



Session 4

Decision Making

Stephen Gilbert

<https://youtu.be/Cv6tuzHUuuk?t=8s>

What explains how people make decisions?



Dr. Ray Gilbert

“People do things that make sense to them at the time.”

The Nature of Truth: Epistemology



“Bearding”

PHILOSOPHICAL FRAMEWORKS

Paradigms/Epistemologies, Theoretical
Perspectives, and Methodology

Slides by Dr. Joanne Marshall

RESEARCH FRAMEWORK

DERIVED FROM CROTTY, 1998

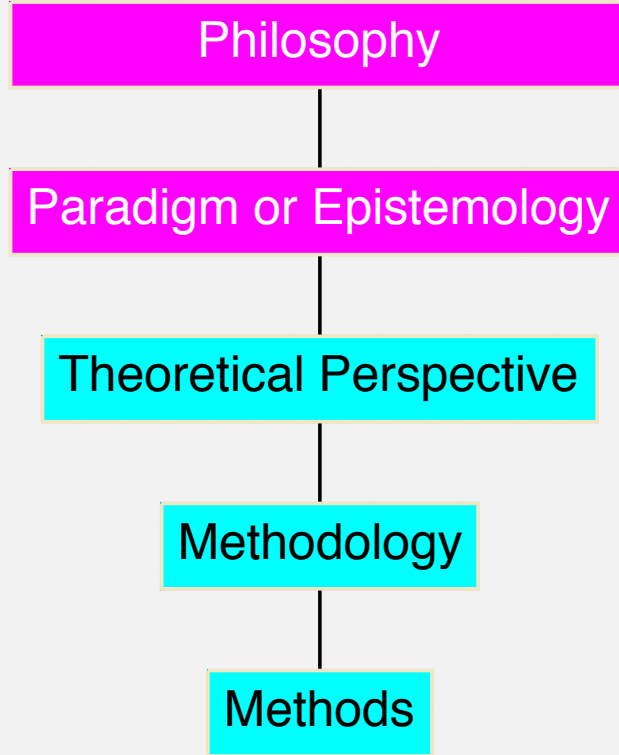
Philosophy

Paradigm or Epistemology

Theoretical Perspective

Methodology

Methods



PHILOSOPHY FIRST




PHILOSOPHY INFORMS
PARADIGMS

PHILOSOPHICAL FRAMEWORKS

“Paradigms shape research at its most basic level; worldviews frame the type of questions asked and what the answers might look like.”

-Brodio & Manning (2002), p. 435

PHILOSOPHICAL FRAMEWORKS

- “Paradigm shift”
 - Positivism vs. Postmodernism
(philosophical paradigm)
- 
- Objectivism vs. Constructionism
(Epistemology)

POSITIVISM

Auguste Comte (19th c.)

System of philosophical
and religious doctrines

Scientific inquiry must
rely on observable data



POSTMODERNISM

- Artistic, philosophical, and cultural movement
- Resists universals and encourages fractured, fluid and multiple perspectives.

PHILOSOPHY OF POSITIVISM →
OBJECTIVIST PARADIGM

- World exists in objectively knowable, singular, natural law-abiding reality
- Goal of science is to predict & control -- applies across contexts

PHILOSOPHY OF POSTMODERNISM →
CONSTRUCTIONIST PARADIGM

= Naturalistic, Hermeneutic, Interpretive

- People interact with each other and the world in complicated, context-specific ways to construct knowledge
- Knowledge / reality is social

PHILOSOPHICAL FRAMEWORKS

<u>Positivism</u>	<u>Postmodernism</u>
Objectivism	Constructionism
Objectivity	Subjectivity
Absolutism	Relativism
Control	Context
<i>Quantitative</i>	<i>Qualitative</i>

