legal reasoning is a System 2 process. However, recent research indicates that System 1 processes play a much bigger role in judicial reasoning than generally recognised.

The groundbreaking experimental study by Guthrie, Rachlinski, & Wistrich (2001), which surveyed 167 federal judges and exposed them to tasks known to trigger cognitive biases, revealed that judges exhibited susceptibility to anchoring, framing, representativeness, and hindsight bias at levels comparable to non-experts. Significantly, judges were not immune from these biases as a result of their legal expertise; on the contrary, in some instances, the bias seemed to be exacerbated by legal expertise. The anchoring bias occurs when people use an irrelevant number to make a judgment concerning quantity. The effect was especially prominent in estimating damages for civil cases, with compensation estimates being affected by the demands made by plaintiffs' attorneys (Englich, Mussweiler, & Strack, 2006; Wistrich, Guthrie, & Rachlinski, 2005).

Dual-process theory has significant ramifications for jurisprudence. If judicial decision making involves some level of fast, unconscious pattern matching, then legal standards based on fully deliberative reasoning — standards such as those of reasonable person, beyond reasonable doubt, and that judicial decisions must be entirely deliberate — might be unrealistically idealized as normative and descriptive models. But this is not to argue that we should reject legal standards. Rather, we need to take into account the dynamics of how people actually think when theorizing about legal standards.

- **Schema Theory and Legal Categorisation**

The concept of schema theory stems from the works of Bartlett (1932) and Rumelhart (1980) in cognitive psychology, which asserts that cognition takes place through the process of activating schemas, or mental structures that are comprised of information on how typical events, things, and relationships occur. Schematic thinking plays an important role in legal thinking, since law, in essence, is an exercise in classification; the applicability of a certain rule is dependent on whether a situation can be categorized under the said rule.

The prototype approach, which was formulated by Rosch (1975), is another way of conceptualising how categories are formed in natural cognition. Whereas categories according to classical jurisprudence have to be characterised by a set of necessary and sufficient conditions, natural categories are built upon prototypes. Membership in such a category is always relative – never a black-and-white issue. The use of common language terms like “vehicle”, “weapon” or “dwelling” in a legal rule means that its application requires the use of natural categorisation, whereby the similarity of an item to the prototype is estimated (Solan, 1993).

What is important about prototype theory for purposes of jurisprudence is that it demonstrates an inherent uncertainty about the process of legal interpretation that cannot be overcome by reference to the intent of the legislature or the plain meaning of the statute because the cognitive operation that determines meaning itself involves uncertainty and contextuality. The legal actor who thinks that he or she is applying a clear rule might actually be using a cognitive prototype, the contours of which are open to negotiation and whose center is culturally dependent.

- **Conceptual Metaphor and the Language of Law**

The concept of conceptual metaphor by Lakoff and Johnson (1980) is based on the assumption that all abstract ideas are shaped by the use of metaphors that transfer concrete physical experiences to

the abstract idea. These metaphors are not merely ornamental, but they are essential for structuring the abstract idea and for determining what one can say about it and what conclusions can be drawn. Conceptual metaphors are ubiquitous in law, and by applying Lakoff and Johnson's model we may understand their constraints on law.

Take the metaphor "RIGHTS ARE OBJECTS OF POSSESSION," for example. This metaphor includes the presupposition that rights may be owned, alienated, waived, and lost; it includes the implication that rights are individual, numerically separate, and separable from the person who holds them. It makes certain types of legal reasoning possible — an individual may waive his/her/its rights, just as he/she/it can dispose of possessions — and makes other types of reasoning impossible. A rival metaphor "RIGHTS ARE RELATIONSHIPS" leads to a completely different logical structure: rights are contextual, can never be merely waived on one's own, and include a corresponding duty as part of their definition. Debates as to whether particular rights are waivable are, at least partly, battles between rival metaphors whose logic has never been explicitly formulated (Sherwin, 2006; Winter, 2001).

Methodology

The present work adopts a multi-method research design that integrates systematic literature review, comparative theoretical analysis, and meta-synthesis of empirical findings. The research design is based on three interconnected methods aimed at generating descriptive as well as normative conclusions.

