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Essay

Cognition, Law, Stories

Lorie M. Graham* & Stephen M. McJohn**

Steven Pinker's *The Stuff of Thought*¹ explores “the view from language—what we can learn about human nature from the meanings of words and constructions and how they are used.”² Cognitive science interacts in many ways with law: how we reason, decide, intend, moralize, and perceive. Legal scholars have increasingly looked to cognitive science to re-examine the assumptions the law makes about human decisionmaking.³ Cognitive science has been deployed in such diverse areas as contract law,⁴ criminal law,⁵ evidence,⁶ civil rights,⁷ trademark law,⁸ capital punishment,⁹ prosecutorial

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1. STEVEN PINKER, *THE STUFF OF THOUGHT* (2007).
2. *Id.* at 427.
3. See generally STEVEN L. WINTER, *A CLEARING IN THE FOREST: LAW, LIFE, AND MIND* (2001) (applying cognitive science to a number of issues in jurisprudence).
4. Henry E. Smith, *Modularity in Contracts: Boilerplate and Information Flow*, 104 MICH. L. REV. 1175, 1176 (2006) (discussing how modularity, as in standard contract terms, can aid in mental processing of complexity).
5. Deborah W. Denno, *Crime and Consciousness: Science and Involuntary Acts*, 87 MINN. L. REV. 269, 272 (2002) (proposing reforms to the criminal law concept of a voluntary act, because “modern neuroscientific research has revealed a far more fluid and dynamic relationship between conscious and unconscious processes”).
6. See, e.g., D. Michael Risinger & Jeffrey L. Loop, *Three Card Monte, Monty Hall, Modus Operandi and “Offender Profiling”: Some Lessons of Modern Cognitive Science for the Law of Evidence*, 24 CARDOZO L. REV. 193, 196 (2002) (“The last quarter century has seen mounting evidence that humans manifest specific and predictable weaknesses in dealing with certain kinds of information under definable conditions, which weaknesses are reflected in traditional proof law imperfectly or not at all.”).
7. Cheryl I. Harris, *Whitewashing Race: Scapegoating Culture*, 94 CAL. L. REV. 907, 927–28 (2006) (critiquing legal institutions premised on

discretion,¹⁰ jurisprudence,¹¹ trade secrets,¹² and legal education.¹³ Legal scholars have made many proposals to adapt legal doctrine to account for cognitive biases in decisionmaking,¹⁴ while a second wave has recognized that

colorblindness, and relying on new literature on cognitive bias, which includes an array of new facts about how the brain processes racial difference. Even when we aspire to take no account of race, it turns out that our brains function to do so beneath the level of our conscious awareness); Linda Hamilton Krieger, *The Content of Our Categories: A Cognitive Bias Approach to Discrimination and Equal Employment Opportunity*, 47 STAN. L. REV. 1161, 1186–1217 (1995); see also, e.g., Eric J. Mitnick, *Law, Cognition, and Identity*, 67 LA. L. REV. 823 (2007).

8. Barton Beebe, *An Empirical Study of the Multifactor Tests for Trademark Infringement*, 94 CAL. L. REV. 1581, 1587–1654 (2006) (analyzing trademark infringement’s likelihood of confusion test in light of the theory of “coherence-based reasoning”); Rebecca Tushnet, *Gone in Sixty Milliseconds: Trademark Law and Cognitive Science*, 86 TEX. L. REV. 507 (2008) (cautioning about importing cognitive science into legal rules without empirical support).

9. O. Carter Snead, *Neuroimaging and the “Complexity” of Capital Punishment*, 82 N.Y.U. L. REV. 1265 (2007).

10. Alafair S. Burke, *Improving Prosecutorial Decision Making: Some Lessons of Cognitive Science*, 47 WM. & MARY L. REV. 1587, 1590–91 (2006) (“A compelling body of cognitive research demonstrates that people systematically hold a set of cognitive biases, rendering them neither perfectly rational information processors, nor wholly random or irrational decision makers.”).

11. See e.g., Scott Fruehwald, *The Emperor Has No Clothes: Postmodern Legal Thought and Cognitive Science*, 23 GA. ST. U. L. REV. 375 (2006); John Mikhail, *“Plucking the Mask of Mystery from Its Face”: Jurisprudence and H.L.A. Hart*, 95 GEO. L.J. 733, 737 (2007) (reexamining H.L.A. Hart’s legal philosophy “in light of recent developments in philosophy, linguistics, cognitive science, and law”); Cass R. Sunstein, *Behavioral Analysis of Law*, 64 U. CHI. L. REV. 1175, 1194 (1997) (arguing that “[E]conomic analysis of law has proceeded on the basis of inaccurate understandings of decision and choice” that fail to account for common cognitive errors). Specific approaches to legal theory may be considerably changed by cognitive science. See Terrence Chorvat, Kevin McCabe & Vernon Smith, *Law and Neuroeconomics*, 13 SUP. CT. ECON. REV. 35 (2005); Jedediah Purdy, *The Promise (and Limits) of Neuroeconomics*, 58 ALA. L. REV. 1 (2006).

12. Yuval Feldman, *The Behavioral Foundations of Trade Secrets: Tangibility, Authorship, and Legality*, 3 J. EMPIRICAL LEGAL STUD. 197 (2006).

13. Deborah Jones Merritt, *Legal Education in the Age of Cognitive Science and Advanced Classroom Technology* (Ohio State Pub. Law Working Paper, Paper No. 94, 2007), available at <http://ssrn.com/abstract=1007800>.

14. A concise portrait of some of the many biases that can affect a group of decision makers:

- The committee might overgeneralize from dramatic and emotionally striking events (the availability heuristic) or from small unrepresentative samples (the

cognitive errors may have benefits, both for individuals and society at large.¹⁵ The Supreme Court, for example, recently sought to guard patent law against the “distortion caused by hindsight bias” in assessing the inventiveness of an innovation.¹⁶

The Stuff of Thought offers insights from cognitive science just where it overlaps the most with law: cognitive linguistics. Cognitive linguistics analyzes language to uncover how

representativeness heuristic).

- The committee might anchor its decisionmaking on an arbitrary starting point and filter factual evidence through the lens of that bias (anchoring or cognitive dissonance).
- The committee might impute its members’ own views and preferences to everyone else, an assumption that reflects lack of empathy or understanding of others’ different situations (the egocentrism bias).
- The committee might tend to defer to experts (the expert-deference bias, also hypervigilance) who themselves tend to be overconfident about their conclusions (the overconfidence bias).
- If the committee is composed of like-thinking persons, deliberation might tend to skew the committee’s conclusions toward positions more extreme than those with which the members started (the polarization effect). Conversely, more heterogeneous committees may tend to avoid the best solutions if they seem too radical (the extremeness aversion). In either event, there is a danger that committee members will go along with a proposal only because they think “everyone thinks this way” (the cascade effect).
- If the problem is complex, the committee may be overwhelmed and paralyzed (information overload) or driven away from correct but extreme positions (the dilution effect) by considering too much information, and may consequently be unduly deferential to other decisionmakers (hypervigilance, noted above).

William N. Eskridge, Jr. & John Ferejohn, *Structuring Lawmaking to Reduce Cognitive Bias: A Critical View*, 87 CORNELL L. REV. 616, 621–22 (2002). The authors express “skepticism about recent attempts to deploy cognitive psychology to support a particular institutional design or role” because it has identified many ways in which thinking goes awry, but not how to think more reliably. *Id.* at 617.

15. Cf. Chris William Sanchirico, *Evidence, Procedure, and the Upside of Cognitive Error*, 57 STAN. L. REV. 291 (2004) (“[T]he law relies upon mental limitations, that it exploits cognitive shortcomings, and that it would not function nearly as well were humans truly perfectly rational.”); Keren Shapira-Ettinger & Ron Shapira, *The Constructive Value of Overconfidence* (Bar Ilan Univ. Pub. Law Working Paper No. 08-01, 2007), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1079762.

16. KSR Int’l Co. v. Teleflex Inc., 127 S. Ct. 1727, 1742 (2007); see also Gregory N. Mandel, *Patently Non-Obvious: Empirical Demonstration that the Hindsight Bias Renders Patent Decisions Irrational*, 67 OHIO ST. L.J. 1391 (2006).

humans use basic cognitive categories like intent, space, time, events, and causation. Cognitive linguistics shows that language is powerful and flexible because it relies on a recursive structure. Recursion is a powerful feature of human thought. A number, for example, is defined recursively: the number before it plus one. 6 is 5 +1. What's 5? 5 is 4 +1—and so on. This essay first looks at how *The Stuff of Thought* might offer insights into a broad range of issues in legal theory. Cognitive linguistics suggests that words do have a core of conventional meaning, which may be at odds with jurisprudential theories that meaning is indeterminate and courts accordingly have free rein in interpreting words. Cognitive science also suggests that people have an innate sense of causation, one that legal theories of causation should take into account. The role of metaphor in thought is another area in which cognitive linguistics has insights to offer legal theory, because there has been considerable debate about whether legal metaphors control legal doctrine. The subject of indirect speech also (and surprisingly) has implications for legal theory, because it illuminates conflicts between rules and the incentives they create.

The final part of the essay explores the cognitive aspects of stories, an approach to cognitive science that could be especially suited to legal theory. Focusing on the cognitive aspects of stories illuminates the cognitive tasks of law, such as reasoning, remembering, learning, persuading, and communicating. Relying on cognitive science concepts, we suggest that narrative plays a fundamental role in legal reasoning, in such areas as memory, moral decision-making, reasoning by analogy, explanation, and even the organization of the vast amount of information that lawyers contend with. Lawyers deal with stories, not just legal rules or analogies. We suggest a recursive definition of “story,” on the theory that stories, like sentences, are a basic object of thinking. Stories are more complex than analogies. A narrative approach provides a more dynamic view of how people think about cases.