Vygotsky
&
Situated Action
by Lucy Suchman

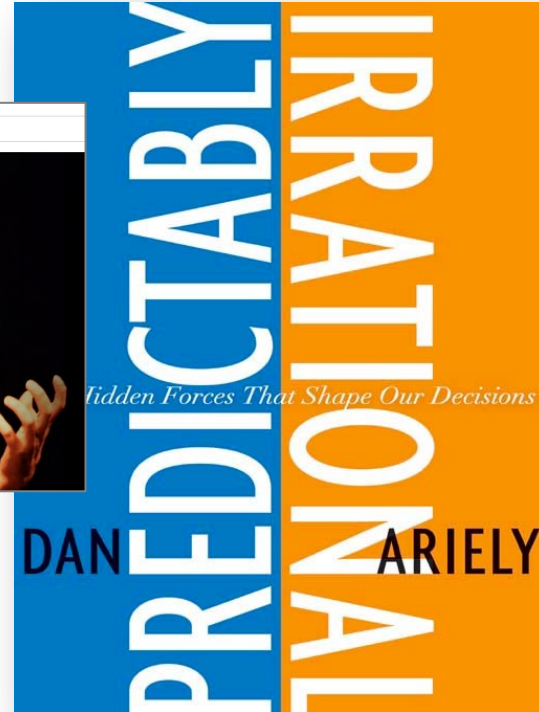
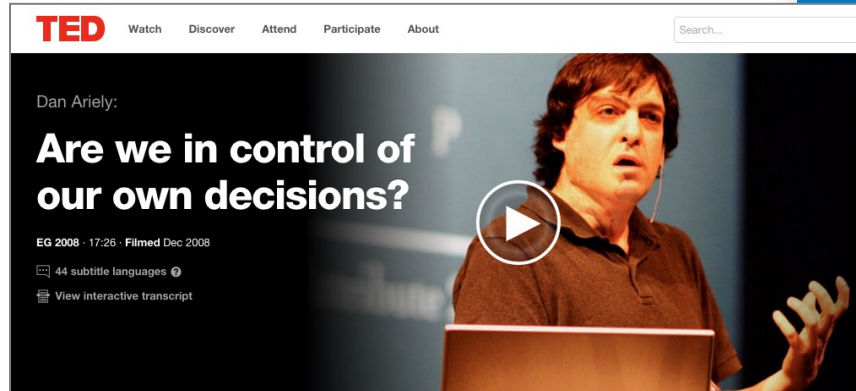
Why is this HCI?

We build tools to help people act on the world,
which involves making decisions.

Decision Making Steps



Dan Ariely



The Nature of Truth: Epistemology

Hammond, 2007
Katsikopoulos, 2009



Correspondence

Accuracy

Empirical

Environment focus

“Does it match the world?”

Plato, Aristotle

One Truth

Reading flight gauges

Weather prediction

Childbed fever (after germs)

Newtonian physics

Coherence

Goodness of Process

Consistency

Rationality

“Does it match our model?”

Kant

More than one truth

Prepping for landing

Playing chess

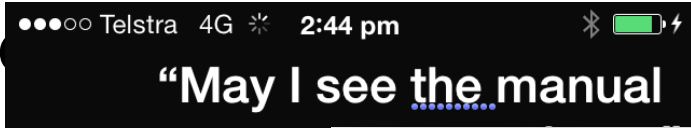
Childbed fever (before germs)

Quantum physics



Relationship to ethics (<http://www.justiceharvard.org/>)

Kathl



d Ecology



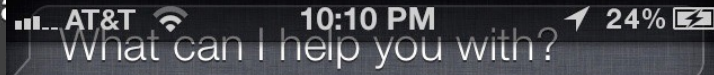
I don't see 'M
your contact
you meant o

Manuel

Victor-Manuel

" How b
Sandy

Unfortuna
the Hurric
was canc



" I have a gambling
problem who should I
call "

I found 6 casinos.

Tap the one you want to call:

Auburn Way South
Muckleshoot Indian... 9.0 miles
★★★★☆ 52 reviews

Auburn Wy South

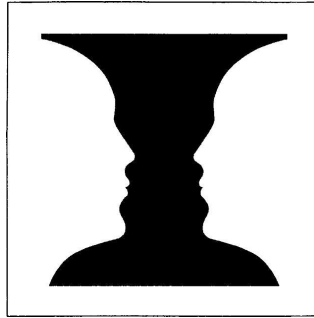


Decision Making on the Fly

Signs in the Corner Activity

Brunswik's Lens Model

It's a
vase.