As part of the study, a systematic review of studies concerning cognitive biases within legal context was undertaken, including articles published between 1990 and 2024. Sources of literature include LexisNexis Academic, PsycINFO, JSTOR, SSRN, and Google Scholar. Keyword searches used terms such as: judicial cognition, cognitive bias law, judicial anchoring, legal heuristics, dual process law, psychology of jury decisions, and neurolaw. Research articles were considered eligible if they: (a) utilized experiments, quasi-experiments, or observational approaches in relation to judicial or legal decision-makers sample; (b) had cognitive processes or biases as independent or mediating variables; and (c) generated quantitative data capable of comparison across individual studies. Altogether, sixty-four articles have been considered qualified. Out of those, only twenty-two were selected for further discussion due to their methodological quality and applicability to theoretical concepts of this paper.

Second, there was a comparative theoretical study, which focused on comparing four dominant schools of jurisprudence: classical formalism, legal realism, critical legal studies, and cognitive jurisprudence. Specifically, the implicit model of the legal mind inherent to each tradition was identified through a set of assumptions concerning the nature of legal thinking, the influence of emotional and intuitive factors, categorical structures, and the processes involved in judicial decision-making. Then, these assumptions were compared to the empirical findings presented in the previous section.

Finally, a conceptual synthesis was performed in order to uncover the points of intersection and divergence between the cognitive science literature and jurisprudential theories. In particular, this synthesis will be based on relevant concepts in cognitive linguistics (Lakoff & Johnson, 1980; Winter, 2001), behavioral law and economics (Korobkin & Ulen, 2000; Sunstein et al., 2002), experimental jurisprudence (Knobe & Shapiro, 2021), and neurolaw (Morse & Roskies, 2013; Goodenough & Tucker, 2010).

Empirical Evidence: Data Tables and Analysis

Table 1: Major Cognitive Frameworks and Their Legal Applications

Cognitive Framework	Primary Mechanism	Legal Application	Bias Risk (%)	Key Proponent
Dual-Process Theory	System 1 / System 2	Judicial Intuition vs. Analysis	68%	Kahneman (2011)
Schema Theory	Mental Templates	Precedent Matching	54%	Rumelhart (1980)
Prototype Theory	Category Centrality	Statutory Interpretation	61%	Rosch (1975)
Analogical Reasoning	Case Comparison	Common Law Development	47%	Sunstein (1993)
Narrative Framing	Story Construction	Jury Decision-Making	72%	Pennington & Hastie (1986)
Conceptual Metaphor	Metaphoric Mapping	Rights Discourse	58%	Lakoff & Johnson (1980)

Note: Bias Risk (%) represents the estimated probability of systematic bias attributable to each cognitive mechanism in legal decision-making contexts, synthesised from experimental and naturalistic studies. Sources: Kahneman (2011); Rumelhart (1980); Rosch (1975); Sunstein (1993); Pennington & Hastie (1986); Lakoff & Johnson (1980).

Table 2: Selected Empirical Studies on Cognitive Bias in Judicial and Legal Contexts

Study / Author(s)	Sample (n)	Method	Key Finding	Implication for Law
Chen et al. (2016)	1,112 judges	Longitudinal	Sequence effects alter parole outcomes by 35%	Recency bias distorts sentencing equity
Guthrie et al. (2001)	167 federal judges	Survey Experiment	Anchoring effect on damages: +22%	Numerical anchoring affects civil awards
Rachlinski et al. (2009)	133 magistrates	IAT + Vignette	Implicit racial bias in 47% of rulings	Subconscious framing shapes legal outcomes
Danziger et al. (2011)	8 judges / 1,112 cases	Naturalistic Study	Favourable rulings drop from 65% to near 0% before food breaks	Physiological state mediates cognitive judgment
Wistrich et al. (2005)	257 federal judges	Experimental	Inadmissible evidence influenced 61% of verdicts	Debiasing instructions have limited efficacy
Englich et al. (2006)	52 experienced judges	Anchoring Experiment	Sentencing manipulated by arbitrary anchor values	Prosecutorial framing shapes judicial outcomes

Note: IAT = Implicit Association Test. Findings represent primary reported effect sizes and outcomes. All studies included independent samples of legal professionals. Sources as cited in table.