FROM MENTALESE TO LEGALESE – WHETHER WORDS HAVE A CORE OF MEANING OR ARE INDETERMINATE

The Stuff of Thought first discusses two linked topics: what concepts are innate, and whether we think in language (whether our brain performs its basic operations using human

language or some other medium). Those topics seem far removed from the law. However, these are relevant to law because legal concepts guide the courts, whether judges are born with those concepts (we likely have an innate sense of *causation*, somewhat different from the legal concept of causation) or learn them (*perfection of a security interest* is pretty unlikely to be an innate concept). Ultimately, the end result is what matters; a murderer goes to jail, whether the intent to kill was formed in words or another medium. Still, it is interesting to analyze how concepts came to be and *The Stuff of Thought* is useful for thinking about legal reasoning in this manner.

Humans use a great number of concepts. A key question is how many of those are factory equipment coded in our DNA and how many are acquired later: learned and put together from more basic concepts. *The Stuff of Thought* shows how language—verbs in particular—seems to use a short list of basic concepts.¹⁷ Such an “inventory of thoughts . . . begins with some basic units, like events, states, things, substances, places, and goals. It specifies the basic ways in which these units can do things: acting, going, changing, being, and having.”¹⁸ The book then further lists such distinctions made by language, such as actions with a goal and actions resulting in a state; objects that are “human or nonhuman, animate or inanimate, solid or aggregate”;¹⁹ events that “tak[e] up stretches of time [or are] ordered.”²⁰ *The Stuff of Thought* works through our apparently innate conceptions of objects (how their properties are conceived), numbers (discrete for small numbers, approximate for large quantities), space (using various frames of reference as appropriate), time (which “may be thought of as a road on which we march, or as a parade that marches past us”), and events (distinguishing, most relevant for law, between events that just happen and events that are caused).²¹ These concepts are geared toward human purposes. Our spatial thinking is geared toward “manipulating things,” our sense of time toward actions, our sense of causation toward assigning responsibility.²²

17. See PINKER, *supra* note 1, at 428.

18. *Id.*

19. *Id.*

20. *Id.*

21. *Id.* at 429–31.

22. *Id.*

One could make a case that our only innate concepts are the short list of basic concepts gleaned from the analysis of language, and that other concepts are constructed from those basic building blocks. Just as plausibly, one could expand that list almost at will. One could argue that concepts like “animal,” “vegetable,” and “mineral” are innate. Categories within those concepts might be innate: perhaps evolution has equipped us with the concepts of “human,” “food animal,” and “predator.” For clarity, *The Stuff of Thought* takes on “Extreme Nativism”—the deliberately provocative idea that most of the concepts we have are innate.²³ Under this theory, each word (with some exceptions, such as coined technical terms) would refer to an innate concept. To take some at random, “marsupial,” “condominium,” and “zipper” would be innate concepts.

The best argument for Extreme Nativism is the contention that words are not like molecules, but rather are like the ancient definition of atoms. They cannot be broken down into more basic concepts. “Father” means more than simply “male parent.”²⁴ “Good” cannot be fully defined by using a set of more basic concepts. If words cannot be broken down, the argument runs, then the concept for the word must be innate.²⁵ That might seem ridiculous. How could preliterate humans have the innate concept of, say, “sonnet”? But the idea is plausible. An analogy has been made to the immune system.²⁶ The human body does not produce antibodies on demand for specific viruses and other intruders. Rather, biologists have learned that the body produces untold variations of antibodies. When a new hazard appears in the body, then an antibody may already exist to match it. The brain may produce great numbers of concepts that wait until they are useful.²⁷

The Stuff of Thought undercuts this theory with several counter-strokes, not so much to defeat the facile but far-fetched argument, but to illuminate how study of language may indirectly reveal aspects of human nature. One argument that most concepts are innate is that we seem to handle complex

23. *Id.* at 92–107 (discussing JERRY FODOR, *THE LANGUAGE OF THOUGHT* (1975)).

24. *Id.* at 94.

25. *Id.*

26. *Id.* at 96.

27. *Id.*

concepts as easily as simple ones.²⁸ A single word can denote a broad, simple concept (“food”) or a more specific and complex one (“vitamin”). But psychologists have shown that complex concepts are indeed more difficult to learn. In experiments, young children found it easier to act out concepts like “give” and “take” than more complex ones like “buy” and “sell” (buying involves both giving and taking).²⁹ People do readily use complex concepts as fluidly as simple ones, but that arises through “chunking.” Once someone has learned a more complex concept, it can be treated as a single chunk and readily used.³⁰ We use “buy” as easily as “give” because it has become a single, chunked concept. In this section, as throughout the book, the discussion of cognition lends itself quickly to law. Law school, in large part, consists of assembling chunked concepts. A tort, like battery, is composed of several elements, each of which breaks down into sub-elements. After enough practice, students and lawyers use “battery” as fluidly as “give.” Law school exams (and the bar exam) are typically specialized reading comprehension tests, where the examinee reads some text and spots the application of learned concepts.

Close analysis of verbs also helps refute the “atomic” theory of concepts, the view that words represent concepts that cannot be broken into components. Verbs divide into classes that share common concepts, reflected by which constructions speakers of a language use. In English, one might say “I hit the bat against the wall” or “I hit the wall with the bat.” However, one might say, “I cut the rope with the knife,” but not “I cut the knife against the rope.”³¹ “Cut,” unlike “hit,” entails the concept of effect (to cause a cut). *The Stuff of Thought* gives examples of four verbs with different sets of concepts (each of which represents an entire class of similar verbs):

VERB	CONCEPT
Hit	Motion, contact

28. *Id.* at 94–95.

29. *Id.* at 100 (discussing Deirde Genner, *Evidence for the Psychological Reality of Semantic Components: The Verbs of Possession*, in *EXPLORATIONS IN COGNITION* (D.A. Norman & D.E. Rumelhart eds., 1975)).

30. *Id.* at 100.

31. *Id.* at 104 (relying on BETH LEVIN, *ENGLISH VERB CLASSES AND ALTERATIONS: A PRELIMINARY INVESTIGATION* (1993)).

Cut	Motion
Break	Effect
Touch	Contact ³²

Regular usage permits each verb to be used only in certain constructions—and that set of constructions is similar for verbs triggering with the same set of concepts. So verbs are split into “crisscrossing microclasses” by concepts like motion, contact, and effect.³³ Note here that courts have made similar distinctions in interpreting language.³⁴

A related question about human cognition is whether we think in language; if someone speaks primarily Icelandic, whether her brain processes concepts by manipulating Icelandic words, or whether cognition occurs in some other medium, which one might call a “language of thought.”³⁵ *The Stuff of Thought* makes the case that the language of thought must be different from the particular language that we speak. First, the Icelandic speaker learned Icelandic. Prelinguistic infants are not unable to think. If she thinks in Icelandic, what did she think in before she learned Icelandic?³⁶ Second, experimental psychologists have shown that “human thoughts are stored in memory in a form that is far more abstract than sentences.”³⁷ After reading a set of related sentences (such as “The tree was in the front yard.”), experimental subjects did poorly at looking at a set of sentences and distinguishing those they had seen from new but similar ones. They also mistakenly thought they had read sentences that presented similar information in a composite form, by combining facts from the sentences. But they did well at remembering the gist of the sentences. This all suggests that the brain does not store the literal words so much as the meanings of sentences.³⁸ Third,

32. *Id.* at 106.

33. *Id.* at 106–07.

34. See, e.g., *County Line Cheese Co. v. Lyng*, 823 F.2d 1127, 1132 (7th Cir. 1987) (“The common meaning of the words ‘shipped to’ would seem to require that the shipper intend the milk to reach its natural destination, the tanks of the distributing plant. To put it another way, the fact that the milk needn’t stay shipped does not mean that you don’t have to ship it in the first place.”).

35. PINKER, *supra* note 1, at 125.

36. *Id.* at 148–49.

37. *Id.* at 149.

38. *Id.* (discussing J.D. Bransford & J.J. Franks, *The Abstraction of*

language does not appear to limit our thinking. People readily create new words, new meanings for old words, and new metaphorical uses for old words.³⁹

A similar, and telling, argument against the brain running on language alone is that “language itself is so badly suited as a medium of reasoning.”⁴⁰ Heresy about the limits of language coming from a book about language, written solely in language, read in language? However, humans never rely on language alone. That would be impossible, given the many meanings that a single word often has, the vagueness of literal meaning, and the manifold limits of language to describe many features of experience. Rather, humans readily understand language in context, relying on many other types of information to interpret communication.⁴¹ Polysemy provides a nice example.⁴² A word often has several distinct meanings, which people readily distinguish in communication. A single sentence often uses the same word or name in different senses: “The Boston Globe decided to change its size and typeface” uses “The Boston Globe” in the senses of an organization and an object.⁴³ Lawyers use “case” in many senses: printed judicial opinions, pending disputes in court, fictional sets of facts for discussion. If people thought only in words, all the other non-verbal information they have would be unavailable in interpreting language—but they rely on it constantly.

Two linguistic concepts, polysemy and verb classes, prove formidable obstacles to another view of word meaning, what *The Stuff of Thought* terms “Radical Pragmatics.” Far from the idea that every word represents an innate concept, Radical Pragmatics proposes that words can have a different meaning on every occasion.⁴⁴ In this view, people use words in so many different ways, making a word’s meaning so dependent on context, that meaning is really just a function of pragmatics, “how language is used in context in light of the knowledge and expectations of the conversants.”⁴⁵ This would explain how a waitress referring to “the ham sandwich” can be referring to

Linguistic Ideas, 2 COGNITIVE PSYCHOL. 331 (1971).

39. *Id.*

40. *Id.* at 150.

41. *Id.*

42. *Id.* at 108–09.

43. *Id.* at 109–10.

44. *Id.* at 107–09.

