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Laws of cognition and the cognition of law

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ABSTRACT

This paper presents a compact synthesis of the study of cognition in legal decisionmaking. Featured dynamics include the story-telling model (Pennington & Hastie, 1986), lay prototypes (Smith, 1991), motivated cognition (Sood, 2012), and coherence-based reasoning (Simon, Pham, Le, & Holyoak, 2001). Unlike biases and heuristics understood to bound or constrain rationality, these dynamics identify how information shapes a variety of cognitive inputs—from prior beliefs to perceptions of events to the probative weight assigned new information—that rational decisionmaking presupposes. The operation of these mechanisms can be shown to radically alter the significance that jurors give to evidence, and hence the conclusions they reach, within a Bayesian framework of information processing. How these dynamics interact with the professional judgment of lawyers and judges, the paper notes, remains in need of investigation.

1. Bayesianism in the wild

Law and particularly *adjudication* have historically been a vibrant site for the study of cognition. By "adjudication," I refer to the formal process by which litigants proffer evidence to a decisionmaker (typically a juror) charged with finding facts and applying rules that specify the significance of such facts. The appeal for the study of cognition is readily apparent: adjudication furnishes a consequential, real-world decision-making system, the relative simplicity of which supports experimental designs that isolate mechanisms of interest from confounds without (it is hoped) compromising external validity.

In this essay, I aim to offer a synthesis akin to the postcard that a traveler might select to help convey her enchantment with an exotic land. The picture on the front will necessarily capture only a tiny portion of the overall environs. But if it manages to combine a sufficient number of sufficiently vivid sights, the card can vouch for the traveler's excitement and possibly even help her to entice friends at home to join her in future explorations.

Surprisingly, the picture on the front of my card is devoid (or nearly so) of images of the more familiar species of "biases" and "heuristics." Expositors of the form of "behavioral economics" justly made famous by Kahneman and Tversky have in fact forayed deep into the territory of the law and set up thriving colonies within it (Sunstein, 2000). But these dynamics are indeed well-known, and it is unnecessary to journey to the law to learn what is known of their operation.

The distinctive attraction of adjudication lies in the view it affords of what I will call *untamed Bayesianism*. Whether the mechanisms that populate this cognitive space should be regarded as manifestations of "bounded rationality" is an interesting question, certainly. But unlike "base rate neglect," "the conjunction fallacy," "hindsight bias," "anchoring," and other familiar members of the behavioral-economics family, these dynamics do not feature reasoning defects that defeat Bayesian information-processing. Rather, they address how information can shape a variety cognitive inputs that a Bayesian framework *presupposes*. Because their operation can radically alter the

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outcomes decisionmakers reach consistent with such a framework, they suggest a variant of Bayesian information-processing much less predictable, much less well-behaved than is normally on display in decision theory texts.

2. Domesticated Bayesianism

Indeed, to understand the significance of these mechanisms, it is useful to begin with a relatively tame exposition of Bayesian information-processing as it might be understood in relation to adjudication (Lempert, 1977). It comprises three essential components: a prior or existing estimate of the probability of some alleged historical event (that *D* stabbed *V* in self-defense, say); a piece of evidence (that *V* propositioned *D*'s girlfriend in *D*'s presence at a bar) the probative significance of which can be expressed in terms of a likelihood ratio, which reflects how much more consistent that evidence is with the alleged event than with some alternative (that *D* premeditated the killing of *V*); and a revised estimate of the probability of the hypothesis. The revised estimate, expressed in odds, can be derived by multiplying the prior estimate, expressed in odds, by the likelihood ratio (Fig. 1A).

As genuinely useful as it is, this account is necessarily incomplete. Not only the prior probability of the disputed event but also the likelihood ratio to be assigned each item of evidence are wholly external to it. Without access to these values or some comprehension of how a decisionmaker effectively determines them, this framework cannot yet be used to explain, predict, or evaluate adjudicatory outcomes.