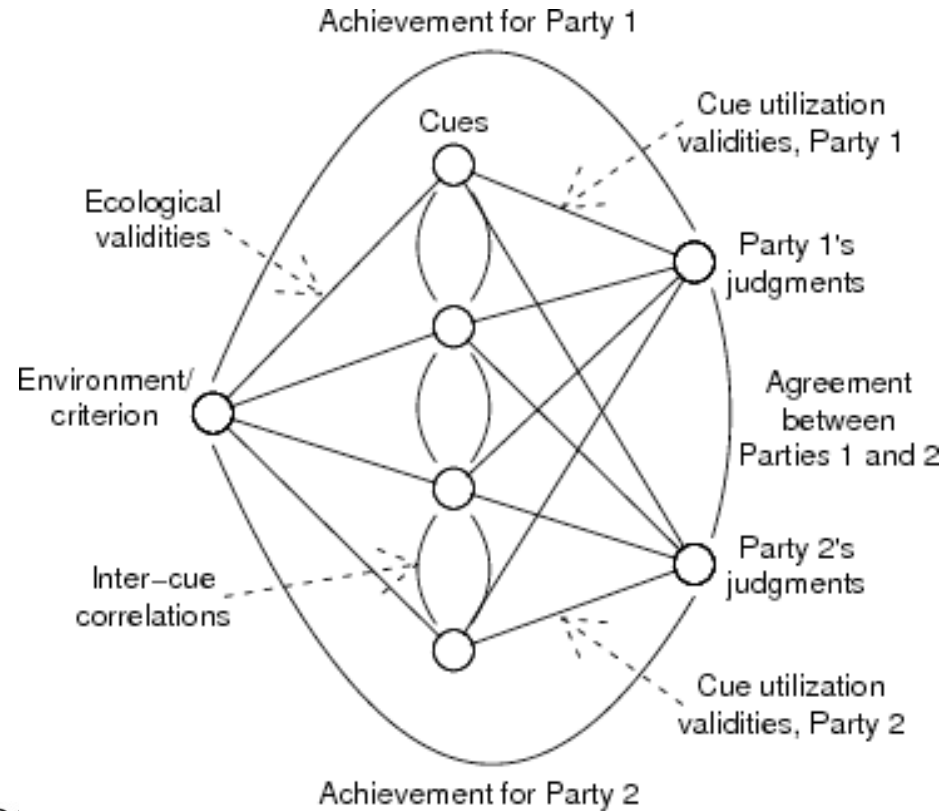


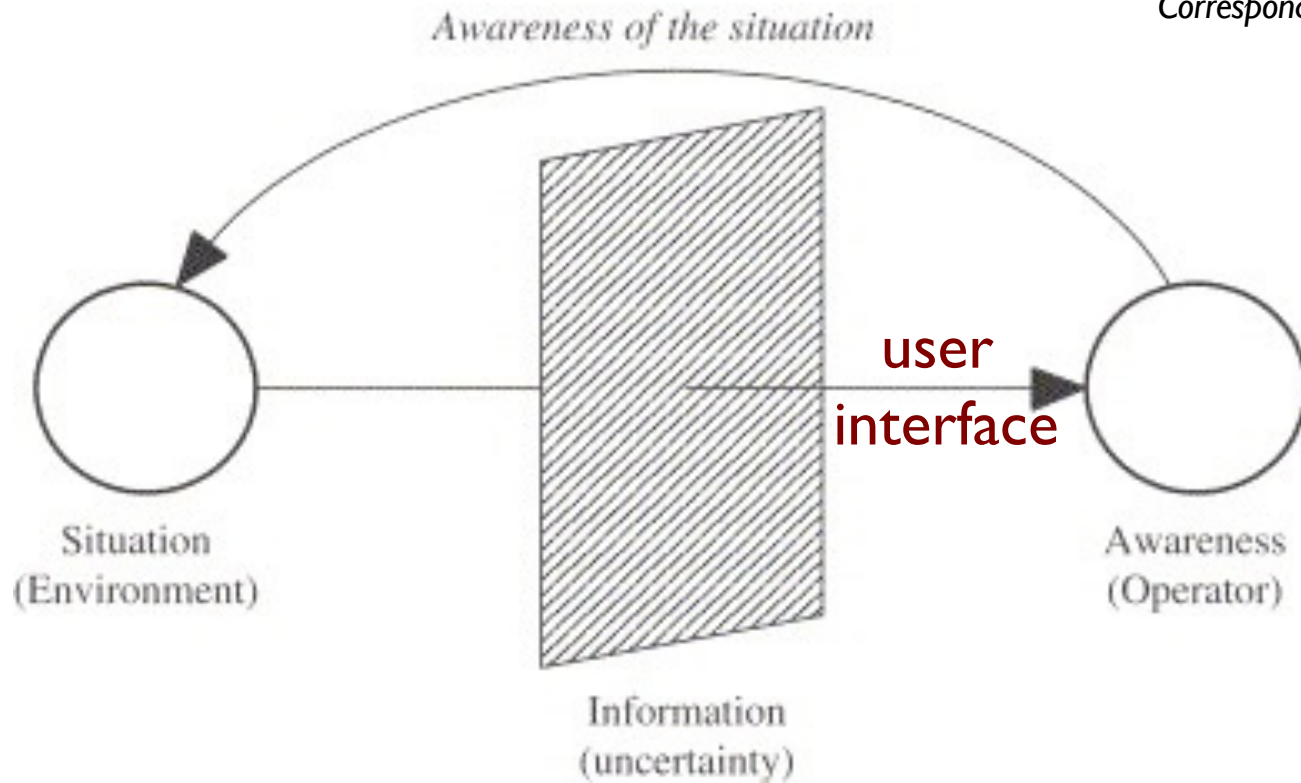
It's two
faces.