45. *Id.* at 108 (discussing a number of papers in linguistics).

the human at the table that ordered a ham sandwich.⁴⁶ It allows for the constant figurative, sarcastic, and metaphorical use of language in both literature and everyday speech. This view resonates with lawyers. Lawyers readily redefine words (as in contracts, patent claims, and statutes). Critical Legal Studies is often associated with the view of indeterminacy of meaning, which suggests that interpretation of words and concepts is never constrained by the text.

Polysemy could support Radical Pragmatics. If a word can encompass many different meanings, the argument runs, then the word has no core meaning. But close study of polysemy suggests that word meaning is more stable. Research indicates that the various meanings a word can have are not improvised on each occasion, but rather learned.⁴⁷ Similarly, frequently used words tend to have more meanings, which are regularly used according to convention.⁴⁸ Laboratory experiments indicate that separate meanings of a word are stored separately in the brain.⁴⁹

Verb classification indicates that words have conventional meanings, as opposed to completely depending on context of use. Speakers of a language regularly avoid uses that conflict with the conventional classification.⁵⁰ Verbs follow a few basic categories (such as causation, motion, and contact) while ignoring the many other ways to characterize an event.⁵¹ So the logical structure underlying classification of verbs is regular and sophisticated, not the ad hoc approach that would create meaning from each communication in context.

The downfall of Radical Pragmatics does not necessarily dispel theories of legal indeterminism. Words likely have a core of conventional meaning, but legal interpretation looks to the meaning of sentences and cases. Whether those assemblies of many words have a conventional meaning is a more complex question. Still, *The Stuff of Thought's* analysis does narrow the

46. *Id.* at 112.

47. *Id.* at 115.

48. *Id.* at 115 (citing R.H. Baayen & F. Moscoso del Prado Martin, *Semantic Density and Past-Tense Formation in Three Germanic Languages*, 81 *LANGUAGE* 666 (2005)).

49. *Id.* at 115 (discussing Devrah Klein & Gregory Murphy, *The Representation of Polysemous Words*, 45 *J. MEMORY & LANGUAGE* 259 (2001)).

50. *Id.* at 112.

51. *Id.* at 112–13.

scope of indeterminacy in language.

“BECAUSE” – OUR INTUITIVE SENSE OF CAUSATION

Lawyers, and law students even more, deal with many conundrums of causation.⁵² In torts, we ask how far a chain of causation can extend before we say that the unreasonable person’s negligence did not cause the plaintiff’s injury. In criminal law, a classic question is, where two people happen to shoot someone at the same time, whether either, both, or neither “caused” the injury. In contracts, only some sorts of financial loss are deemed “caused” by breach of contract. Courts over centuries have struggled unsuccessfully to define and apply clear concepts of causation. For policy reasons, courts have even held that a defendant caused injury by selling a dangerous pharmaceutical, even if the plaintiff may have been harmed by the same pharmaceutical sold by others.⁵³

The Stuff of Thought does not supply a theory of causation from cognitive science. Indeed, science generally has become more cautious about speaking in terms of causes. *The Stuff of Thought* does offer lawyers something useful: a description, drawn from the study of language, of how we seem to inherently view causation, which might be summed up as “Oomph.”⁵⁴

The Stuff of Thought first examines jurisprudential and philosophical attempts to define causation, running a gamut of perspectives from Hume through Kant to possible worlds and neural networks.⁵⁵ Hume faulted our sense of causation as being mere correlation: if thunder follows lightning, we infer that lightning caused thunder. But, as Hume himself wrote, our sense of causation goes beyond that: correlation does not always show causation, and events often have more than one cause.⁵⁶ A more accurate description of our sense of causation is the counterfactual theory: lightning causes thunder if thunder would not occur without lightning.⁵⁷ Lawyers have

52. See generally Richard W. Wright, *Causation in Tort Law*, 73 CAL. L. REV. 1735, 1740 (1985) (presenting “a systematic critique of these various accounts of the causation requirement in tort law”).

53. See generally Mark A. Geistfeld, *The Doctrinal Unity of Alternative Liability and Market-Share Liability*, 155 U. PA. L. REV. 447 (2006).

54. PINKER, *supra* note 1, at 208.

55. *Id.* at 208–18.

56. *Id.* at 209–10.

57. *Id.* at 211.

long recognized this approach, usually calling it but-for causation. As lawyers have learned, though, the counterfactual approach runs into several intractable problems. The greatest is that it is not always possible to change one event and then compare the hypothetical world that results. We cannot just say all things being equal, except for surgically changing one fact.⁵⁸ Events are too interdependent to truly do that. *The Stuff of Thought* cites a philosophical formulation of causation: that “A causes B” means “B does not occur in the possible worlds closest to ours in which A does not occur.”⁵⁹ That formulation elegantly captures the idea of but-for causation, but leaves the basic problems unresolved.

Language appears to reflect an intuitive theory of causation.⁶⁰ Verbs reflect several different types of causation: pure causation (such as “begin,” “cause,” “produce”), causing a specific effect (such as “melt,” “move,” “roll”), preventing (“avoid,” “thwart”), and enabling (“assist,” “help”).⁶¹ Other words imply a causal connection (such as “but,” “despite”).⁶² Linguists account for that with a “mental model of ‘force dynamics.’”⁶³ This model supposes an agonist, with a tendency toward motion or rest, and an antagonist, exerting force on the agonist, which may or may not be sufficient to change the agonist’s state.⁶⁴ This yields four possibilities: causation (antagonist keeps rest-tending agonist moving), preventing (antagonist keeps motion-tending agonist in place), “movement despite a hindrance” (motion-tending agonist keeps going despite force from antagonist) and “stability despite a push” (rest-tending agonist remains in place despite force from antagonist).⁶⁵ Verbs may also distinguish whether the antagonist’s actions have a defined endpoint (distinguishing blocking and allowing) and whether the verb includes the effect (such as “break”).⁶⁶

58. *Id.* at 212.

59. *Id.* at 213.

60. *Id.* at 219.

61. *Id.*

62. *Id.*

63. *See id.* at 219, (discussing Leonard Talmy, *Force Dynamics in Language and Cognition*, 12 COGNITIVE SCI. 49 (1988)).

64. *Id.* at 219–20.

65. *Id.* at 220.

66. *Id.* at 220–21.

Our moral intuitions may follow these linguistic distinctions. *The Stuff of Thought* cites the notable “trolley problem,” where logically equivalent events are evaluated differently, apparently on the distinction between causing and enabling.⁶⁷ A trolley rolls down a railroad track toward a fatal collision with five workers. The question is whether a bystander should flip a switch to send it onto a side track, where it will kill just one worker. Most people respond that they would pull the switch. In another version, the only way to save the five workers is to throw a large man in front of the trolley. Most people respond that they would not throw the man. The difference in moral intuitions could arise from different force dynamics, suggesting that actively causing the death of one person by throwing a man is less blameworthy than enabling the train, by flipping the switch, to cause the death of one person.⁶⁸

Linguistics also suggests that causation plays another key role in cognition. Cognitive semantics suggests that “the mind understands every entity in terms of four causes: who or what brought it about; what it’s made of; what shape it has; and what it’s for.”⁶⁹ Word meanings regularly use these distinctions. In the phrase, a “good road,” the adjective “good” modifies “road” as to the sense of what it is for (driving on).⁷⁰ The verb “began” in “she began the book” hooks onto the “what it’s for” component of book (books are to be read), not what the book is made of, or shaped like, or its origin.⁷¹ Others of the four causes are hooks for other words. Polysemy again provides clear examples. When “a count noun is used as a mass noun (as in *There was sausage all over his shirt*),” the meaning depends on what the sausage is made of.⁷² The sentence means not that one sausage (as in a count noun) is all over his shirt, rather that a mass of sausage was all over his shirt. In another type of polysemy, the noun for the origin of something may be used for the thing itself (as in the *New York Times* for the organization that produced the object, a newspaper—or vice

67. *Id.* at 229–30.

68. *Id.*

69. *Id.* at 116 (citing JAMES PUSTEJOVSKY, *THE GENERATIVE LEXICON* (1995)).

70. *Id.*

71. *Id.*

72. *Id.*

versa).⁷³

It would be an interesting project to see how legal reasoning follows the lines of those four causes. “Who or what brought it about” is key to many legal concepts. The origins of a rule, a contract or other legal entity often play a large role in its treatment. “What it’s for” is part and parcel of any legal analysis. Rules, agreements, and communications are interpreted in light of the underlying public policy, transaction, or purpose. Less obvious are “what it’s made of”⁷⁴ and “what shape it has.” Lawyers do speak of the law’s physical properties (as in, “a flexible standard”) and its shape: the scope of a rule, the breadth of a decision, a gap or loophole in the law, the extent of patent protection. The Supreme Court held that the constitutionality of copyright legislation may depend on whether it fits the “traditional contours of copyright protection.”⁷⁵ Whether that spatial terminology affects jurisprudence, or just provides a convenient trope, goes to the next topic: the power of metaphor.

METAPHOR IN LAW AND LINGUISTICS

The Stuff of Thought addresses a question that has increasingly occupied legal discourse, especially intellectual property: the extent to which human thinking is controlled by metaphors.⁷⁶ Some cognitive linguists hold that metaphors determine how we think: “Our ordinary conceptual system, in terms of which we both think and act, is fundamentally metaphorical in nature.”⁷⁷ Under this view, human thinking—from everyday life to politics to science—is governed by the conceptual metaphors of the parties. The thinking of those on

73. *Id.*

74. One example is the oft-quoted sayings attributed to Otto von Bismarck, “There are two things you don’t want to see being made—sausage and legislation.”

75. *Eldred v. Ashcroft*, 537 U.S. 186, 221 (2003).