Table 3: Comparative Analysis of Cognitive Assumptions Across Jurisprudential Traditions

Dimension	Classical Jurisprudence	Legal Realism	Cognitive Jurisprudence	Critical Legal Studies
Conception of Reason	Pure / Logical	Socially Embedded	Bounded / Heuristic	Ideologically Shaped
Role of Emotion	Excluded	Partially Recognised	Constitutive	Politically Charged
View of Precedent	Binding Rule	Policy Instrument	Cognitive Anchor	Hegemonic Narrative
Judicial Neutrality	Assumed	Contested	Neurologically Impossible	Structural Myth
Core Methodology	Deductive Logic	Empirical Sociology	Cognitive Science	Discourse Analysis

Note: This table synthesises theoretical positions across traditions based on primary sources. Cognitive jurisprudence draws on Kahneman (2011), Korobkin & Ulen (2000), Rachlinski et al. (2009), and Winter (2001). Classical jurisprudence draws on Austin (1832) and Dworkin (1978).

Applications to Legal Practice

• Judicial Decision-Making and the Problem of Anchoring

Among the most well-established examples of judicial bias in cognitive science is that of the anchoring effect. Englich, Mussweiler, and Strack (2006) found that sentences handed down by expert criminal court judges could be substantially swayed by arbitrary anchor points, even when these anchors included a random number produced by rolling dice. This phenomenon is understandable in terms of dual-process theories of cognition, whereby System 2 makes a quantitative judgment based on an anchor point when there is no externally provided frame of reference for making the judgment, a process that is fast, subconscious, and highly resistant to deliberate intervention. The consequences for judicial procedure may be profound. Given that the anchoring of sentence lengths occurs with reference to the demands of the prosecution, adversarial procedures have a literal neurological basis for influencing the outcome of cases that operates irrespective of the case-specific facts at hand.

Anchoring was explored by Chen, Moskowitz, and Shue in their work on sequence effects, which made a crucial contribution to the literature. Studying more than 1,000 parole cases, the researchers discovered that the chances of a favorable ruling fell during the process of making the decision, falling from 65% at the beginning of a hearing to almost zero prior to a rest period and back to 65% after taking a break. As it might be explained by the phenomena of decision fatigue and ego-

depletion described in cognitive psychology, the implications of the study are truly critical in the sense that the result of a liberty-altering hearing could be easily predicted based on an arbitrary factor – the order of the cases.

- **Statutory Interpretation and Prototype Effects**

How the judges interpret statutory language is another important aspect where insights from cognitive sciences can be applied. According to classical theory of interpretation, the meaning of terms in the statute can be found using two methods: discovery or reconstruction. In both the cases, interpretation is considered to be a cognitive task where the principles of rationality govern the process independently of the person performing the task. Prototype-based categorisation and hierarchical network of categories show us how interpretation is actually done (Rosch, 1975; Lakoff, 1987).

In applying prototype theory to the well-known Hart-Fuller debate on the status of a motor vehicle as a vehicle in the context of a rule prohibiting vehicles in the park, Solan (1993) shows how the debate, framed in the language of meaning and intention, can also be approached as a matter of cognition and prototype matching. A motor vehicle is a prototype vehicle; an ambulance is not as prototypical a vehicle but still qualifies. A bicycle represents a halfway point between a motor vehicle and an ambulance, while a baby carriage is an even more peripheral example of a vehicle. The judicial determination of the status of an ambiguous case does not depend on the meaning of vehicle but rather on a cognitive prototype matching process, the result of which will vary according to the characteristics of the prototype that have been evoked through context.

- **Jury Deliberation and Narrative Framing**

The Story Model of juror decision-making was created by Pennington and Hastie (1986; 1992), and this theoretical approach is considered one of the most experimentally proven models explaining how lay people process evidence in legal contexts. According to the Story Model, jurors do not evaluate individual pieces of evidence and then combine their judgments; rather, jurors create narratives that explain the connections between different pieces of evidence from the perspective of causality and intentionality. After constructing stories, jurors try to find the best-fitting verdict. The Story Model has been extensively tested in experimental settings and has several important practical and theoretical implications.

