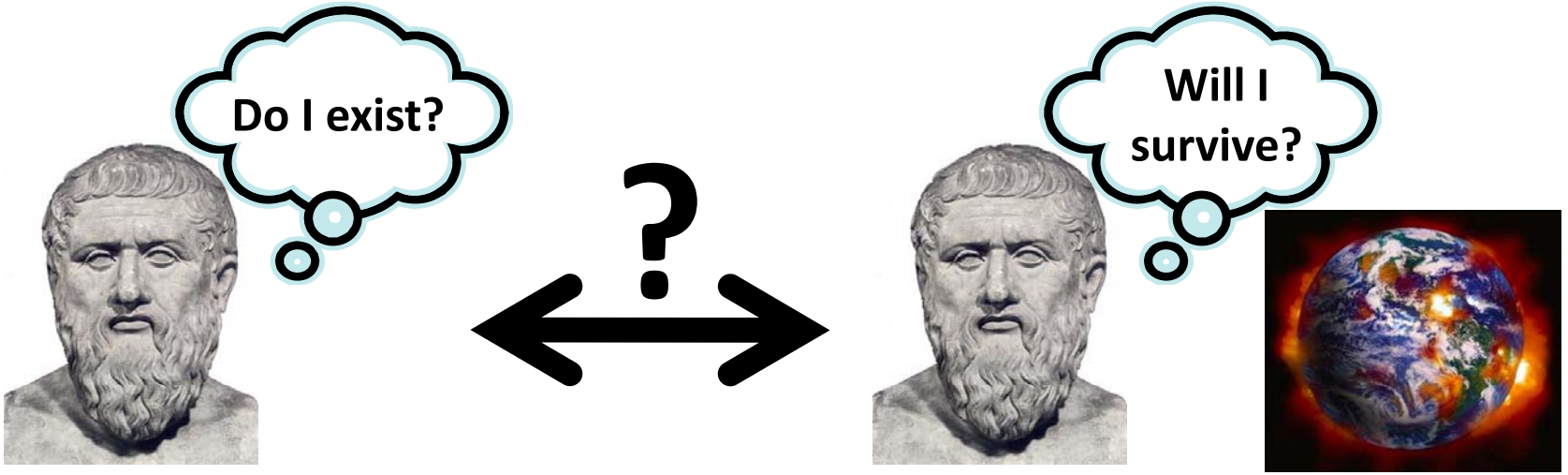
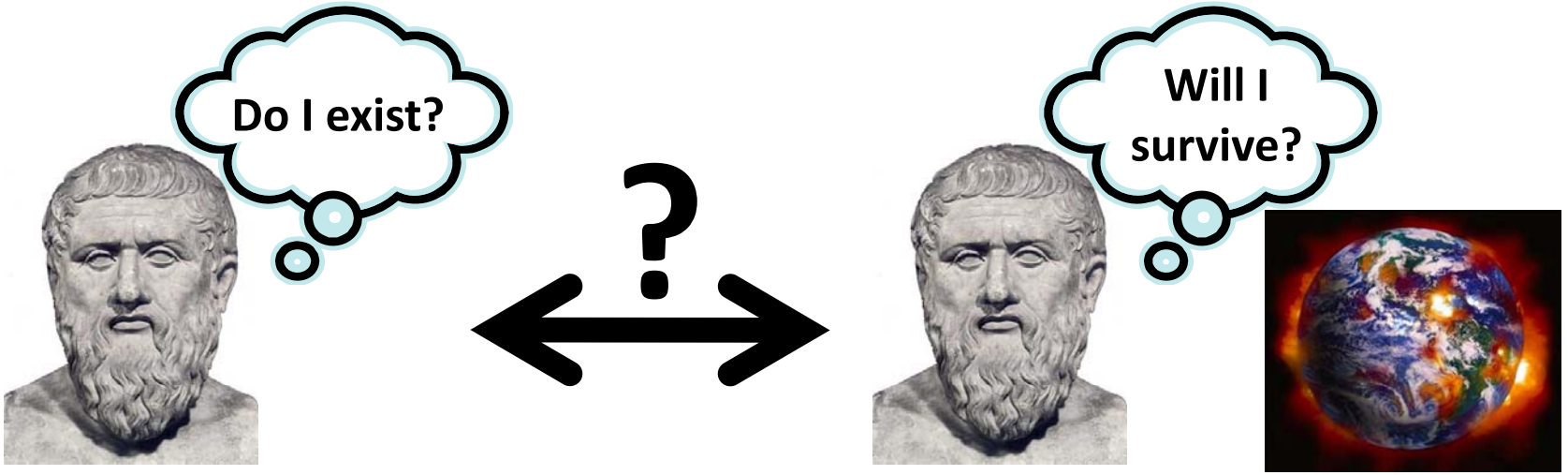