76. *See, e.g.*, James Grimmelmann, Note, *Regulation by Software*, 114 YALE L.J. 1719, 1727 (2005) (questioning the “spatial metaphor” that equates software with architecture for legal purposes: the view that “[j]ust as the set of things we can physically do in physical spaces is determined by their physical architecture, the set of things we can virtually do in virtual spaces is determined by their virtual architecture—that is, by the software programs that create these spaces”).

77. PINKER, *supra* note 1, at 245 (quoting GEORGE LAKOFF & MARK JOHNSON, *METAPHORS WE LIVE BY* 3 (1980)).

the political right is dominated by the metaphor of the government as a strict parent; the thinking of those on the political left is dominated by the metaphor of the government as a nurturing parent.⁷⁸ In philosophy, if metaphors rule, Cartesianism rests on the metaphor “knowing is seeing,” Locke on “the mind is a container.”⁷⁹ To change someone’s view, reasoned argument will never be sufficient. Rather, supplanting the metaphor that controls their thinking on the subject is required.

Arguments in law and politics often feature competing metaphors or arguments about the best way to apply a metaphor. One battleground in recent years involves using the term “intellectual property,” to encompass such areas of law as copyright, patent, trademark, and trade secret.⁸⁰ To put it in broad terms, those favoring broad rights in those areas and those favoring limited rights (meaning, broad rights of others to use the information in question) have often treated the very concept of “intellectual property” as controlling. Proponents of strong protection argue that intellectual property should be treated just like other types of property: the owner should have strong rights to exclude others, the duration of protection should be long, and infringement should be broadly defined. Proponents of limits on protection have sometimes reacted by striking at the very term, stating that we should speak of copyrights, patents, and trademarks individually, and not lump them into a single term, “intellectual property,” which brings with it a host of concepts more suited to the house and garden. Other metaphors have been brought to bear, like “pirates,” “trolls,” and “information wants to be free.” If the strong view of metaphorical thinking is right, then the words in which the debate is conducted will control the outcome.⁸¹ A related question arises with respect to the law governing computer

78. *Id.* at 246.

79. *Id.* at 245–46.

80. Michael Madison, Comment, *Where Does Creativity Come From? and Other Stories of Copyright*, 53 CASE W. RES. L. REV. 747, 763–64 (2003).

81. Cf. A. Michael Froomkin, *The Metaphor Is the Key: Cryptography, the Clipper Chip, and the Constitution*, 143 U. PA. L. REV. 709, 718 (1995) (“The courts, and to a lesser extent the legislative and executive branches, have yet to come to grips with many cryptographic conundrums. As a result, this part of the legal ‘landscape’ remains relatively barren. As more and more settlers arrive in cyberspace, the nature of this new landscape will depend critically on the legal metaphors that the colonists choose to bring with them.”).

networks.⁸² If metaphor controls, then using terms like “cyberspace law,” and treating the Internet as a place, will govern how the law develops in that area.⁸³ Commentators have suggested competing metaphors, such as a river, a highway,⁸⁴ the development of the American frontier, or feudal economies.⁸⁵

The Stuff of Thought, here as with many issues, fashions a convincing middle-ground. Metaphors play a role in thinking, and can be powerful tools. But the position that thought is simply a competition between metaphors, as opposed to knowledge corresponding to objective truth, is subject to several objections. For one thing, “our best science and mathematics can predict how the world will behave in ways that would be a staggering coincidence if the theories did not characterize reality.”⁸⁶ A second telling objection is that the metaphors-control-thinking argument must apply to itself. But it proposes an objective truth, that thinking is controlled by metaphors.⁸⁷ So it becomes a counterexample to its own argument. This move is convincing in this context and a good argument to remember with respect to other arguments that tend toward pure relativism. The strong version of legal indeterminacy would undermine itself, if words were too

82. See, e.g., Dan L. Burk, *The Trouble with Trespass*, 4 J. SMALL & EMERGING BUS. L. 27 (2000).

83. A number of legal scholars have analyzed the interplay between the cyberspace metaphor and legal reasoning. See Julie E. Cohen, *Cyberspace as/and Space*, 107 COLUM. L. REV. 210 (2007); Dan Hunter, *Cyberspace as Place and the Tragedy of the Digital Anticommons*, 91 CAL. L. REV. 439, 442 (2003) (“This Article explains how the CYBERSPACE AS PLACE metaphor leads to undesirable private control of the previously commons-like Internet and the emergence of a digital anticommons.”); Mark A. Lemley, *Place and Cyberspace*, 91 CAL. L. REV. 521 (2003); Jacqueline Lipton, *Mixed Metaphors in Cyberspace: Property in Information and Information Systems*, 35 LOY. U. CHI. L.J. 235 (2003); Michael J. Madison, *Rights of Access and the Shape of the Internet*, 44 B.C. L. REV. 433, 437 (2003) (arguing that “the Internet-as-place metaphor” should look to the user’s embodied experience, not formalist property law doctrine); Maureen O’Rourke, *Property Rights and Competition on the Internet: In Search of an Appropriate Analogy*, 16 BERKELEY TECH L.J. 561 (2001); see also Stephanie A. Gore, “A Rose by Any Other Name”: *Judicial Metaphors for New Technologies*, 2003 U. ILL. J.L. TECH. & POL’Y 403 (2003).

84. Richard A. Epstein, *Intel v. Hamidi: The Role of Self-Help in Cyberspace?*, 1 J.L. ECON. & POL’Y 147, 159 (2005).

85. See Alfred C. Yen, *Western Frontier or Feudal Society?: Metaphors and Perceptions of Cyberspace*, 17 BERKELEY TECH. L. J. 1207, 1207 (2002).

86. PINKER, *supra* note 1, at 247.

87. *Id.* at 247–48.

indeterminate to express a specific theory of indeterminacy.

Taking the argument from the other direction, “people could not analyze their metaphors if they didn’t command an underlying medium of thought that is more abstract than the metaphors themselves.”⁸⁸ In addition, people routinely ignore the irrelevant aspect of metaphors, and may ignore the metaphorical aspect of an expression so much that they mix metaphors, such as Hamlet’s “to take arms against a sea of troubles” or the less familiar “once you open a can of worms, they always come home to roost.”⁸⁹

Metaphors may not control thought, but they play important roles. People can learn new ideas by transferring the structure of familiar ones: thinking of the atom as a solar system or an antibody like the key to a lock.⁹⁰ Novel metaphors have helped scientists solve problems and create new theories. The most famous might be Einstein’s thoughts about passing trains or passengers on a beam of light, which helped him conceive relativity. But none of those metaphors control thought on those subjects. An atom need not have a Pluto. Rather, metaphors can provide a means for manipulating concepts where the words do not already exist. A new scientific discovery can be named with existing words, used in a metaphorical sense.⁹¹ Metaphors can also help organize and search the vast amount of information that people experience. Similarity seems to be key to recall, as when aspects of an event remind us of something else.⁹² Metaphors can express ideas and feelings that literal language cannot reach, as in the metaphors in fiction and poetry.⁹³ *The Stuff of Thought* quotes Flaubert’s metaphor on the limits of language: “language is a cracked kettle on which we beat out tunes for bears to dance to, while all the time we long to move the stars to pity.”⁹⁴

The developing story of the intellectual property and cyberspace metaphors bears out the view in *The Stuff of Thought*. The term “intellectual property” has become more common and such rights have increased (although decreasing

88. *Id.* at 249.

89. *Id.* at 239.

90. *Id.* at 241.

91. *Id.* at 257.

92. *Id.* at 275.

93. *Id.* at 276–77.

94. *Id.* at 278 (quoting GUSTAVE FLAUBERT, *Madame Bovary: Life in a Country Town* 173 (G. Hopkins trans., Oxford University Press 1998) (1857)).

in some aspects), but more so due to political than literary power. Congress has taken some measures that add to the pile of intellectual property, such as extending the term of copyrights,⁹⁵ strengthening patent protection for biotech companies,⁹⁶ and making it easier to prove trademark dilution.⁹⁷ Such legislative expansion, however, was responsive to lobbying by the respective industries, although the surrounding debate certainly featured many metaphors on both sides.⁹⁸ Analysis of the case law shows that judges have recognized the cyberspace-as-place metaphor without being constrained by it and have regularly probed the relevant underlying policy issues.⁹⁹ Judges, like people generally, readily peel away intellectual property metaphors: “Even if we follow Gypsum’s hypostatization and treat the trade secret, a concept, like an object, theft is not the correct analogy.”¹⁰⁰ The distinctions between real property and intellectual property readily have been unearthed.¹⁰¹ Meanwhile, the Supreme Court has pared back on intellectual property, a return of the

95. See Sonny Bono Copyright Term Extension Act, Pub. L. No. 105-298, 112 Stat. 2827 (1998) (codified as amended in scattered sections of 17 U.S.C.).

96. See Cooperative Research and Technology Enhancement (CREATE) Act of 2004, Pub. L. No. 108-453, 118 Stat. 3596 (2004) (codified as amended in scattered sections of 35 U.S.C.).

97. See Trademark Dilution Revision Act of 2006, Pub. L. No. 109-312, 120 Stat. 1730 (2006) (codified as amended in scattered sections of 15 U.S.C.).

98. See, e.g., JESSICA LITMAN, DIGITAL COPYRIGHT, 126-45 (2001) (describing in detail copyright industries’ role in legislation increasing copyright protection).

99. David McGowan, *The Trespass Trouble and the Metaphor Muddle*, 1 J.L. ECON. & POL’Y 109, 109 (2005) (analyzing case law and rejecting the claim that “metaphors such as ‘space’ or ‘place’ or ‘property’ cause judges to think of the Internet as similar to physical property, in which persons may stake private claims the law protects from encroachment.”); see also Lemley, *supra* note 83, at 523 (“While acknowledging the dangers of the CYBERSPACE AS PLACE metaphor and the fact that courts have already started down the wrong road, I suggest that courts and commentators who think seriously about the nature of the Internet still have ample room to make reasoned policy decisions. Though metaphor can mislead us, we need not be its slaves”); Cohen, *supra* note 83 (discussing ability to consciously choose metaphor in legal discussion).