*the
individual
matters*

Brunswik's Lens Model

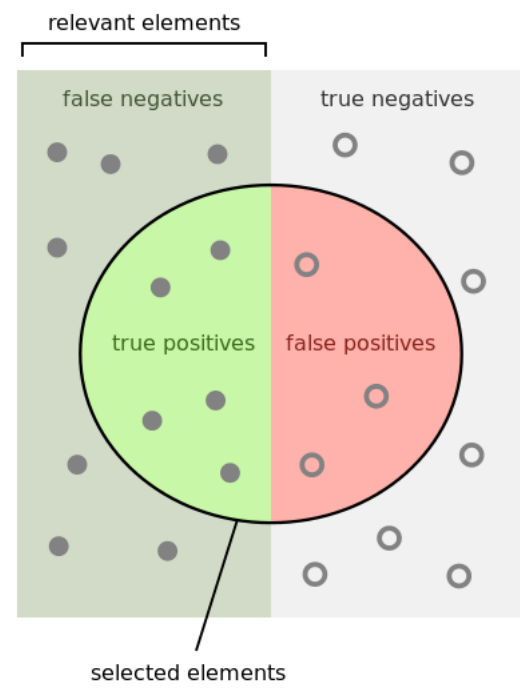
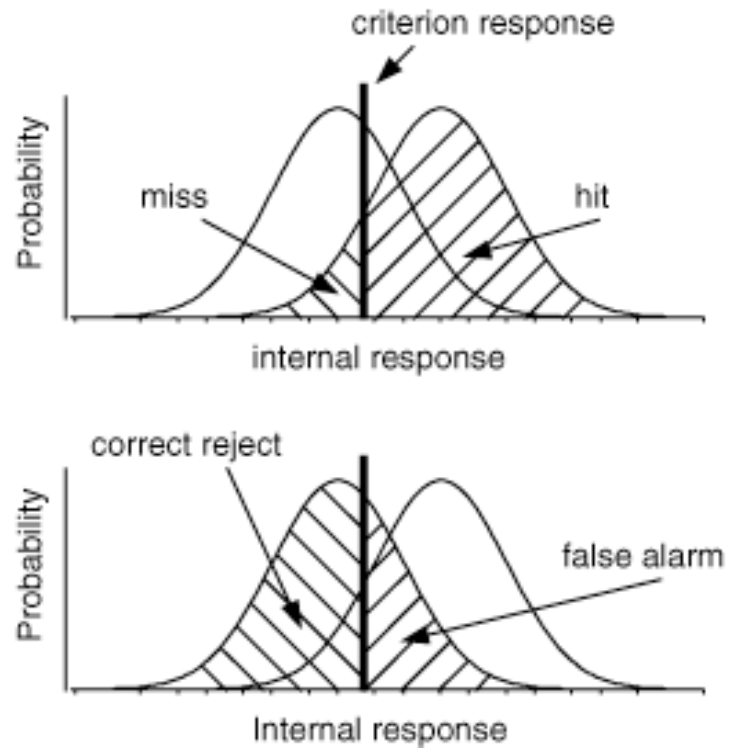




Alex Kirlik

Are operator's judgments
correlated with actual states?