Anthropic probability and other puzzles affecting the human survival

An informal look at some things the FHI gets up to

Future of Humanity Institute
OXFORD UNIVERSITY



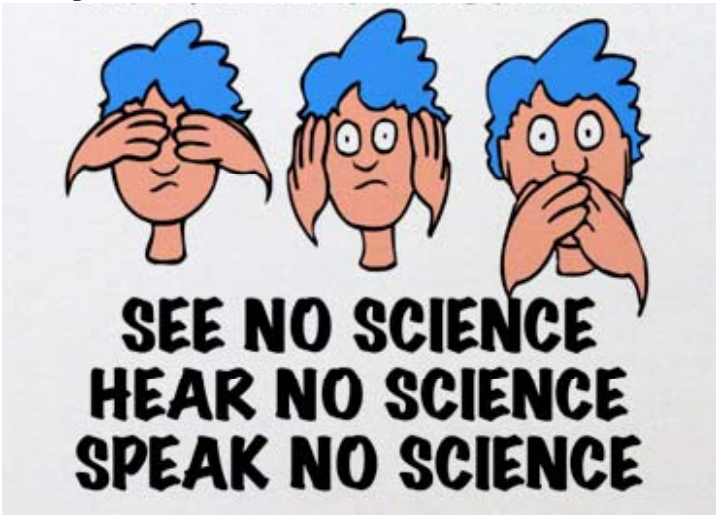
Why is the FHI in the philosophy department?

An informal look at some things the FHI gets up to

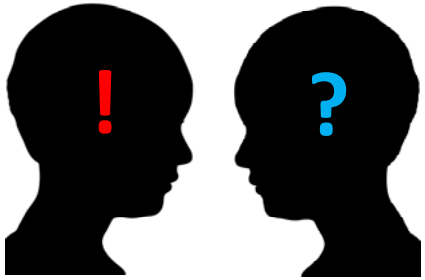
Future of Humanity Institute
OXFORD UNIVERSITY

Why philosophy?

Dealing with areas where the scientific method cannot apply.



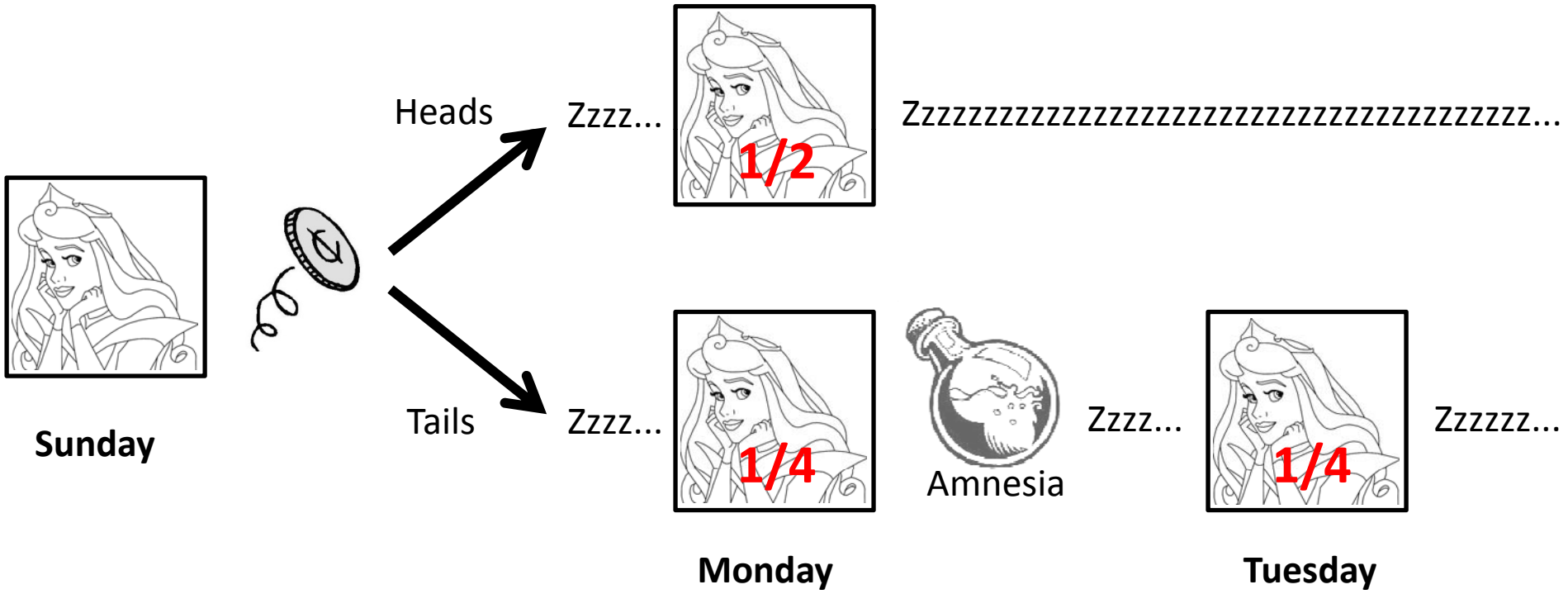
Where biases and uncertainties rule the day.