100. U.S. Gypsum Co. v. Ins. Co. of N. Am., 813 F.2d 856, 858 (7th Cir. 1987).

101. See, e.g., Molly Shaffer Van Houweling, *The New Servitudes*, GEO. L.J. (forthcoming 2008) (discussing the applicability of the common law servitude concept to intellectual property licensing).

pendulum familiar in the history of law.¹⁰² The attitudes of people toward intellectual property are best predicted by what they have at stake (or the stories they tell), rather than what metaphors they have heard.¹⁰³ The metaphors of property serve more as focal points than controls.

LAW AND INDIRECT SPEECH – HOW LEGAL RULES CAN CREATE EFFICIENT NORMS

Another area where cognitive linguistics could shine light on the role of law is indirect speech. *The Stuff of Thought* uses some game theory to fit the logic of communication to the reality of human relationships. Logician Paul Grice formulated several well-known maxims of conversation: Quantity (say no less or more than the conversation requires); Quality (do not say that which is false or unsupported); Manner (do not be obscure, ambiguous, wordy, or disorderly); Relevance (be relevant).¹⁰⁴ Grice's maxims effectively capture guidelines people generally follow. We quickly note if a speaker speaks too much, or falsely, or is difficult to understand, or strays from the topic. We also use departures from the maxims as signals to listeners of something beyond the literal meaning: sarcasm (as by damning by faint praise), wordplay (such as using ambiguity or obscurity for humorous effect), or changing the topic, or introducing the irrelevant (to signal the present topic is touchy).¹⁰⁵

The Stuff of Thought discusses a specific way in which people deliberately communicate inefficiently: indirect speech. An example is the offer of a bribe to a traffic officer.¹⁰⁶ A straightforward offer might be accepted—or raise the stakes from a traffic ticket to an arrest for attempted bribery. An ambiguous offer (a suggestively placed fifty-dollar bill, along with a vague statement) violates the maxim of Manner. But it

102. See, e.g., *KSR Int'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727, 1742 (2007) (raising obviousness standard for obtaining patent protection); *eBay Inc. v. MercExchange*, 547 U.S. 388, 388 (2006) (raising standard for obtaining injunctions against patent infringement).

103. Cf. Michael J. Madison, *The Narratives of Cyberspace Law (or, Learning from Casablanca)*, 27 COLUM. J.L. & ARTS 249, 254-55 (2004) (suggesting wryly that legal scholars should pay more attention to narrative than metaphors in thinking about the legal regimes applicable to the Internet).

104. PINKER, *supra* note 1, at 377.

105. *Id.* at 378-79.

106. *Id.* at 393.

is superior strategy—because it should yield acceptance by a corrupt officer, but not arrest by an honest one. Such deliberate fuzziness of communication is so common that it has many names: well-established words like tact and hypocrisy, to newer coinages like “plausible deniability,” for vague or secret communications that can later be effectively denied. Rather than departures from the norm, as the Maxims might suggest, this reflects a more accurate description of how people communicate. The Maxims framework suggests that people follow a principle of cooperation, seeking to convey information as efficiently and accurately as possible, a framework that one might expect from a logician.¹⁰⁷ But people’s interactions are often partly cooperative and partly conflicting. In addition, people often want to transfer some information while avoiding communicating other information. Any commercial transaction has cooperative elements (if both parties would gain from exchange) and conflict (the price, the warranties, the allocation of various risks). Social interactions have elements of conflict and cooperation, if more intangible.

Indirect speech is often used, as *The Stuff of Thought* shows, to avoid communicating a particular category of information: information about the information that people know. With a deftly offered bribe, the recipient will know that money is there for the taking, but will not know (or be able to show) that a bribe is being offered. The same can hold for an infinite variety of interactions. *The Stuff of Thought* gives examples of special interest campaign contributions (where no quid pro quo is specifically requested),¹⁰⁸ romantic overtures,¹⁰⁹ and extortionate threats.¹¹⁰ In each setting, an offer can be made indirectly and indefinitely, so that each party does not know what the other party knows. A similar dynamic leads to the oft-noted inanity of common polite phrases. At a dinner among strangers, one might not directly request the salt to be passed, but more vaguely say, “Is there any salt down there?” As in the other examples, it communicates the possibility of a transfer but without a direct request—or order.

We pay the price of muddy communication to protect social relationships. Following the categories commonly utilized by

107. *Id.* at 376–77.

108. *See id.* at 396.

109. *Id.* at 412.

110. *Id.* at 413–14.

anthropologists, *The Stuff of Thought* divides social relationships into Community (symmetric relationships with sharing, as within families), Authority Ranking (asymmetric relationships, where one party has superior status, jealously guarded, and conveys authority over others), and Equality Matching (symmetric exchange relationships where fair social exchange of goods or services makes both parties better off).¹¹¹ Indirect speech can allow interactions to go through without threatening existing relationships. A “whimperative” like “Is there any salt down there?” allows a diner to get the salt, without treating the others as inferiors—so it maintains a Communal or Equality Sharing relationship, and makes clear that the diner just hopes for the salt, not to claim a position of Authority.¹¹² Conversely, an ambiguous threat uses indirect speech to maintain Authority: because the threat is ambiguous, the speaker need not follow through if denied (which could be costly and dangerous) but does not suffer the loss of face, and therefore loss of Authority, that backing down would entail.¹¹³ A superior could make an ambiguous threat, saying that if the work was not done properly, she would not be happy.

In many of these settings, indirect speech is used to prevent mutual knowledge from becoming common knowledge.¹¹⁴ *The Stuff of Thought* illustrates the difference between mutual knowledge and common knowledge with the tale of the Emperor’s New Clothes. Everyone at the procession could see that the Emperor wore no clothes, but no one could be sure that the others knew that because they were all playing along. But when the child shouted, “The emperor has no clothes!” and everyone laughed, the mutual knowledge became common knowledge. Each person knew the emperor was unclothed, and more importantly, knew that the others knew that the emperor was unclothed, and knew that the others knew that the others knew that the emperor was unclothed (and so on).¹¹⁵

Common knowledge depends on *recursion*, “a formula that contains an example of itself.”¹¹⁶ Numbers are recursive. The Nth integer is simply the (N-1)th integer plus one. Likewise,

111. *Id.* at 400–10.

112. *Id.* at 388.

113. *Id.* at 413–14.

114. *Id.* at 418–22.

115. *Id.* at 419.

116. *Id.* at 421.

common knowledge can be framed in such self-referential terms: People know y , and y is defined as “[e]veryone knows x and everyone knows y .”¹¹⁷ Defining a formula in terms of itself seems to hazard circular reasoning. Playing on this, the Jargon File defines recursion as follows: “recursion: *n.*: See *recursion*.”¹¹⁸ But as long as the return has a termination point (e.g., one person knows that the emperor has no clothes), recursive formulas have great generative power. They figure prominently in mathematics and computer science.¹¹⁹ Noam Chomsky’s linguistics, a landmark in cognitive science, rest on a recursive formula for sentence structure.¹²⁰ Some language scientists regard recursion as fundamental to human cognition:

Recursive ability is uniquely human and affects more than just our language, but most of our behaviour For example, in a classroom we often see child A watch child B watch child C watch the teacher. But in chimps, we see chimp A watch its mother, chimp B watch its mother, chimp C watch its mother¹²¹

If human cognition takes into account the mental state of others, and chimp cognition does not, humans have much greater tools for social structures. Indirect speech prevents social disruptions and illustrates recursion, a key aspect of human cognition. Does “Is there any salt down there?” have anything to tell us about the law? The law is at the other extreme from pretense of Communitarity through instinctive sharing, or Equality through matching equality. The law speaks in terms of Authority and issues direct orders. But

117. *Id.*

118. Jargon File, Recursion, <http://www.catb.org/jargon/html/R/recursion.html> (last visited Oct. 26, 2008).

119. See Jonathan Zittrain, *The Generative Internet*, 119 HARV. L. REV. 1974, 2028 (2006) (“Today, thanks to networked information technology and the recursively generative code produced in large part by amateurs, art can be produced and shared by people other than professional artists, citizens can engage in far-ranging dialogues with others whom they would not otherwise encounter, and people can work together from the four corners of the globe to produce intellectual projects of social and economic significance.”).

120. See STEVEN PINKER, *THE LANGUAGE INSTINCT* 101 (1994).

121. Gaia Vince, Puzled Monkeys Reveal Key Language Step, *NEW SCIENTIST*, Jan. 15, 2004, available at <http://www.newscientist.com/article.ns?id=dn4572&print=true> (quoting David Premack); see also W. Tecumseh Fitch & Marc D. Hauser, Computational Constraints on Syntactic Processing in a Nonhuman Primate, 303 *SCI.* 377 (2004) (“The capacity to generate a limitless range of meaningful expressions from a finite set of elements differentiates human language from other animal communication systems.”).

some aspects of the law play the same role as whimperatives.