Signal Detection Theory



How many selected items are relevant?

$$\text{Precision} = \frac{\text{true positives}}{\text{true positives} + \text{false positives}}$$

How many relevant items are selected?

$$\text{Recall} = \frac{\text{true positives}}{\text{true positives} + \text{false negatives}}$$

Gary
Klein

Naturalistic Decision Making

Poorly structured problems

Expertise:

knowledge

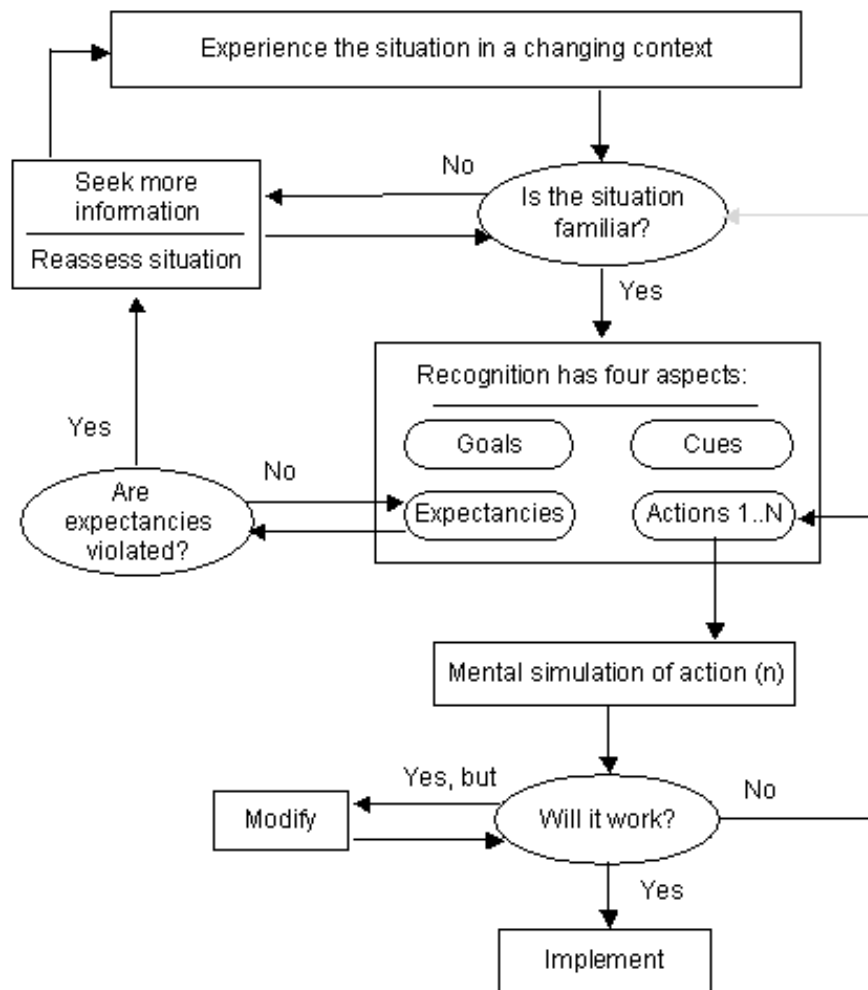
cue processing differs for novices & experts

experience

All about judgment of the situation.

NDM

Hybrid environment can mess with this.



Heuristics & Biases

Kahneman & Tversky

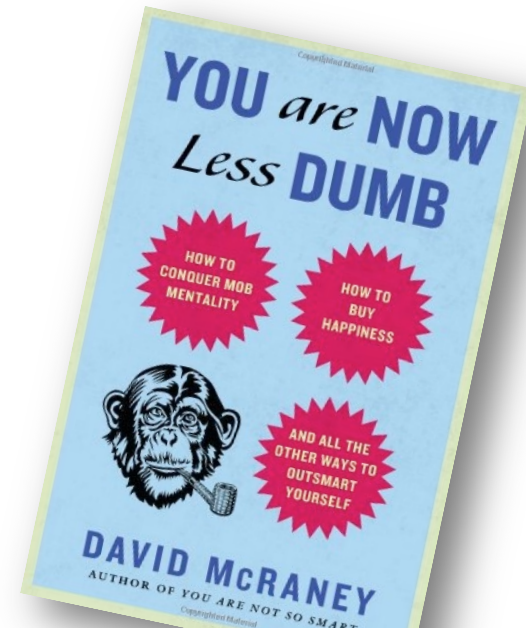
Attempts to model human judgment, even though it violates Bayesian thinking.