The study of cognition in adjudication has identified a host of dynamics that fill in these blanks. The picture of information-processing that emerges is replete with forms of conflict—practical and moral—that mock the elegant tranquility of *Posterior odds = Prior odds × Likelihood ratio*.

3. Story-telling model

Pennington and Hastie's *story-telling model* (STM) comprises the most significant collection of these dynamics (Pennington & Hastie, 1992, 1991, 1990, 1986). According to STM, we can view decisionmakers (say, jurors in a murder case) as endowed with a stock of story schema (e.g., "violent bully who menaces strangers in local bar;" "overly controlling man, prone to unwarranted or excessive jealousy and likely to seek revenge for a perceived slight").

Acquired through one or another form of socialization, these schema operate less as alternative hypotheses then as alternative templates for organizing and interpreting evidence. Conceptually speaking, we can see them as supplying priors (e.g., the frequency with which a barroom tough's harassment will escalate to a lethal threat). But even more important, the template that a decisionmaker uses will decisively shape the significance, and the hence the probative weight, or in Bayesian terms the likelihood ratio, that he or she assigns successive pieces of evidence (whether, e.g., *V's* proposition telegraphed threatening intentions or instead supplied *D* with the motivation to provoke a fatal confrontation).

Finally, the operative template *augments* the evidence supplied by the parties. Assumptions and inferences derived from the decisionmakers' richly elaborated social schema will be used to fill in the myriad gaps that inevitably stand between the evidence presented in the courtroom and a coherent reconstruction of some real-world event.

STM reveals just how much drama the simple Bayesian framework has obscured from us! Much less important than the role evidence plays in updating the decisionmakers' evolving assessment of competing factual allegations,

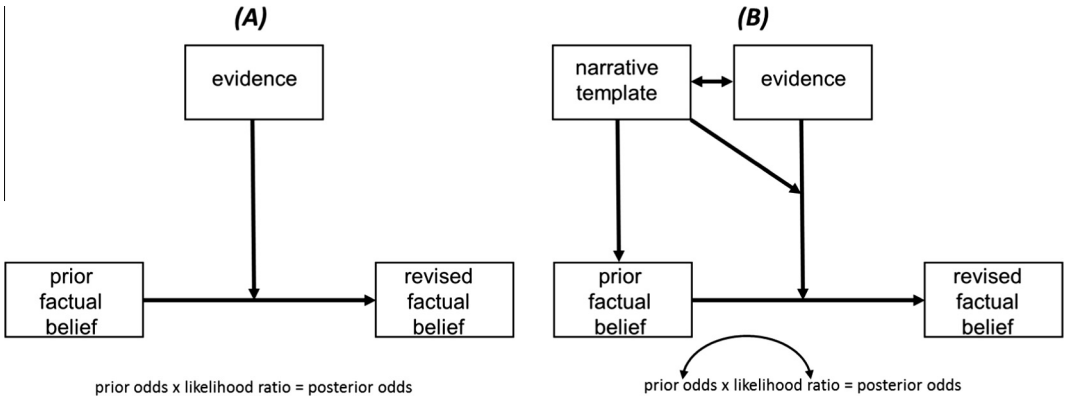

Fig. 1. Bayesian information-processing and the story-telling model (STM). Under a Bayesian information-processing model (A), the decisionmaker updates her assessment of the probability of a factual claim in proportion to how much more or less consistent each successive piece of evidence is with that claim than with any alternative one. Under STM (B), evidence also influences which of two or more narrative templates the decisionmaker selects. The narrative template determines the prior probability the decisionmaker attaches to the factual claim and the likelihood ratio or weight the decisionmaker attaches to each piece of evidence. The decisionmaker's prior and the likelihood ratio she assigns to evidence will be correlated, insofar as the same source—the operative narrative template—will conform both to a narrative-congruent conclusion. The probability that the decisionmaker will reach that conclusion is reinforced by narrative-congruent assumptions and inferences that effectively augment the evidence presented by the parties.