The game theoretic mechanisms follow a similar progression from the refinements on Grice's maxims. Grice's maxims were descriptors of the dynamics of conveying information in conversation, but their descriptive power was narrowed by their assumption of complete cooperation. This is rather similar to what might be called first-generation law and economics. Economic analysis of law typically saw legal rules as a response to market failures. Contract law, for example, existed to minimize transaction costs.¹²² Transactions are generally beneficial. If Buyer purchases Seller's Mini Cooper, then both parties are better off, in their own estimation: Buyer preferred to have the Mini Cooper than to retain the price, and Seller preferred to have the price than to retain the Mini Cooper. Exchange is good, but mutually beneficial exchanges may be obstructed or made more costly if parties have to negotiate to address every risk: if the Mini Cooper is defective, or is hit by lightning during shipping, or a necessary part goes out of production before the sale and these risks are incorporated into negotiations, then the price goes up. Contract law provides default rules to address all those contingencies, so the parties need only negotiate to the extent they want to customize the rules to their transactions (such as agreeing that one party bear the risk of a lightning strike). So in deciding questions of contract law, the law and economics approach was to find the rule that the parties would have agreed upon, had they explicitly addressed it. Like Grice, this approach assumes a cooperative approach. In other areas, like torts and criminal law, economic analysis did not assume cooperation, but did make a parallel assumption of complete information.¹²³

Game theory, and the economics of information, brought a new approach—just as *The Stuff of Thought* used game theory to refine Grice's maxims for a better description of human communication. Some contract law rules were better seen as “information-forcing” defaults. Under this approach, contract law would provide default rules not to fill the gaps for parties,

122. See generally Jason Scott Johnston, *Strategic Bargaining and the Economic Theory of Contract Default Rules*, 100 YALE L.J. 615 (1990) (discussing and critiquing economic analysis of default rules).

123. See generally RICHARD POSNER, *ECONOMIC ANALYSIS OF LAW* 167–245 (Aspen Publishing 7th ed. 2007) (analyzing tort and criminal law rules, generally assuming complete information).

but to give them incentive to disclose information efficiently.¹²⁴ Game theory also provides economic support for a view that focuses on the expressive function of law.¹²⁵ Rather than serving as a carrot or stick, the law can sometimes serve as a focal point to aid social coordination. This expressive theory of law allows economic analysis of law to encompass social functions of law that had long been studied in other disciplines, such as sociology and anthropology.

The discussion of indirect speech suggests a related function of law. Just as indirect speech avoids disruption of social relationships, so law can allow parties to interact while avoiding relationship-threatening communications. Contract law, in part, plays such a role in commercial life. Negotiations for transactions can be hazardous. As a great amount of literature shows, the dynamics of negotiations can result in mutually beneficial transactions falling through. If one party feels that the other party is exerting too much authority, the party may walk away rather than comply.¹²⁶ Contract law, by providing default rules that govern many contingencies, reduces the hazards of negotiation.¹²⁷ In *The Stuff of Thought* terms, it allows the parties to maintain the form of an Equality relationship, rather than an Authority relationship.

Family law can be viewed in a similar way with regard to Pinker's social relationships. Family relationships are Communality relationships, where the parties share freely. Even raising the question of the terms on which to share things may violate the principles of Communality. Family law allows

124. See Ian Ayres & Robert Gertner, *Filling Gaps in Incomplete Contracts: An Economic Theory of Default Rules*, 99 YALE L.J. 87, 91 (1989).

125. See Richard H. McAdams, *A Focal Point Theory of Expressive Law*, 86 VA. L. REV. 1649, 1651 (2000) (arguing that "law provides a focal point around which individuals can coordinate their behavior. When individuals have a common interest in coordinating, as frequently occurs, a legal rule may guide behavior merely by influencing expectations about how others will behave"); Richard H. McAdams & Janice Nadler, *Testing the Focal Point Theory of Legal Compliance: The Effect of Third-Party Expression in an Experimental Hawk/Dove Game*, 2 J. EMPIRICAL LEGAL STUD. 87 (2005).

126. Russell Korobkin & Chris Guthrie, *Psychological Barriers to Litigation Settlement: An Experimental Approach*, 93 MICH. L. REV. 107, 143 (1994) (stating people act based on their perception of treatment by others).

127. See Stephen M. McJohn, *Default Rules in Contract Law as Response to Status Competition in Negotiation*, 31 SUFFOLK U. L. REV. 39, 40 (1997) ("The process of negotiation itself, however, may become a competition. Rather than simply trying to achieve their original goals, parties sometimes shift in whole or in part to 'win' the bargaining.").

parties to avoid such discussions. Parties can avoid questions of how to share family property, or to divide property among the survivors of a deceased family member, and especially such questions as how to allocate familial rights (not just property, but such core matters as custody of children). In short, the law allows parties to avoid discussions that could threaten Communitarian relationships.

A set of default legal rules also avoids mutual knowledge. Members of a family group, where the law supplies the rules, do not need to know whether the other family members know the content or even existence of those rules. That allows all parties to proceed, if they wish, without broaching such possibilities as death, divorce, mental incompetence, and the other subjects of family law. Parties to a possible contract need not mention such contingencies as breach, mistake, illegality—or know whether the other parties know the governing legal rules. Legal rules in other contexts likely play such a face-saving role. Some safety regulations allow individuals to adapt their behavior without conceding to mere social norms. Where seat-belts and motorcycle helmets are not required, some people who would actually prefer to use the safety measure might forgo protection simply to maintain a certain social image or to avoid publicly conceding to social pressure. Where the law changes to require protection, the individual can buckle up as though it were involuntary. In other contexts, the mutual-knowledge blocking role of the law may hinder legal progress. The conformity required by the law may prevent people from realizing the extent to which some others dislike the law.¹²⁸

Indirect speech provides a good example of how examining interactions from a cognitive perspective can throw light on the law's effects. Asking for the salt and drafting a statute can have some surprising similarities, because both go to the dynamics of social interactions. People react not just to literal words, but the implications they have for the mental state of others. Legal rules, like standards of politeness, allow people to conform their behavior to social norms without sacrificing status.

128. Cf. Cass R. Sunstein, *Conformity and Dissent* (Univ. Chi. Law & Econ., Olin Working Paper No. 164, 2002), available at http://ssrn.com/abstract_id=341880 (arguing that the majority of individuals conform to society, but when this occurs, society can make large mistakes).

STORIES IN LEGAL COGNITION

Many of the cognitive science findings discussed in *The Stuff of Thought* are relevant to law. It gives many examples from the law, such as the “conundrum” intellectual property poses for our intuitive sense of property as a thing,¹²⁹ the ill fit between our sense of causation and legal questions (did Guiteau kill Garfield, where Garfield survived the shooting but not the following dubious medical treatment?),¹³⁰ the match between our intuition that a state of being is involuntary (and therefore blameless) and the case law holding that status crimes are unconstitutional,¹³¹ and even an explanation for the prolixity of legalese in contracts: unlike most communication, a contract is “directed to an adversarial reader rather than a cooperative one.”¹³² Legal scholars have drawn increasingly on cognitive science concepts.

Here we suggest adding another approach to the mix—following literary theorists who have linked cognitive science with narrative theory. As Mark Turner put it, “*Story* is a basic principle of mind. Most of our experience, our knowledge, and our thinking are organized as stories.”¹³³ We discuss here how focusing on the cognitive aspects of stories illuminates the cognitive tasks of law, such as reasoning, remembering, learning, persuading, and communicating. The cognitive science concepts from *The Stuff of Thought*—chunking, recursion, causation as Oomph, the primary qualities of an object—play into a cognitive view of stories. To make it more concrete, we turn to how a cognitive science view of stories could fit with recent legal scholarship.

There is nothing new in saying that lawyers deal in stories.¹³⁴ Trial lawyers compete to develop more appealing stories for the jury. Appellate lawyers are told to hone a story for the panel of judges.¹³⁵ Legal academia is increasingly open

129. PINKER, *supra* note 1, at 85.

130. *Id.* at 86-87.

131. *Id.* at 207.

132. *See id.* at 377-78.

133. MARK TURNER, *THE LITERARY MIND*, at v (1996).

134. *See, e.g.*, Richard A. Posner, *Legal Narratology*, 64 U. CHI. L. REV. 737,738-39 (1997) (discussing various ways stories figure in legal theory and practice).

135. *Cf.* Kenneth Chestek, *The Plot Thickens: The Appellate Brief as Story* 5 (Dec. 18, 2007) *available at*

to law as stories. Legal theory has seen turns toward narrative, law-and-literature, and story-scholarship.¹³⁶ Some scholars deliberately adopted story-telling as a form of scholarship to challenge the dogmas of mainstream legal scholarship.¹³⁷ Even the form of the standard law review article has changed. Increasingly, an article opens with an engaging story, as if to compensate the reader for the dozens of pages of footnoted legal analysis ahead. It is so established that stories are a staple of law, but there could be fresh insights from the combination of narrative theory and cognitive science.

Looking at the cognitive role of stories would broaden the usual perspective on legal reasoning.¹³⁸ Most discussion of legal reasoning focuses on the justification for legal rules and decisions. Thinking about stories helps bring into focus the many other cognitive tasks that the law requires, and also gives one a more accurate window into how legal decisions are made (as opposed to how they are justified).¹³⁹ The law requires not only decision-making, but a range of other cognitive tasks such as learning, memory, persuasion, and the transferring of learned concepts. Lawyers and law students are acutely aware of the considerable demands that law makes on learning and memory, but legal theory tends to take those tasks for granted, treating judicial decision-making as the principal object of study. Even in considering judicial decision-making, legal

http://papers.ssrn.com/sol3/papers.cfm?abstract_id=998388) (discussing the parallels between appellate brief writing and fiction writing).

136. See Paul Gewirtz, *Narrative and Rhetoric in the Law*, in *LAW'S STORIES: NARRATIVE AND RHETORIC IN THE LAW 2* (Peter Brooks & Paul Gewirtz eds., 1996); see also Richard Delgado & Jean Stefancic, *Norms and Narratives: Can Judges Avoid Serious Moral Error?*, 69 *TEX. L. REV.* 1929, 1933 (1991) ("Could reading a well-written, deeply felt counternarrative save a judge from history's condemnation in cases such as the ones we will discuss?").

137. See generally Nancy L. Cook, *Outside the Tradition: Literature as Legal Scholarship*, 63 *U. CIN. L. REV.* 95 (1994); Daniel A. Farber & Suzanna Sherry, *Telling Stories Out of School: An Essay on Legal Narratives*, 45 *STAN. L. REV.* 807 (1993).