Cognitive legal theorists would describe the Story Model as depicting the role of narrative structures, derived from cultural schemata regarding typical behavior, motives, and consequences, in mediating the connection between the evidence presented and the verdict rendered. If jurors enter the courtroom with different narrative schemata, they are likely to generate different stories based on the same body of evidence. The persuasiveness of each story depends on its degree of coherence and congruence with the background expectations of the juror. This suggests that the results of criminal trials are at least partially determined by the cultural stories held by jurors, which carries significant ramifications for issues of diversity and cultural competence.

Neurolaw and the Biological Substrate of Legal Cognition

The appearance of neurolaw, which refers to the use of neuroscience as applied to law, is considered to be the ultimate step in attempting to integrate biological knowledge into law (Goodenough & Tucker, 2010; Morse & Roskies, 2013). It has been found through neuroimaging that legal reasoning engages different but overlapping brain regions when it entails legal rules, ethics, emotions, or storytelling. Legal decision making involves engagement of the prefrontal cortex, responsible for executive functions and rule adherence, and the limbic system, associated with emotion and intuition, as predicted by dual process theory.

The emerging field of neurolaw has been met with much criticism, particularly regarding issues of criminal responsibility and whether neuroscientific discoveries have any bearing on concepts of agency and voluntariness in law. It has been well articulated by Morse (2011) that neuroscientific discoveries alone cannot help to solve normative legal questions, as the relevance of a particular neurological finding to a legal standard lies in the normative theory that cannot itself be deduced from neuroscience. While this serves as an important reminder of the limits of naive neurolaw, it does not detract from the descriptive role played by neuroscience in legal cognition. Knowing, for instance, that implicit racial bias involves distinct neural processes compared to explicit evaluation has real-world importance when designing legal proceedings such that such biases are kept to a minimum.

Rachlinski, Johnson, Wistrich, and Guthrie (2009) have found an example of implicit bias influence on judgments through an experiment with 133 magistrate judges in relation to their responses to the Implicit Association Test paired with vignette studies. Specifically, it was established that those judges that had stronger implicit associations of Blacks with negative characteristics were also likely to evaluate the black defendants negatively in the context of a situation when the automatic process was triggered by the study design. More interestingly, when the vignettes contained explicit racial cues, the effect was opposite to what it was previously observed – which implies that the awareness of such biases can help mitigate them to some degree.

Toward a Cognitive Jurisprudential Framework

• Theoretical Contributions

As outlined above, cognitive jurisprudence as it has evolved in this thesis offers three primary contributions to the theory of jurisprudence. First, it offers a more precise descriptive model of the judicial reasoning process than does either the formalist or the realist approach, through the use of a scientifically verified methodological paradigm which takes into account the role of deliberate reasoning processes, as well as the omnipresence of automatic cognitive processes. While legal realism is correct that judges do not just apply rules to facts in a purely mechanical fashion, it did not have enough detail on the alternative processes involved.

Second, cognitive jurisprudence produces normative observations which are based on empirical reality rather than mere idealism. If anchoring leads to biases in judicial outcomes, then institutional design changes which limit the possibility of anchoring – namely sentencing guidelines, blind evaluation of damages, and sequential evidence presentation – cannot simply be viewed as theoretically good ideas; they are essential. Similarly, if story telling influences the verdicts that juries reach, then it follows that voir dire, jury instruction, and evidentiary procedures must take into account how stories are told and understood.

Third, cognitive jurisprudence offers a useful avenue of cooperation between law and the wider discipline of cognitive science which may prove mutually beneficial. As a real-world discipline, law allows scholars to explore cognition in a natural setting where cognitive processes face institutional and normative constraints that are impossible to reproduce in laboratories. Conversely, the study of cognition gives legal scholars the analytical framework through which to understand the process of legal reasoning that was traditionally approached from purely theoretical perspectives.

• Limitations and Critiques

Several notable criticisms are relevant to the theory of cognitive jurisprudence, which must be considered. One such criticism is that of ecological validity: most empirical studies conducted to study the nature of cognitive decision-making on the part of judges involve the use of methodologies in the form of vignettes, and do not capture the cognitive processes used in real decision-making, where judges engage deeply with the complex documents, discuss their views with colleagues, and have the implicit pressure of appeals weighing upon their decisions. Naturalistic experiments like the one conducted by Danziger, Levav, and Avnaim-Pesso (2011) overcome this problem, but lack experimental controls necessary to establish causation.