Where the uncertainties are fundamental: everything is open to *justified* questioning. **???**

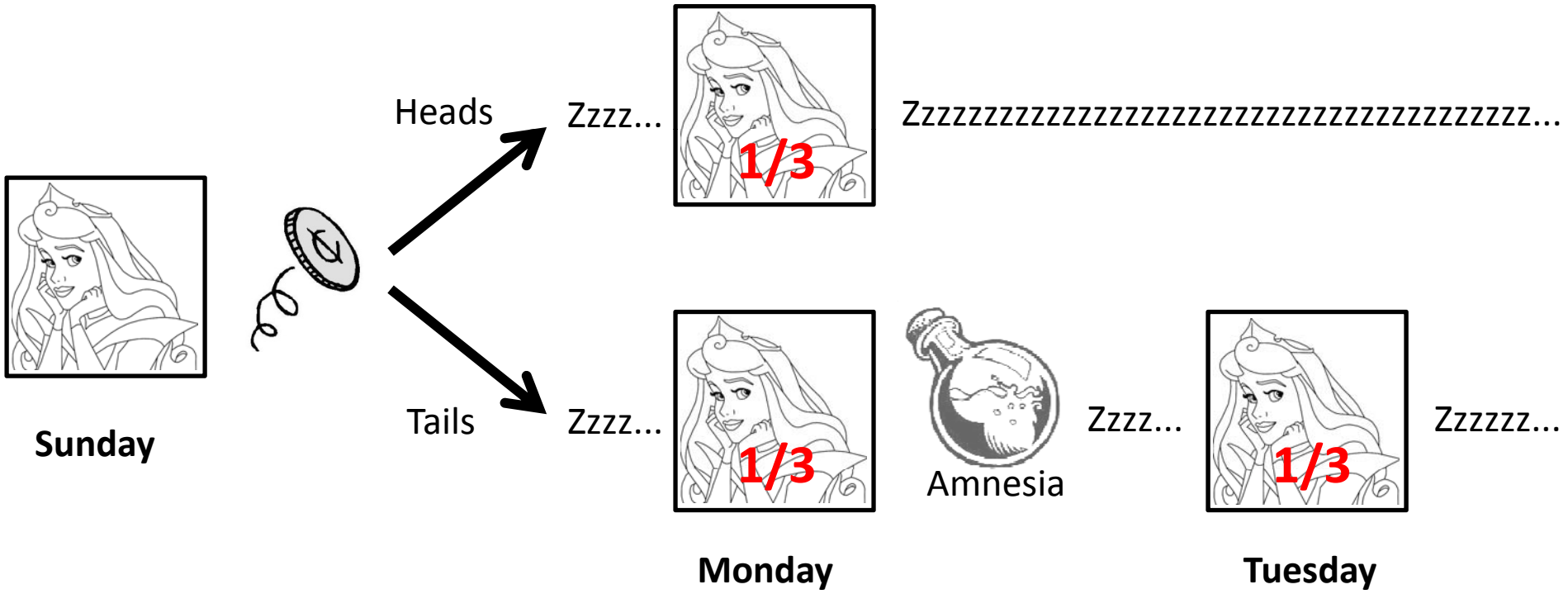
What is the probability of Heads?

1/2



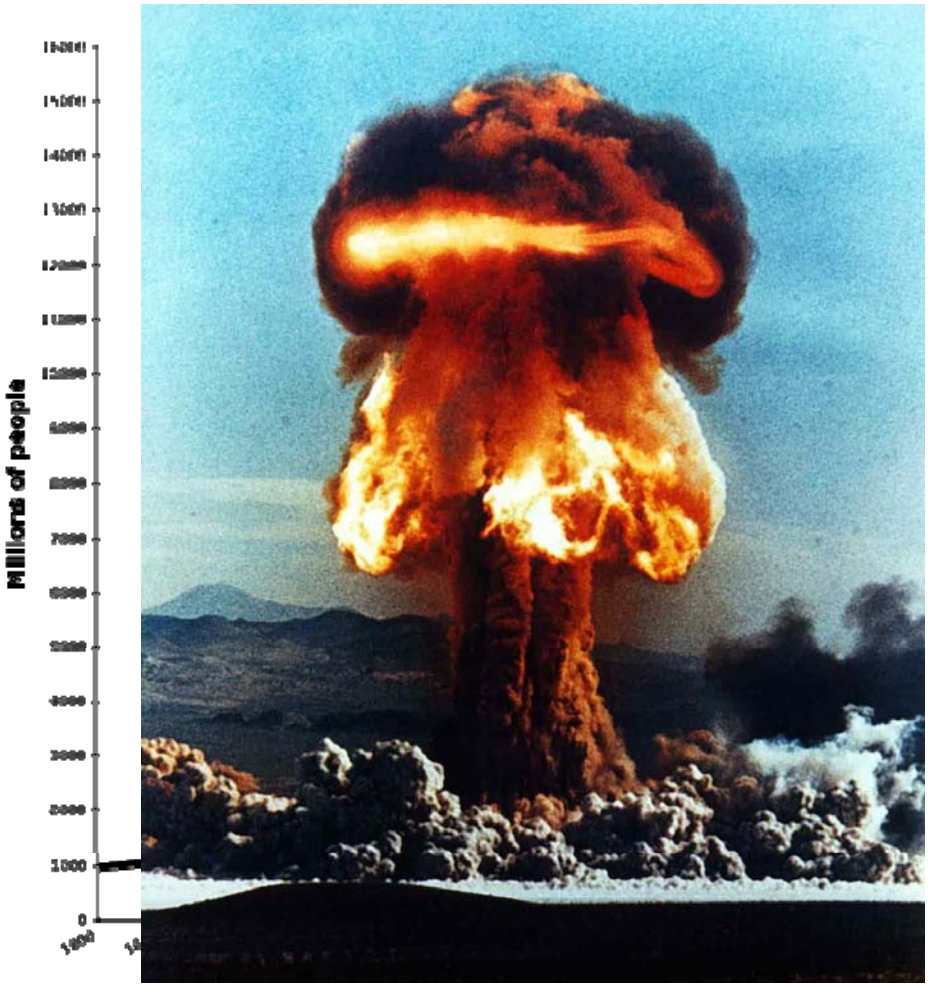
What is the probability of Heads?