138. Cf. Carol M. Rose, *Property as Storytelling: Perspectives from Game Theory, Narrative Theory, Feminist Theory*, 2 *Yale J.L. & Human.* 37 (1990); Stefan H. Krieger, *The Place of Storytelling in Legal Reasoning: Abraham Joshua Heschel's Torah Min Hashamayim* (Hofstra U. Legal Studies Research Paper Series, Research Paper No. 07-26, 2007), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1010930.

139. Cf. William B. Turner, *Nietzsche, Foucault, Scalia 1* (Emory Sch. of Law, Pub. Law & Legal Theory Research Paper Series, Research Paper No. 06-28, 2006), available at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=948311 (exploring narrative strategies in Supreme Court opinions).

theory pays little attention to how (or whether) judges acquire the knowledge of the myriad cases and rules (let alone the mass of evidence that a single case may produce) that are pertinent to the decisions in cases.

A story is almost an ideal data structure for human cognition. Stories lend themselves to learning and memory, for several reasons. A story is a linked sequence. Once someone remembers one part of a story, one can then recall the next part—or work backwards. Contrast that with other agglomerations of information, where knowing one part does not help with remembering the next. Stories also have several levels of abstraction, as law recognizes—most notably in Learned Hand’s abstractions test for copyright infringement.¹⁴⁰ A story may be described in the sequence of words, a sequence of events, a sequence of scene, or an abstract summary. There are also different abstract dimensions that can be analyzed: its plot, moral, or themes. These levels of abstraction make stories helpful as cognitive units: in learning, in remembering, or in conveying information.¹⁴¹

As a cognitive device, a story is also “robust.” This means that a portion of a story may be forgotten (or revised, or even misremembered) without doing too much harm to it as a whole. The rest of the story may still be remembered or learned or used for persuasion. Compare this aspect of stories with other compilations of information. A mathematical proof, for example, is much less robust, being so fragile that it can be rendered completely invalid if just one line is made invalid. Changing a key aspect of a story, of course, may change the

140. *Nichols v. Universal Pictures Corp.*, 45 F.2d 119, 121 (2d Cir. 1930)

Upon any work, and especially upon a play, a great number of patterns of increasing generality will fit equally well, as more and more of the incident is left out. The last may perhaps be no more than the most general statement of what the play is about, and at times might consist only of its title; but there is a point in this series of abstractions where they are no longer protected, since otherwise the playwright could prevent the use of his ‘ideas,’ to which, apart from their expression, his property is never extended.

141. Since long before writing, stories have been central to the transmission of knowledge, as in transmitting traditional knowledge. GREGORY CAJETE, LOOK TO THE MOUNTAIN: AN ECOLOGY OF INDIGENOUS EDUCATION 68 (1994) (“Current research in the cognitive process is just beginning to investigate the metaphoric structures and inherent processes in stories and storytelling. . . . Story—in creative combination with encounters, experiences, image making, ritual, play, imagination, dream, and modeling—forms the basic foundation of all human learning and teaching.”).

meaning of the story—but that is a useful feature.

Stories also convey emotive content effectively. Cognitive science is increasingly recognizing the importance of emotions in cognition. The emotive aspect of stories makes them easier to learn and remember, and also makes them more persuasive. This may not always be an advantage, since emotive aspects may affect decision-makers who are unaware or unwilling to admit being so affected.¹⁴² One must consider the role of emotions to understand how legal reasoning truly works.

In order to view stories in cognitive terms, it is necessary to attempt to define “story.” Stories are used throughout every culture, and studied in many disciplines, and used by every profession, yet no one has concretely defined “story.” Perhaps the best known formulation holds that a story has a beginning, middle, and an end. That serviceable definition, however, does not substantially advance our understanding of the cognitive role of stories. Some have suggested looking to the verbal and sequential nature of stories: “A story can be described as a sequentially presented set of propositions, each using various types of verbal constructions to create different propositional frames.”¹⁴³ We would suggest a formulation that fits with the cognitive role of stories—that a story is a connected sequence of events and stories. This is hardly a rigorous definition, but it could prove useful in understanding how we think with stories. It seeks to define a story recursively, as being composed of stories, which in turn are composed of sequences of events.

This recursive definition fits several aspects of stories. It suggests that our ability to handle concepts recursively (important in other aspects of human cognition, such as language and inferring the mental states of other people) is used when we deal with stories. It also allows stories to take on several levels of abstraction. A story could be a short sequence of events, or a sequence of stories, or a sequence of sequences of stories—meaning that stories can be characterized at several levels of abstraction.

A story, so defined, can function as what *The Stuff of Thought* calls a “chunk,” a single unit which can be manipulated or processed by the brain, just as concepts can be assembled into more complex concepts, which are then treated

142. Cf. Susan Bandes, *Empathy, Narrative, and Victim Impact Statements*, 63 U. CHI. L. REV. 361, 392–93 (1996) (arguing that some stories should be excluded exactly because of the emotional power of narrative).

143. DAVID HERMAN, *STORY LOGIC* 44 (2002).

as a chunk.¹⁴⁴ Stories can be readily compared, retrieved from memory, used for reasoning, and communications.

The formula also conceives of stories as “connected” sequences of events and stories. The word “connected” here plays a place holding role—or even a question-begging role. How events become connected to constitute stories is hardly settled.¹⁴⁵ Our ability to tell, interpret, evaluate, and invent stories suggests that some sort of logic is at work—but the nature of that logic (or whether different types of stories have different logics) is something that requires more insight into cognition. But it would seem likely that at least part of the glue holding stories together is our intuitive sense of causation, as discussed in *The Stuff of Thought*. Other things governing the connection of stories would be our use of metaphor and analogy, by which one story has meaning for other stories (as in the case law method)—at various levels of abstraction.

Another way to describe how the elements of stories become connected might be the form of inference Charles Sanders Peirce identified as “abduction.”¹⁴⁶ Peirce divided reasoning into three categories. The first two forms are familiar in discussions of reasoning: deductive reasoning, as in mathematical proofs or in the application of a categorical rule to a set of facts, and inductive reasoning, which applies observations about items to similar items.¹⁴⁷ Peirce proposed that people must use a third form of reasoning, which he called “abduction.” Abduction takes information and forms likely explanations.¹⁴⁸ Abduction would underlie a broad range of inferences, from formulation of scientific hypotheses to the many guesses we make to get through daily life.¹⁴⁹ Peirce did not succeed in formulating a logic of abduction (unlike deduction, and to a lesser extent, induction). Cognitive scientists and philosophers have relied on the concept, sometimes terming it “inference to the best explanation,” although just how people form explanations so readily remains

144. See PINKER, *supra* note 1, at 100.

145. HERMAN, *supra* note 143, at 35.

146. See Stephen M. McJohn, *On Uberty: Legal Reasoning by Analogy and Peirce's Theory of Abduction*, 29 WILLAMETTE L. REV. 191, 192–93 (1993).

147. *Id.*

148. *Id.*

149. *Id.* at 201.

an important area of study.¹⁵⁰ But, both as a matter of logic and psychology, Peirce's proposal carries a lot of explanatory force itself, because people do depend on forming likely explanations, where neither the iron laws of deduction nor the straightforward implication of induction would apply.

A similar sort of reasoning pervades stories, which in order to satisfy our intuitive sense of narrative must make sense in a way that does not simply depend on the sort of reasoning in a mathematical proof. Stories have many explanatory aspects, exemplified by the case-based reasoning key to legal reasoning. Events in a story may explain earlier events. More broadly, a story is often used as a means of explanation. Lawyers use stories to explain abstract ideas like legal principles or policy considerations, or much more specific and concrete concepts, like the actions of a party in a case.¹⁵¹

A cognitive view of stories fits well with the increasing attention to narrative theory in legal scholarship. Silbey has explored the role of "origin stories" in the law, particularly as they related to the law of intellectual property.¹⁵² Origin stories—like the Biblical tale of the Garden of Eden, or the founding of Rome by Romulus and Remus—serve a number of cultural functions.¹⁵³ Origin stories assign meaning to institutions, provide an explanation and justification of social arrangements, and support cultural unity through common belief.¹⁵⁴ As Silbey shows, the law uses what might be called origin stories: legal rules are traced and given authority by their origin.¹⁵⁵ Interpretation and application of legal rules often look to the original purpose of the rule. Intellectual property law provides a special twist on origin stories, by assigning control of information to the author or inventor that originated information.¹⁵⁶

150. See, e.g., Gilbert Harman, *The Inference to the Best Explanation*, 74 PHIL. REV. 88 (1965).

151. Cf. Dennis M. Patterson, *Law's Pragmatism: Law as Practice & Narrative*, 76 VA. L. REV. 937, 963–65 (1990).

152. See Jessica Silbey, *The Mythical Beginnings of Intellectual Property*, 15 GEO. MASON L. REV. 319 (2008).

153. *Id.* at 324.

154. *Id.* at 323–24.

155. *Id.* at 326.

156. Turner, in his cognitive approach to stories, sees a similar thinking in such sayings as "brainchild" and "Necessity is the mother of invention." TURNER, *supra* note 133, at 52 ("The extraordinary richness of the story of birth has made it perhaps the premier example of a familiar and powerful story that is projected onto other stories.").

A cognitive view of stories complements this analysis. As discussed above, a cognitive view suggests that “the mind understands every entity in terms of four causes: who or what brought it about; what it’s made of; what shape it has; and what it’s for.”¹⁵⁷ An origin story can supply two of those basic causes: who brought about the legal concept, and what it is for. Any appellate decision or law review article is likely to feature a discussion of the origins of the relevant legal rule, and why it was created. This is hardly objectionable, as a matter of legal reasoning. But noting the cognitive slots that origin stories so neatly fit into can help us be aware of the cognitive blind spots they may foster. Because an argument based on the original purpose of a rule can be so satisfying, it may be accepted when it deserves greater examination.