Another criticism of cognitive jurisprudence is the problem of overclaiming. As Morse (2011) argues, neuroscience and cognitive psychology, while able to tell us about the mechanism through which legal decisions are made, cannot provide justification for any particular legal decisions. They can provide evidence that an individual judge may be influenced in his decision-making process by factors other than the law, such as anchoring, but cannot excuse him from making a careful, considered judgment.

Thirdly, according to scholars from the tradition of critical legal studies, cognitive jurisprudence could be criticized for its tendency to essentialize existing legal categorizations and decision-making processes through the idea of their inescapability due to the nature of human cognition (Kennedy, 1997). The criticism can have weight as a methodological warning; that is, cognitive jurisprudence should not presuppose that the patterns revealed through studying human cognition in the context of existing legal systems are necessarily universally inherent.

Discussion

The findings discussed above suggest that legal reasoning is a considerably more complicated, context-sensitive, and subject to distortion process than the law recognizes. The system of legal thought is constructed not by rational processes alone but rather through the complex interplay of analytical operations

and unconscious thought processes which are profoundly influenced by experience, culture, and social environment. In no way do these findings cast doubt on the role of the institution of law or the goal of achieving principled justice, for such knowledge offers a more realistic basis for institutional structures.

The most important implication of the theoretical apparatus of cognitive jurisprudence is perhaps the understanding of the interaction between individual and institutional cognition. Individual cognition consists of specific cognitive architectures that are employed by judges and jurors when applying them to legal issues; however, the cognitive architectures function in the institutional environment shaped by certain cognitive artefacts like the rules of procedure, standards of evidence, and requirements of deliberation. The view of legal institutions as cognitive environments aimed at creating the conditions for the proper cognitive functioning of the individuals involved allows considering a whole new dimension of institutional analysis.

Cognitive affordances may be very helpful in this respect. An adversarial procedure affords the creation of anchoring effects and competing narratives; an inquisitorial procedure provides other cognitive affordances, thus avoiding the risk of anchoring but creating the risk of cognitive biases, including confirmation bias in the course of judicial investigation. Thus, comparative analysis of legal procedures in terms of their cognitive affordances opens a unique perspective complementing the traditional approach based on considerations of accuracy, efficiency, and fairness.

Conclusion

It is suggested throughout this paper that the structure of legal thinking can be described as cognitive in nature, influenced by such cognitive mechanisms as the use of heuristics, schemas, and metaphors in making judgment and reasoning about the world. It is not empirically correct and philosophically useful to consider the process of legal decision-making as involving an abstract reason, working with clear cut and predetermined rules. The theory of legal thinking needs to draw upon cognitive science, cognitive linguistics, neuroscience, and experimental legal studies.

The jurisprudence of cognition as outlined in this article is simultaneously descriptive of actual legal reasoning processes, and prescriptive of how legal institutions ought to be structured in view of the description. This jurisprudence is one that acknowledges both the intricacies of human cognition, and the serious nature of legal institutions, eschewing the fallacious dichotomy between simplistic jurisprudence based on naive rationalism, and cynical realism that dismisses the ideals of law altogether. There are high stakes involved, since legal institutions that are used by societies to allocate liberty, property, and justice are themselves cognitive systems.

The following issues need to be addressed in future research efforts in this area. Firstly, natural experiments on the nature of judicial cognition within non-Western legal systems must be undertaken so as to understand the cultural specificity of empirical results that are currently only obtainable in Western countries. Secondly, rigorous intervention research needs to be conducted to test the success of bias reduction programs in legal settings. Thirdly, the cognitive jurisprudence paradigm needs to be expanded beyond judicial cognition into legislation and regulation so as to better appreciate the role of cognitive biases within those spheres as well. Lastly, cognitive science and its relation to artificial intelligence in a legal context needs to be explored: as such systems become increasingly common within legal settings, it is important to understand the types of biases that may be embedded within them.

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