

# Could (do) experiments reveal (deep) irrationality?

Tversky & Kahneman 1974; Cohen 1981; Stich 1985

Kevin Dorst  
kevindorst@pitt.edu

Rationality  
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## I. Tversky and Kahneman 1974

Don't need to track all the details; what matters is the *picture*, and a few illustrations.

### The Picture

- Reasoning under uncertainty is *hard*. So limited critters like us must rely on **simple heuristics**.
- We get away with it because these heuristics are generally *good enough*.
- Nevertheless, in certain (predictable) circumstances, they lead to *severe* and *systematic* deviations from rational/optimal choices.
- We can learn what the heuristics are—and therefore what errors we're prone to make—by studying "cognitive illusions".
- Once we identify them, we can develop "debiasing" methods.

### Examples:

*Representativeness*: People judge probability that *A* is *B* or *B* will produce *A* by using the degree to which *A* resembles (a prototypical) *B*.

→ *Base rate neglect*. Lawyers and engineers problem.

"Jack is a 45-year-old man. He is married and has four children. He is generally conservative, careful, and ambitious. He shows no interest in political and social issues and spends most of his free time on his many hobbies which include home carpentry, sailing, and mathematical puzzles."

Judgments largely ignored what proportion were engineers. Most strikingly, with NO information said 30% chance; but with *useless* info, said 50%.

*Why mistake?* Suppose 50% of engineers and 20% of lawyers fit description "no interest in political and social issues." Suppose 30 engineers and 70 lawyers. How many of each would fit the description? (15 vs. 14.) Suppose 70 engineers and 30 lawyers. How many of each? (35 vs. 6.)

→ *Conjunction fallacy*.

Linda is 31 years old, single, outspoken and very bright. She majored in philosophy. As a student, she was deeply concerned with issues of discrimination and social justice, and also participated in anti-nuclear demonstrations.

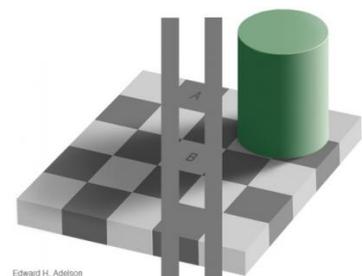
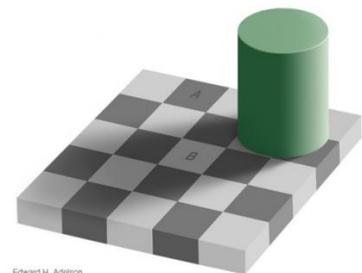
What's more likely?

"Judgment under Uncertainty: Heuristics and Biases"

"General probabilistic inference is intractable"

Side note: "rational" vs. "optimal"  
Side note: "severe" vs. "systematic"

Analogy: learn how visual system works by studying visual illusions.



Note: replication questions.

- a) Linda is a bank teller.
- b) Linda is a bank teller who's active in the feminist movement.

*Why mistake?* Every possibility in which (b) is true is one in which (a) is true, so (a) cannot be less likely than (b).

*Availability:* People assess probability of  $X$  by the ease to which examples of  $X$  come to mind.

Of 10,000 random words, how many end in \_n\_?

*Anchoring and (insufficient) adjustment:* People often make estimates by starting with a base value and then adjusting, but they adjust insufficiently.

Number of African countries? Roulette wheel.

**Upshot:** For a variety of instances of  $H$ :

- i) Evidence that people use reasoning heuristic  $H$ .
- ii)  $H$  is not rational.

## II. Cohen 1981

**Puzzle:** Experiments show people incapable of dealing with simplest reasoning tasks; yet every waking minute your brain executes computational feats that the most sophisticated computers cannot.

The Grand Argument:

How do we establish (ii) above? Must appeal to *normative intuitions*.

E.g. logic. Should we defer to logic textbooks?

P1) If God doesn't exist, then it's not the case that if I pray, my prayers will be answered.

P2) I don't pray

C) God exists.

(Explanation:  $\neg(P \rightarrow A)$  true only if  $P$  true and  $A$  false, so it's false; so in order for  $\neg G \rightarrow \neg(P \rightarrow A)$  to be true,  $\neg G$  must be false.)

E.g. probability. Should we defer to mathematicians?