Availability – What can I remember?

Representativeness – How typical is it?

Framing – What's the story?

Automation as a heuristic
(can violate coherence)





More Heuristics

Recognition – If you recognize it, it's better/bigger/more known.

Do what everyone else does

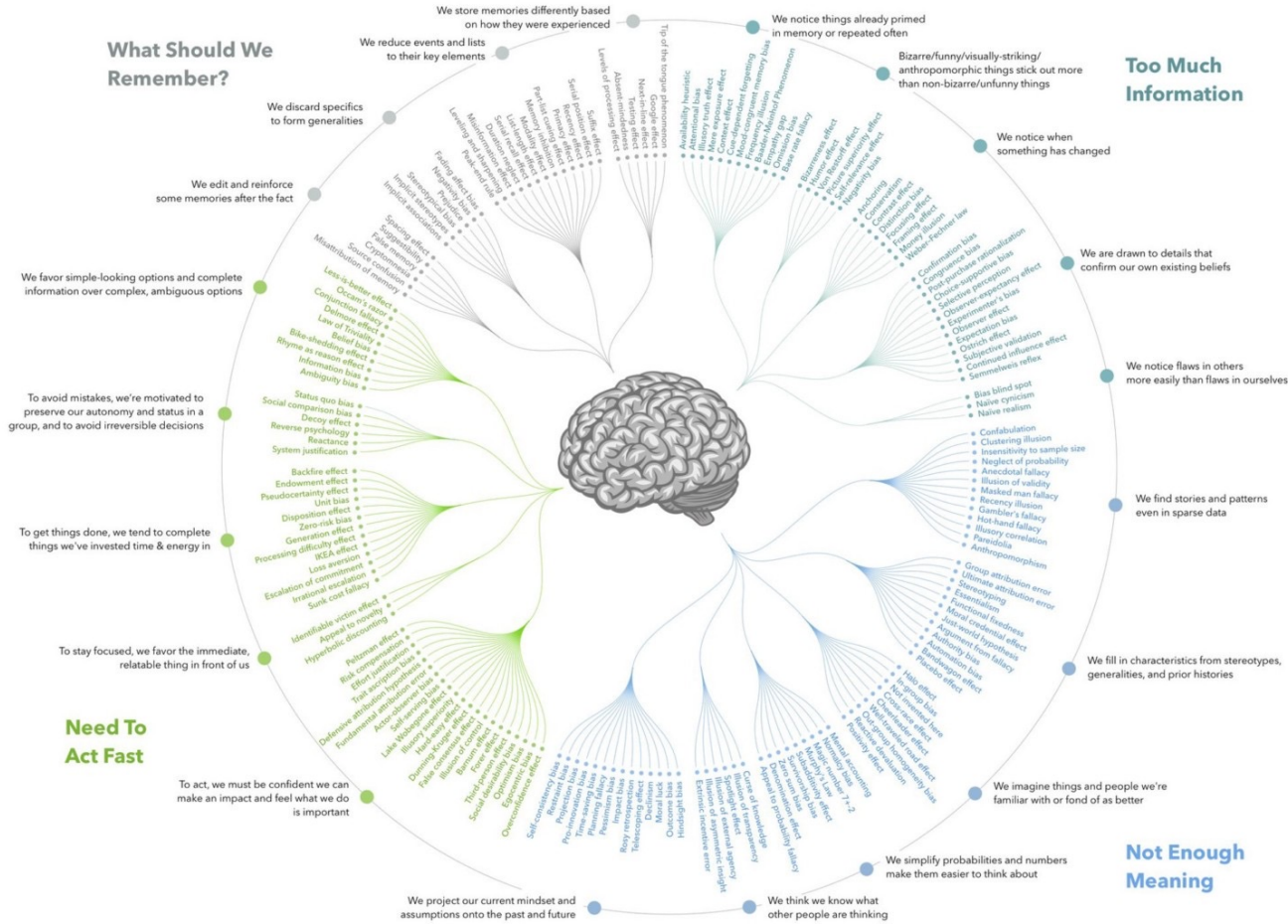
When do these
work well vs. badly?