1/3



The Doomsday argument

100 billion humans have lived on Earth



The Doomsday argument

You should expect humanity to survive...
Only if *you* are extremely unlikely!

The Doomsday argument

Either:

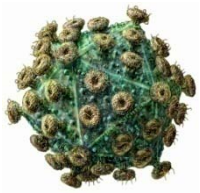
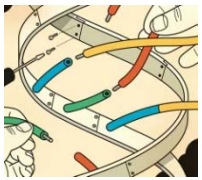
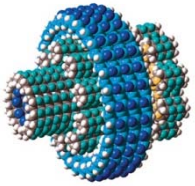
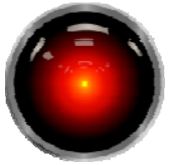
A: People are born every day

B: People are only born on the 1st of January

You, and everyone you know,
were born on the 1st of January

Is **A** or **B** the most likely?

What are existential risks?

1. Pandemics 
2. Synthetic biology 
3. Nanotechnology 
4. Artificial intelligence 
5. Nuclear war 
6. *Asteroid impact*
7. *Environmental collapse*

(not risky enough)

What are existential risks?

1. Pandemics
2. Synthetic biology
3. Nanotechnology
4. Artificial intelligence
5. Nuclear war
6. *Asteroid impact*
7. *Environmental collapse*

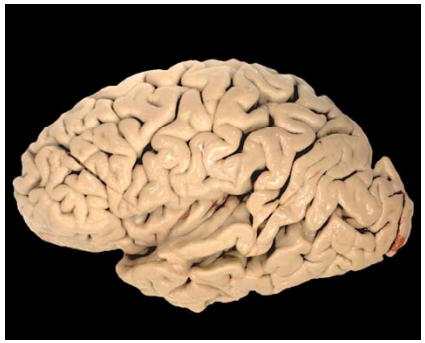
AI: Power of Intelligence

Terminator: big muscles, no brain

AI: Power of Intelligence

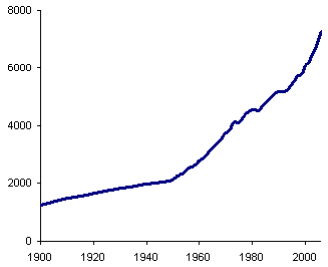
Who’s the dominant specie?

