
Bayesianism and its rivals

Renaissance Park, Room 909

Northeastern University

March 11-13, 2022

1 Schedule

Friday, March 11

5PM-5:15PM	Opening remarks
5:15PM-6:45PM	Speaker: Fiery Cushman (Harvard) Paper: Dangerous thoughts
6:45PM	Dinner (speakers and organizers)

Saturday, March 12

9AM-9:30AM	Breakfast
9:30AM-11AM	Speaker: Katya Tentori (Trento) Paper: Forecasting accuracy: From formal models to human intuitions, and back (with a new scoring rule)
11AM-11:15AM	Coffee
11:15AM-12:45PM	Speaker: Zoe Jenkin (Washington University in St. Louis) Paper: Encapsulated failures
12:45PM-1:30PM	Lunch
1:30PM-3PM	Speaker: Ralph Hertwig (Max Planck Institute for Human Development, Berlin) Paper: How experimental methods shaped views on human competence and rationality
3PM-3:30PM	Coffee
3:30PM-5PM	Speaker: Vincenzo Crupi (Turin) Paper: Critique of pure Bayesian cognitive science
5-5:15PM	Closing remarks
5:15PM	Dinner (informal, all welcome)

2 Wireless

There are two ways to connect to wifi during the conference:

Method 1: Eduroam: If your university belongs to eduroam, you should be able to connect to eduroam using the eduroam profile already installed on your computer.

Method 2: NUwave-guest: The guest wireless network at Northeastern is NUwave-guest. This can be connected to after a short registration process, and a daily password change. Instructions on connective to NUwave-guest can be found here:
<https://tinyurl.com/BayesRivalsWIFI>.

3 Abstracts

Sara Aronowitz, “Learning, again”

A standard model of learning is that observations are incorporated into the agent’s beliefs, and then the story ends - observations, after being digested, have served their epistemic purpose. In this talk, I’ll argue that observations have a second function: they are repurposed, and reused in analogical reasoning, imagination, and certain types of memory. This notion of repurposing opens up the possibility that some kinds of learning, such as building new theories, are informed by what we observe without at the same time and to the same degree being informed by what we believe.

Vincenzo Crupi, “Critique of pure Bayesian cognitive science”

Bayesian approaches to human cognition have been extensively advocated in the last decades, but sharp objections have been raised too. I outline a diagnosis of what has gone wrong with prevalent strands of Bayesian cognitive science (pure Bayesian cognitive science), relying on illustrations from the psychology of reasoning and tools from the philosophy of science. Bayesians’ reliance on so-called method of rational analysis is a key point of my discussion. I tentatively conclude on a constructive note, though: an appropriately modified variant of Bayesian cognitive science can still be coherently pursued.

Fiery Cushman, “Dangerous thoughts”

People treat certain thoughts to, for instance, do immoral deeds as ‘unthinkable’. We develop a computational model that explains why even considering such actions is risky. If these actions have negatively skewed distributions of payoffs — usually you get a small benefit, but occasionally you pay a large cost — it is difficult for a boundedly rational agent to discover the rare, but harmful, costs when simulating possible future outcomes. Thus, a heuristic to avoid contemplating taking such actions — even if they may be positive expected utility — outperforms a strategy that tries to estimate each action’s expected utility on a case-by-case basis.

Ralph Hertwig, “How experimental methods shaped views on human competence and rationality

Within just 7 years, behavioral decision research in psychology underwent a dramatic change. In 1967, Peterson and Beach (1967a) reviewed more than 160 experiments concerned with

people’s statistical intuitions. Invoking the metaphor of the mind as an intuitive statistician, they concluded that “probability theory and statistics can be used as the basis for psychological models that integrate and account for human performance in a wide range of inferential tasks” (p. 29). Yet in a 1974 *Science* article, Tversky and Kahneman rejected this conclusion, arguing that “people rely on a limited number of heuristic principles which reduce the complex tasks of assessing probabilities and predicting values to simple judgmental operations” (p. 1124). With that, they introduced the heuristics-and-biases research program, which has profoundly altered how psychology, and the behavioral sciences more generally, view the mind’s competences and rationality. How was this radical transformation possible? We examine a previously neglected driver: The heuristics-and-biases program established an experimental protocol in behavioral decision research that relied on described scenarios rather than learning and experience. We demonstrate this shift with an analysis of 605 experiments which shows that the descriptive protocol has dominated post-1974 research. Specifically, we examine two lines of research addressed in the intuitive-statistician program (Bayesian reasoning and judgments of compound events) and two lines of research spurred by the heuristics-and-biases program (framing and anchoring and adjustment). We conclude that the focus on description at the expense of learning has profoundly shaped the influential view of the error-proneness of human cognition.

Zoe Jenkin, “Encapsulated failures”

Bayesian epistemology tells us that to be rational our beliefs must 1) update in response to evidence through conditionalization and 2) conform to standards of coherence. While our beliefs sometimes meet these criteria, they also often fail. Some failures are mere performance errors, while others are deeper and more systematic, driven by fundamental features of cognitive architecture. I’ll focus on one such feature: informational encapsulation. Informational encapsulation in perception, social cognition, emotion, and language processing renders some evidence inaccessible for updating, and leads to incoherence. Are agents rendered irrational when they fail to meet Bayesian standards due to informational encapsulation? I argue that neither a straightforward yes nor a straightforward no answer is successful. Instead, the agent’s degree of irrationality is sensitive to the degree of informational encapsulation of the subsystem.

L.A. Paul, “Deviant updating”

Using a Bayesian framework, I will explore the idea that certain ways of being open to the world present a distinctive kind of problem: they threaten to change the way an individual makes sense of the world at a foundational level. This can affect what one is able to consider as evidence, and thus has implications for decision making. I will then explore the implications of this for a special case: people who suffer from paranoia.

Katya Tentori, “Forecasting accuracy: From formal models to human intuitions, and back (with a new scoring rule)”

The ability to anticipate upcoming events is a fundamental component of human cognition, supporting intelligent behavior and informed decisions in uncertain environments. However,

the general consensus on the importance of having accurate forecasts does not translate into an agreement on how to measure and promote the quality of forecasts. A question naturally arising, then, is what scoring rule best captures people’s intuitive assessment of forecasting accuracy. We provide an original answer to this question by means of a new experimental paradigm for eliciting ordinal judgments of accuracy concerning pairs of categorical forecasts for which various combinations of associations or dissociations between the Quadratic, Logarithmic, and Spherical scoring rules are obtained. We show that, overall, the Logarithmic rule predicts participants’ accuracy judgments better than the alternatives, but also that there are specific classes of forecasts in which participants’ judgments — although normatively sound — systematically depart from what is expected by all the three models. This appears mainly related to participants’ consideration of the ranks in the forecasting distribution, an aspect that is at the core of positional voting systems but is neglected by classical scoring rules for probabilistic forecasting. Based on these results, we propose a new scoring rule (BLog, for “Borda-adjusted-Log score”) that combines the logarithmic rule with the ranking algorithm of the Borda count, one of the most prominent positional voting methods. We provide a demonstration that this new measure is strictly proper and show that it outperforms the Quadratic, Logarithmic, and Spherical models on our data. Finally, we discuss the implications of our findings for the development of new family of formal models that are more aligned with human intuitions about forecasting accuracy.