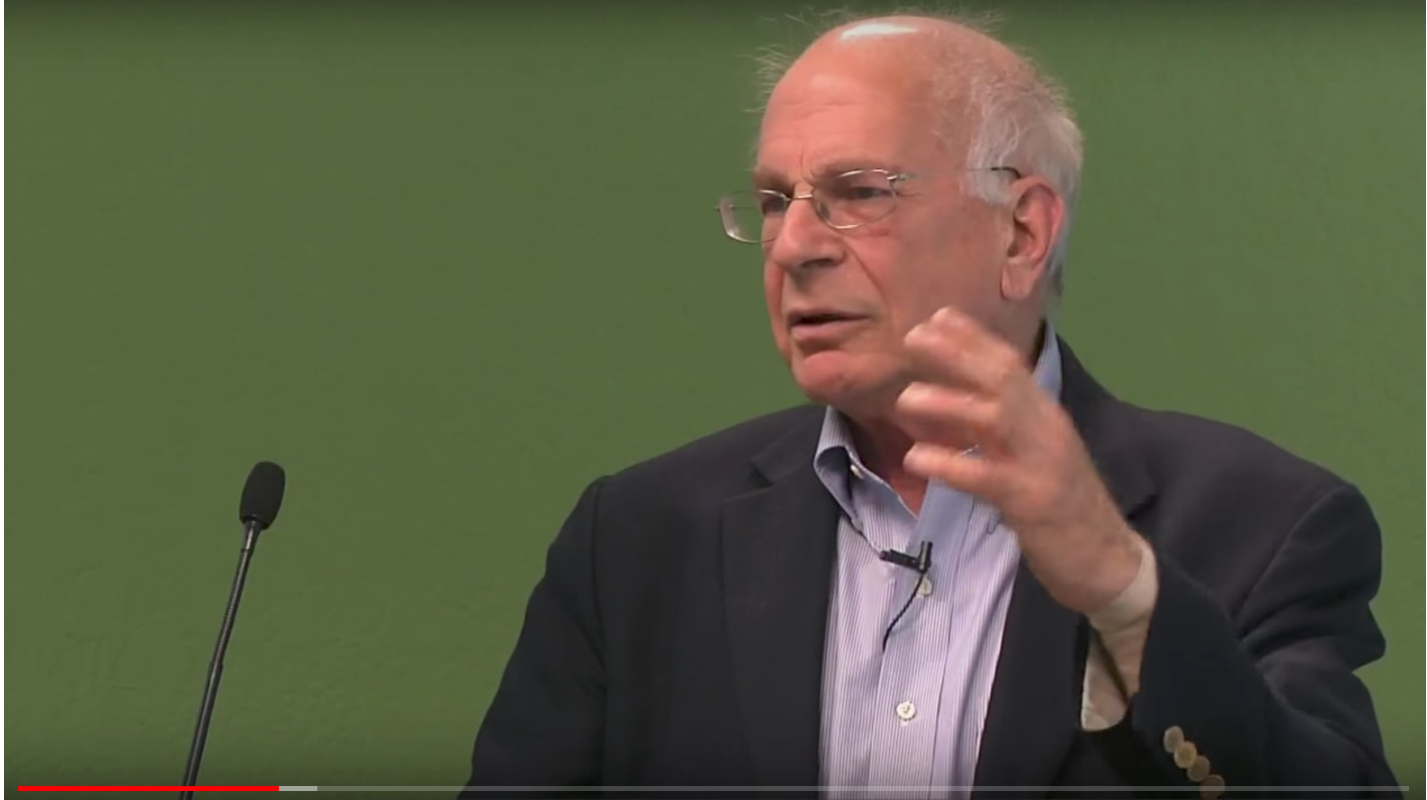
Default – Don't change a default

Take-the-best & Tallying – validity of cues

Fast & Frugal Trees – Q&A, one outcome per Q

COGNITIVE BIAS CODEX, 2016





11:42 / 1:02:26



Summary

Decision making is hard to predict.

It probably requires both mental models and data from the world.

We haven't solved it yet.