AI: Power of Intelligence

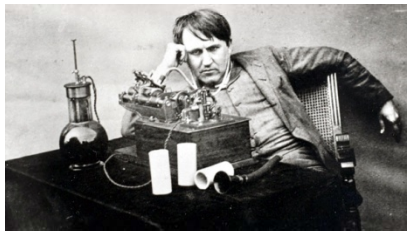


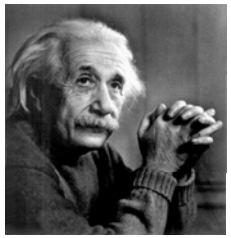
+

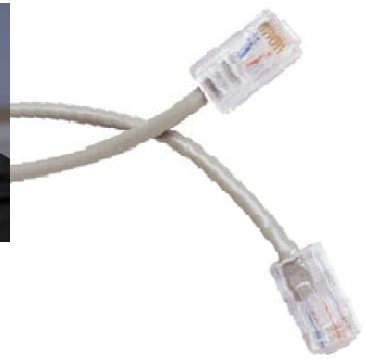
Pop: 200 000

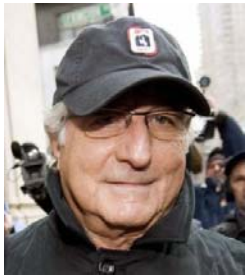


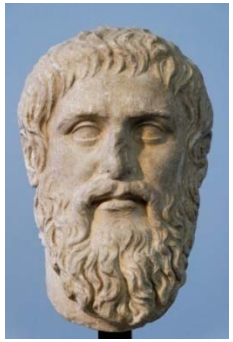
AI: Power of Intelligence

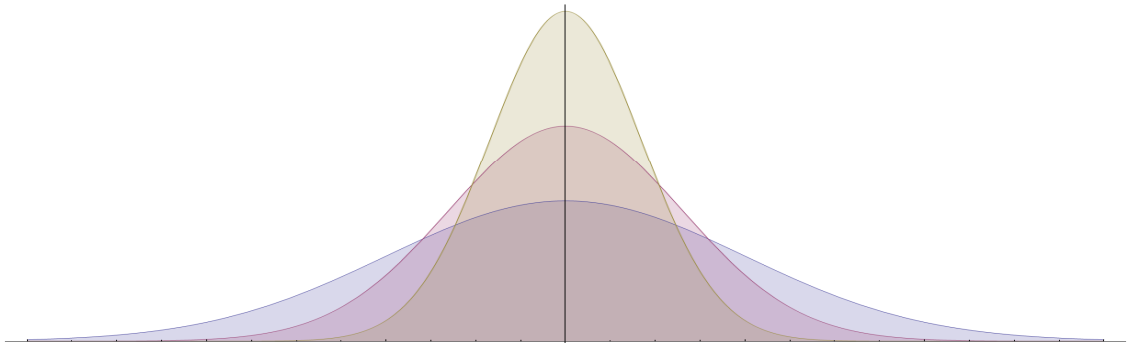












PREDICTING AGI

We're doing it badly

AGI predictions

"significant advance can be made in [machines using language and improving themselves, if a] group of scientists work on it together **for a summer**."

(Dartmouth conference, 1956)

"Nonetheless, the dramatic slowdown in [computerised chess playing ability] suggests the boundary may be near."

(Dreyfus, 1965)

AGI predictions

"[AGI will be developed in 15-25 years]"

(various)

2012, 2011, 2010, 2009, 2008,

2007, 2006, 2004, 2002, 2001,

1999, 1995, 1993, 1990, 1979,

1973, 1970, 1965, 1962, 1960

Plan for the Talk

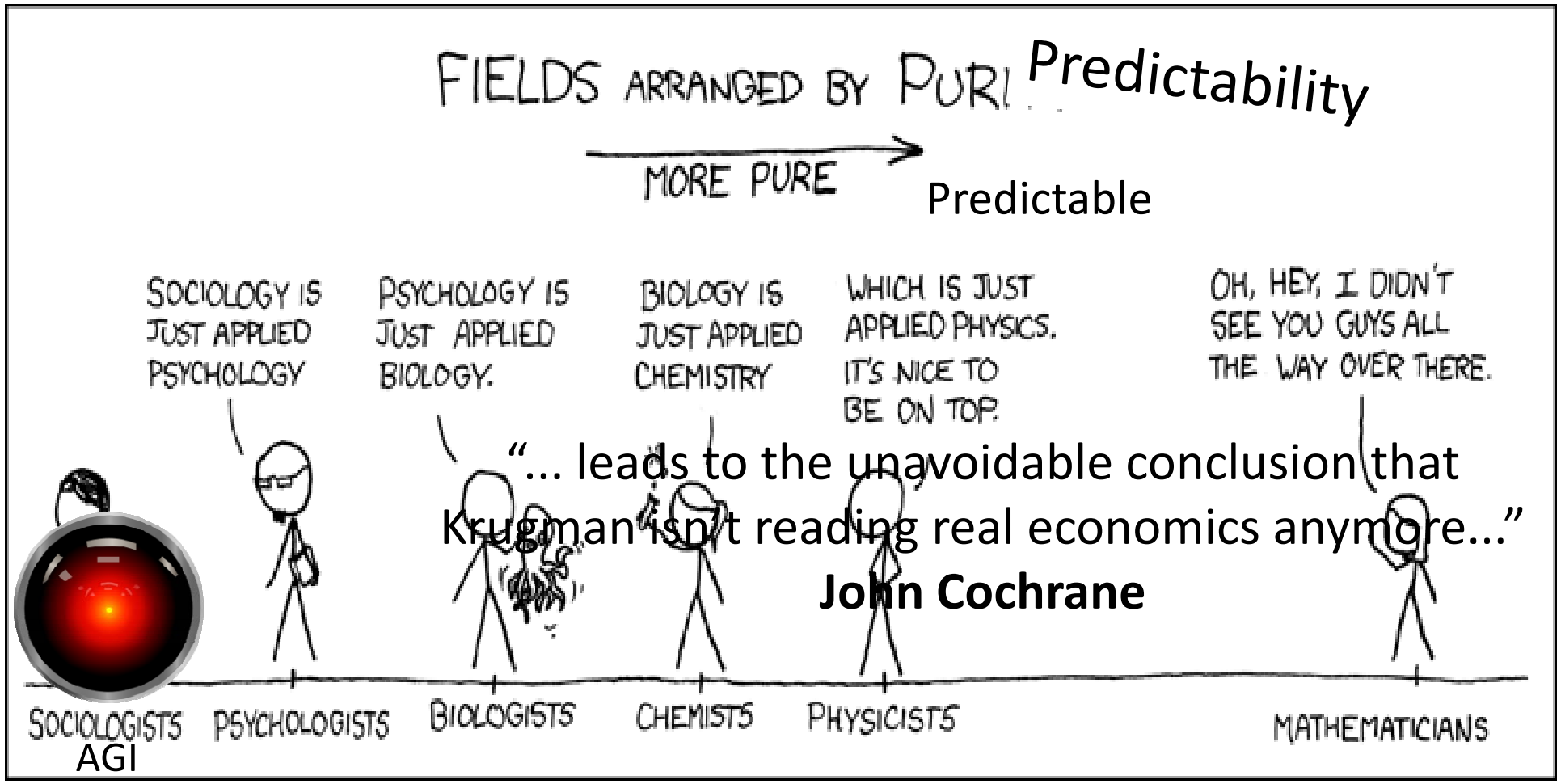
AGI predictions: timelines and philosophy.