Origin stories can fill many different functions, in law as elsewhere. Sometimes the story supplies an explanation for the rule, sometimes it primarily serves as authority for the rule, sometimes it serves as cultural adhesive—or it could be any combination of these functions. More broadly, this suggests that stories could be categorized for analysis of their cognitive aspects.¹⁵⁸

The cognitive approach would supplement other attempts to bring together law and literary theory. Patent claims, for example, present a thorny problem that can be addressed in legal or linguistic terms. A legal scholar and a literary scholar collaborated to suggest that patents could be studied from the perspective of “genre theory,” which takes into account the social action of texts, as interpreted by a community.¹⁵⁹ This fits with the narrative approach to cognitive science. As part of the attempt to analyze narrative as “a process of building and updating mental models about the worlds that are told about in

157. PINKER, *supra* note 1, at 116.

158. Lawyers could craft stories by using an appropriate category for a particular type of advocacy. Cf. Ruth Anne Robbins, *Harry Potter, Ruby Slippers and Merlin: Telling the Client’s Story Using the Characters and Paradigm of the Archetypal Hero’s Journey*, 29 SEATTLE U. L. REV. 767, 768 (2006) (focusing on “the relationship of mythology and folklore heroes to everyday lawyering decisions”).

159. See Presentation by Dan Burk & Jessica Reyman, *Patents as Genre* (2007), http://www.law.depaul.edu/centers_institutes/ciplit/ipsc/ppt/Jessica_ReymanPT.ppt#258,3,DefinitionofGenre.

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stories,”¹⁶⁰ David Herman suggested the following typology of genre by preference for story types:¹⁶¹

Genre	Preference Rankings (by Event Type)
Epic	Accomplishments > achievements > activities > states
News reports	Achievements > accomplishments > activities > states
Psychological novels	States > activities > accomplishments > achievements
Ghost stories	Activities > states > accomplishments > achievements

Stories may be subject to conceptual classification as *The Stuff of Thought* classified verbs. This suggests, for example, examining the many stories in reported legal cases, to see if different areas of law show preference for event rankings. Tort cases could differ from contracts, and that different torts could vary—such as battery compared to intentional infliction of emotional distress.

The idea that a story is a cognitive unit—that cognition relies on stories, analogous to how cognition relies on words, sentences, and metaphors—permits a broader view of the staple of legal reasoning, reasoning by analogy.¹⁶² Treating story as a cognitive unit has two effects on the role of metaphor. First, it supports the view in *The Stuff of Thought* that metaphor is central to our thinking, but not determinative. Stories, which use metaphor but also other cognitive devices, play an important, and less constraining, role in reasoning. Second, it provides a more dynamic view of analogical reasoning than a strong view of metaphor does. Turner’s views on reasoning by analogy would provide a welcome insight into legal reasoning. In cognitive science, as in discussions of legal reasoning, analogical reasoning is usually discussed as projecting inferences about a target to a source.¹⁶³ The strong

160. HERMAN, *supra* note 143, at 1.

161. *Id.* at 37.

162. See generally Cass R. Sunstein, *On Analogical Reasoning*, 106 HARV. L. REV. 741 (1993).

163. MARK TURNER, COGNITIVE DIMENSIONS OF SOCIAL SCIENCE 123–24 (2001).

view of metaphor treats metaphor as organizing our thinking about a matter, once the set of facts fall within the domain of the metaphor. This views analogy as a relatively static process. Once similarities are detected between two cases, then aspects of the first are inferred to be true of the second. However, Turner aptly observes that analogical reasoning is a more dynamic process. Making an analogy is not so much a matter of discovering existing similarities, but rather an active process of reasoning dynamically, to forge an entire network of connections between two cases.¹⁶⁴ In other words, making an analogy is like creating a story.

A cognitive view of stories could complement other cognitive science approaches to decision-making. A recent copyright case illustrates well a common disposition toward stories. A jury determined that the defendant had infringed copyright by downloading some twenty-four songs to her computer without authority and placing them in the Kazaa folder on her computer, which made them available for download by other Kazaa users.¹⁶⁵ The jury then awarded \$222,000 in damages.¹⁶⁶ Actual damages in the case were probably about \$20,¹⁶⁷ so the award of \$222,000 (\$9,250 per song) went far beyond compensating the copyright owners for their lost revenue. The jurors, it seems, awarded such a massive amount because they felt that defendant lied to them.¹⁶⁸ The defendant steadfastly denied downloading any

164. *Id.* at 124.

165. Jeff Leeds, *Labels Win Suit Against Song Sharer*, N.Y. TIMES, Oct. 5, 2007, at C1. The legal theory that the defendant “distributed” the works simply by making them available to others by placing them in her Kazaa folder (without a showing that anyone downloaded the songs from her) presents a likely ground for appeal; see Fred von Lohmann, *Capitol v. Thomas: The Key Appeal Issue*, Oct. 9, 2007, <http://www.eff.org/deeplinks/2007/10/capitol-v-thomas-key-appeal-issue> (last visited Oct. 26, 2008).

166. See von Lohmann, *supra* note 165.

167. Eric Bangeman, *Appeal in RIAA Case to Focus on “Unconstitutionally Excessive” Punishment*, Oct. 15, 2007, <http://arstechnica.com/news.ars/post/20071015-appeal-in-riaa-case-to-focus-on-unconstitutionally-excessive-punishment.html>.

168. Wired Blog Network, *RIAA Juror: ‘We Wanted to Send a Message’*, <http://blog.wired.com/27bstroke6/2007/10/riaa-juror-we-w.html> (last visited Nov. 20, 2008) (“During a 45-minute telephone interview, Hegg said jurors found that Thomas’ defense—that she was the victim of a spoof—was unbelievable. ‘She should have settled out of court for a few thousand dollars,’ Hegg said. ‘Spoofing? We’re thinking, ‘Oh my God, you got to be kidding . . .

songs, despite overwhelming evidence from user files, password use, online discussions, and other records. She presented an implausible story to the jury, which reacted strongly. Had defendant acknowledged the actions, and presented a defense on other grounds, such as fair use or no damages, the jury might have been less draconian. All by way of illustrating a commonplace: people skillfully evaluate stories they hear and have strong reactions to stories deemed implausible.¹⁶⁹

We can take that insight into a much more high-tech analysis of moral decision-making. Recall the trolley problem—a staple conundrum among contemporary moral theorists. A trolley is rolling along the tracks on its way to killing five workers. Most people say they would flip a switch that sends the trolley onto another track, even if that would kill a worker there, since it is better to let one die rather than five. However, most people say that even if the only way to save the five workers would be to throw a large man in front of the trolley they would not do it. These questions have been posed to people while their brains were being imaged with fMRI.¹⁷⁰ The results suggest that the logical considerations were overcome by a more basic emotional repugnance at the thought of manhandling someone onto the railway tracks. Parts of the brain thought to be associated with abstract thinking were activated by the switch story, while parts of the brain associated with emotions were stimulated more by the manhandling story.¹⁷¹

Another interpretation is suggested by treating stories as basic cognitive units. The first story—flipping a switch to save the five workers—is relatively plausible. We regularly flip switches in daily life. From movies and books (not to mention kids' cartoons), we are familiar with switching lines to divert

. She's a liar."").

169. Cf. Nancy Pennington & Reid Hastie, *A Cognitive Theory of Juror Decision Making: The Story Model*, 13 *CARDOZO L. REV.* 519, 528 (1991).

170. Joshua D. Greene et al., *An fMRI Investigation of Emotional Engagement in Moral Judgment*, 293 *SCIENCE* 2105 (2001); see John Mikhail, *Moral Cognition and Computational Theory*, in 3 *MORAL PSYCHOLOGY: THE NEUROSCIENCE OF MORALITY* 90 (Walter Sinnott-Armstrong ed., 2007) (calling for an explanation that provides a computational basis for moral reasoning); see also Sean Kevin Thompson, *A Brave New World of Interrogation Jurisprudence?*, 33 *AM. J.L. & MED.* 341 (2007), (discussing the possible uses of fMRI in legal proceedings); Alexandra J. Roberts, *Everything New is Old Again: Brain Fingerprinting and Evidentiary Analogy*, 9 *YALE J.L. & TECH.* 234 (2007).

171. Greene, *supra* note 170, at 2106–07.

things on train-tracks. The second story is a lot less plausible. We seem to understand intuitively that we could not save the five workers by jumping in front of the trolley. It would more likely require the mass of the large bystander. Most of us do not throw people around on a regular basis, let alone people much larger than we are. People are more familiar with the concept of flipping switches than with throwing people. The story is cleverly concocted to present a nice moral problem, but its very cleverness makes it somewhat implausible. So perhaps part of the reason that it gets rejected is its unlikely logic—especially when it has been juxtaposed with a more plausible, accessible scenario. This is consistent with the fMRI data—as the discussion of the copyright case reminded us, our gut reactions to implausible stories can have an element of moral outrage.

Cognitive science will play an increasing role in the law, from litigation to refinement of doctrine to legal theory to legal education. Studying the cognitive aspects of stories could play a role in the law as well, and offers an area where lawyers have a particular expertise. Cognitive science is multi-disciplinary, studying human thinking by looking at words and sentences (linguists), artificial intelligence (computer scientists), brains (neurologists and psychologists), and behavior (anthropologists, psychologists again, evolutionary biologists, behavioral economists). Lawyers' stock-in-trade is the story.¹⁷² Lawyers view stories from every angle (creating, analyzing, adapting, transferring, and disputing). The study of stories offers a particular opportunity for lawyers not just to benefit from cognitive science, but to participate.

172. Legal education and practice expose lawyers to numerous stories over the years, giving them a practical reasoning, and habit of mind, that may differ from other groups; see Lorie Graham, *Aristotle's Ethics and the Virtuous Lawyer*, in *ARISTOTLE AND MODERN LAW* 489, 501-05 (Richard O. Brooks & James Bernard Murphy eds., 2003).