

POLS201
Spring 2019

Ian McDonald

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Pearl and the Ladder of Causation

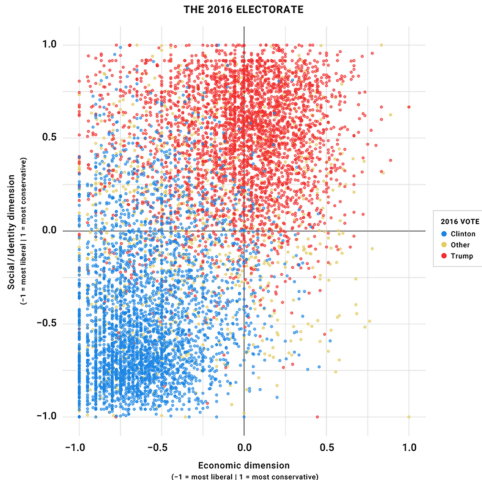
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January 28

Any advice for Howard Schultz?

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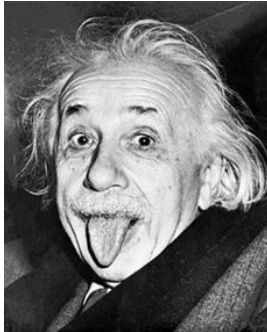


Remember This Guy?

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- “Imagination is more important than knowledge”



- He's not kidding. Imagination is the ability to construct a story we can't see.
- Figuring the earth revolves around the sun? That took imagination.

Pearl and Mackenzie: Ladder of Causation

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- “Causal explanations, not dry facts, make up the bulk of our knowledge. . . ”
- “It is useless to ask for the causes of things unless you can imagine their consequences.”

As we Learned in Political Science 103

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- Voters create mental models, aka “causal inference engines” in our minds.
- People can make useful judgments in politics with little grasp of facts.
- Three kinds of cognitive ability: seeing, doing, and imaging.

Pearl's Ladder, Rung 1: Observation

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- Observation. Collecting data and making associations. Computers, robots, owls, all do this.
- “Good predictions need not have good explanations.” (30)
 - But consider the 10 causes with two possible states problem.
 - Ten causes create 30 *million* combinations of causal sequences.

Computers might retain factoids, but people don't

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- People can make good guesses about causal relationships
- Computers can only make the guesses we tell them

Pearl's Ladder, Rung 2: Intervention

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- A simple causal model suggests where an intervention can change an outcome.
- This idea is closely related to the power of experimentation.
 - If I can control for confounding variables, I can learn something,
- Example: “Blond hair makes you Republican”
- Probably not. But how do you know? Blond hair certainly covaries with partisanship.

Pearl's Ladder, Rung 2: Intervention

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- Neat. But what about steps in a logical sequence that we can't create, but *only* imagine.
- Suppose:
 - Terms of Versailles treaty terms were less punitive.
 - Children were denied smallpox vaccinations.
 - Primary elections are all “open”

Pearl's Ladder, Rung 3: The Counterfactual

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- The gold standard of causal inference
- Two identical parallel worlds, with the one difference we care about.
- We reason through the possibilities given what we already know.
- If we know enough about the topic, we propose an alternative causal story.

Does Pearl try to “define” causality?

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- No, and he asks you to not worry about it.
- Euclid “never defined points and lines.”
 - He described them, but didn’t define them. Do you see the difference?
- Sometimes, we can use an idea if we describe it well, even if we don’t settle on a definition.
- For now: causes are attached to processes that we can’t see but leave traces.