What performance should we expect?

What performance do we get?

Singularity Institute's database of 257 AI predictions (1950-2012).

How predictions in AGI compare



"... leads to the unavoidable conclusion that Krugman isn't reading real economics anymore..."

John Cochrane

AGI predictors | Historians | Economists

expert opinion | past examples | scientific method | deductive logic

How predictions in AGI compare

"…comments from Chicago economists are
the product of a Dark Age of macroeconomics..."
Paul Krugman

"... leads to the unavoidable conclusion that
Krugman isn't reading real economics anymore..."
John Cochrane

Average quarterly GDP adjustments:
±1.7 points

How predictions in AGI compare

"…comments from Chicago economists are
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Paul Krugman

"... leads to the unavoidable conclusion that
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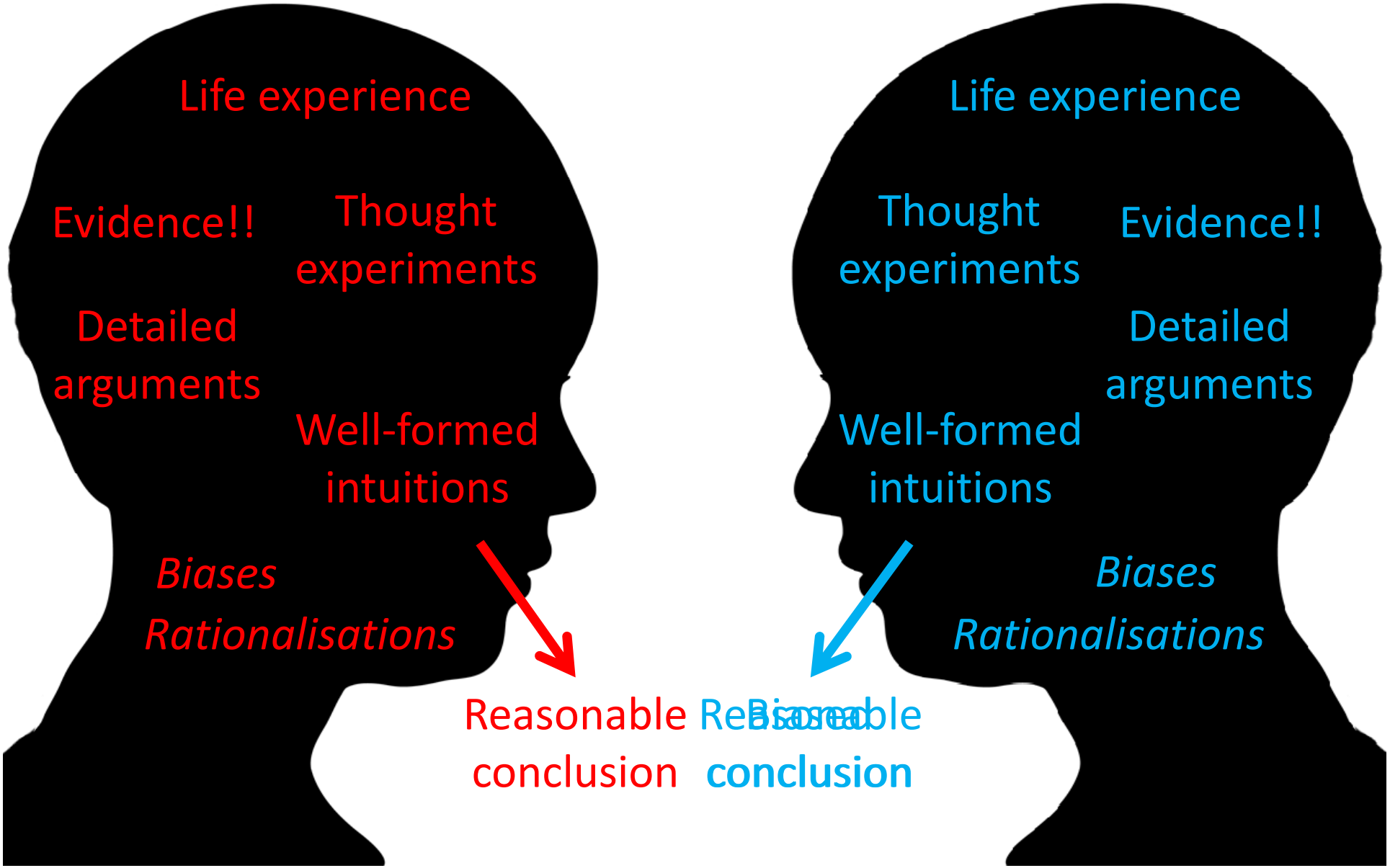
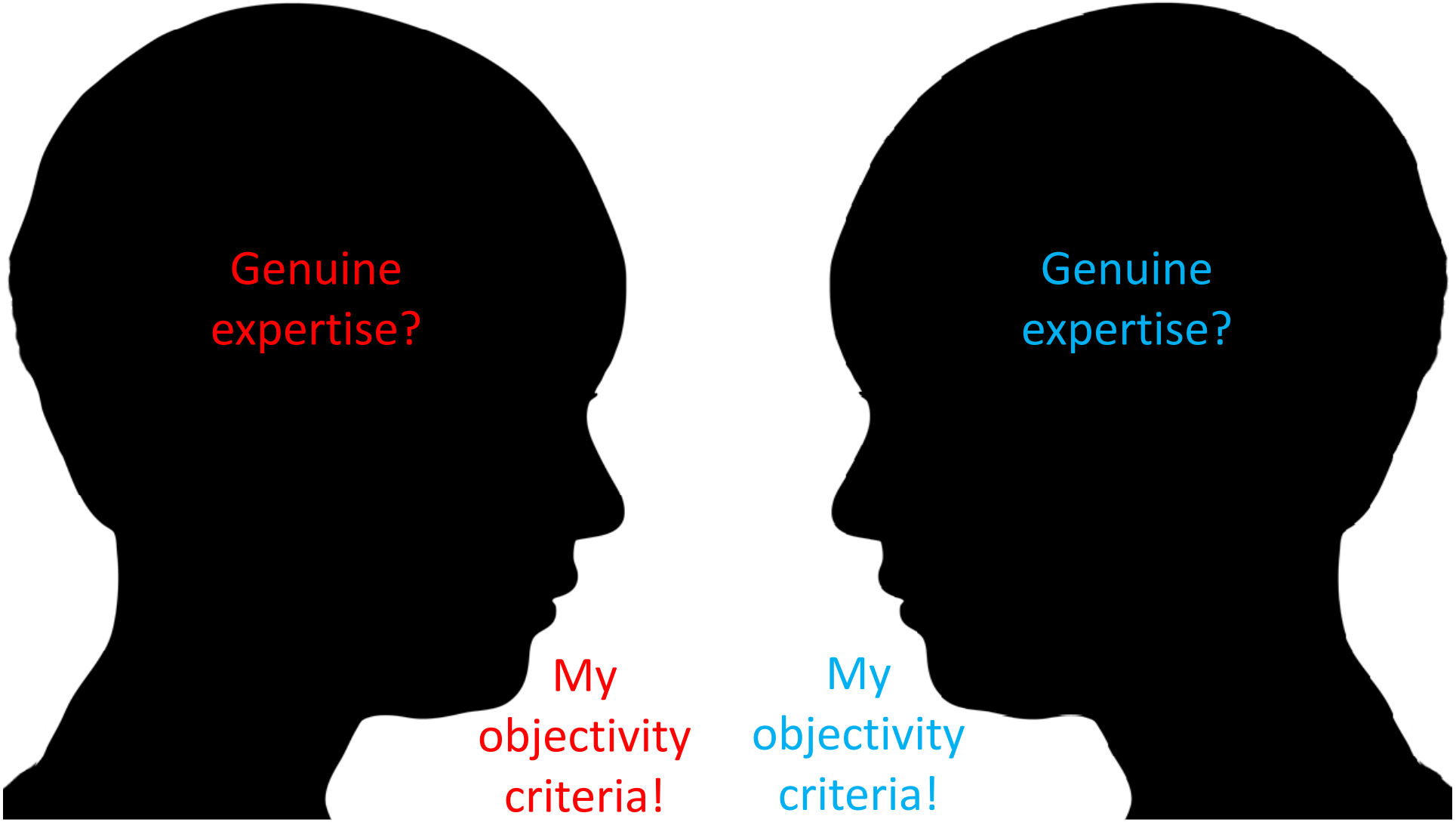
John Cochrane

Disagreements and Overconfidence



Disagreements and Overconfidence



Opinions relevant, only if **objectively** better

When are experts good?