Five candidates running for office:

Joe, 45%; Bernie, 20%; Elizabeth, 15%; Pete, 10%; Mike, 10%.

What do you think's likely to happen?

✓ Joe will win.

✓ Joe or Bernie will win.

?? Bernie, Elizabeth, Pete, or Mike will win.

→ We need an account of how we arrive at a normative theory governing these judgments.

Cohen: (narrow) reflective equilibrium built upon our considered

Plane crashes vs. car crashes.

Conceptual issues; normative issues.

Average when 10? 25.

Average when 65? 45.

Standard empirical theory.

Normative theory.

"Can human irrationality be experimentally demonstrated?"

The simple narrative that "probability is too hard" can't be it; handheld calculators can do probability, while supercomputers still can't drive cars.

Slogan: "Ordinary reasoning sets its own standards."

"Immediate and untutored inclination to judge that  $p$ "

$\neg G \rightarrow \neg(P \rightarrow A)$

$\neg P$

$G$

Credit: Dorothy Edgington.

The Q: What justifies applying measure-theory to our judgments about what's "probable"?

judgments in particular cases.

Generates a *normative* theory of good reasoning, and a *descriptive* theory of our **reasoning competence**.

Competence vs. performance.

Chomsky and grammaticality.

Can make mistakes—of course! Even systematic ones.

Analogy: slur words when drunk.

But the *data* that generate the (idealized) normative theory are the same ones that generate the (idealized) descriptive one.

So we could not discover that people can be *deeply* or *fundamentally* irrational.

### The Narrow Arguments

Apparent instances of irrationality can be sorted into one of four categories.

I can't say I fully understand his categorization choices.

#### 1) *Cognitive illusions*.

E.g. Availability heuristic; Wason selection task.

Real errors, but are deviations from the norm (of rationality).

Need *ecological validity* to get a sense of generality.

"Slips of the mind"

This criticism *has* been taken to heart.

#### 2) *Tests of knowledge*.

E.g. Law of large (vs. small) numbers; calibration research.

#### 3) *Misapplications of correct normative theory*.

E.g. Affirming the consequent ("conditional perfection").

"He'll be mad if you interrupt him"  
 ~→ He won't be made if you don't.

#### 4) *Incorrect normative theory*

E.g. base-rate neglect.

### **Some questions:**

- We know from ethics that pre- and post-reflective equilibrium judgments can differ massively and systematically. Does "deep" rationality matter if performance errors are wide and systematic?
- Are (2)–(4) interestingly distinct categories?
- Details of specific criticisms...

### **III. Stich 1985**

"Could Man Be an Irrational Animal?"

Disanalogy between Cohen and Chomsky: grammar *varies* across people and times.

Yet Cohen proceeds (reasonably enough) as if there is an objective (not subject-dependent) fact about what types of reasoning are good.

So why can't one group ("the experts") have a competence which reveals that the underlying competence of another group ("the fools") is systematically, deeply irrational?

Relativism? Majoritarianism? Yuck.

**Worry:** But this is decidedly *not* what psychologists are claiming! Rather, the claim is that these are biases we *all* are susceptible to.

What experiments *could* vs. *do* show.

Thoughts?

**My Takeaway:**

- Cohen is right that the normative issues are subtle, and cannot be glossed over or taken for granted.
- Cohen *might* be right that there's some "deep" disposition toward rationality.
- But I think this leaves very open the question of *how* rational people really are.

This might help support taking it as a default, and seeing if we can understand the empirical results through it.

Bonus: Stich on the argument from natural selection.

P<sub>1</sub>) NS selects for reliable belief/action strategies.

P<sub>2</sub>) Reliable belief/action strategies are rational.

C NS selects for rationality.

(P<sub>1</sub>) is false: Rats and radiation; different errors have vastly different consequences.

Also, (P<sub>2</sub>) is false: strategies that are reliable in one environment can be unreliable in others!

**This seems right.** But that's not to say it defuses all challenges from natural selection.

When asking whether a strategy is *problematically* irrational, the natural questions to ask are the degree to which the errors it leads to are *systematic*, *common*, and *important*—and also the ease with which a better strategy could be deployed.

But these are also precisely the questions that would tell us how much *selection pressure* there is against using the strategy.

→ The better the case for irrationality, the deeper the puzzle about why the tendency wasn't selected out.