Good performance	Poor performance
Static stimuli	Dynamic (changeable) stimuli
Decisions about things	Decisions about behavior
Experts agree on stimuli	Experts disagree on stimuli
More predictable problems	Less predictable problems
Some errors expected	Few errors expected
Repetitive tasks	Unique tasks
Feedback available	Feedback unavailable
Objective analysis available	Subjective analysis only
Problem decomposable	Problem not decomposable
Decision aids common	Decision aids rare

"Competence in experts: The role of task characteristics"

James Shanteau: Organizational Behavior and Human Decision Processes

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Grind is easy, insight hard

How long will it take to produce the next Michael Bay ‘blockbuster’?

When will someone solve the Riemann hypothesis?

Moore’s law, hence AGI:

By year XXXX, computers will have Y
(a level comparable with the human brain!),
then AGI.

The evidence: AGI predictions

The Singularity Institute collected a database of 257 AGI-related predictions (online, in research journals, news articles, etc...) 1950-2012.

95 are timeline to AGI predictions.

"By golly, I predict that we will have human-level AGI by year XXXX!" A Renown Expert

The evidence: AGI predictions

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I transformed each one into a median date of AGI estimate.

The evidence: AGI predictions

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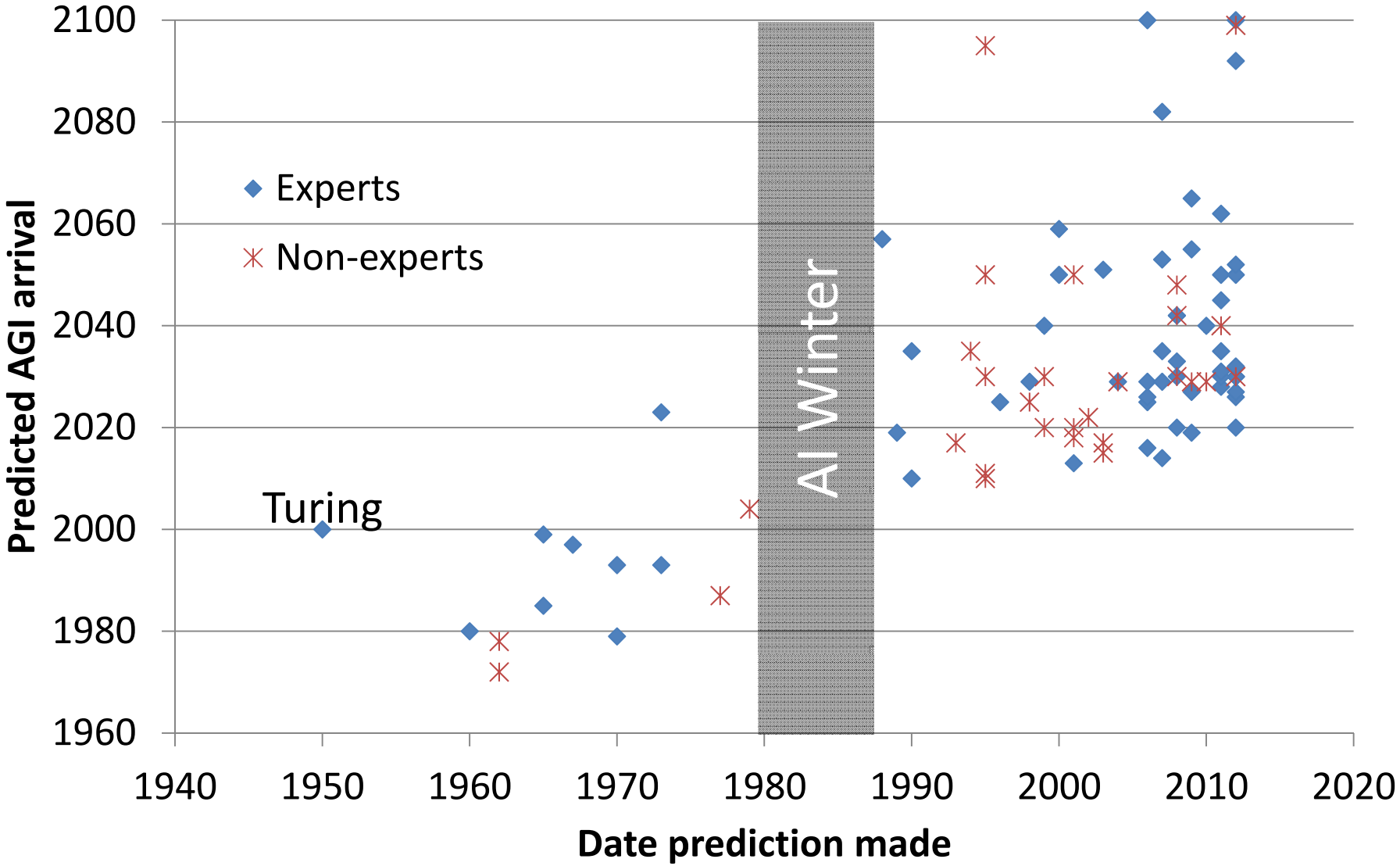
95 are timeline to AGI predictions.

I transformed each one into a median date of AGI estimate.

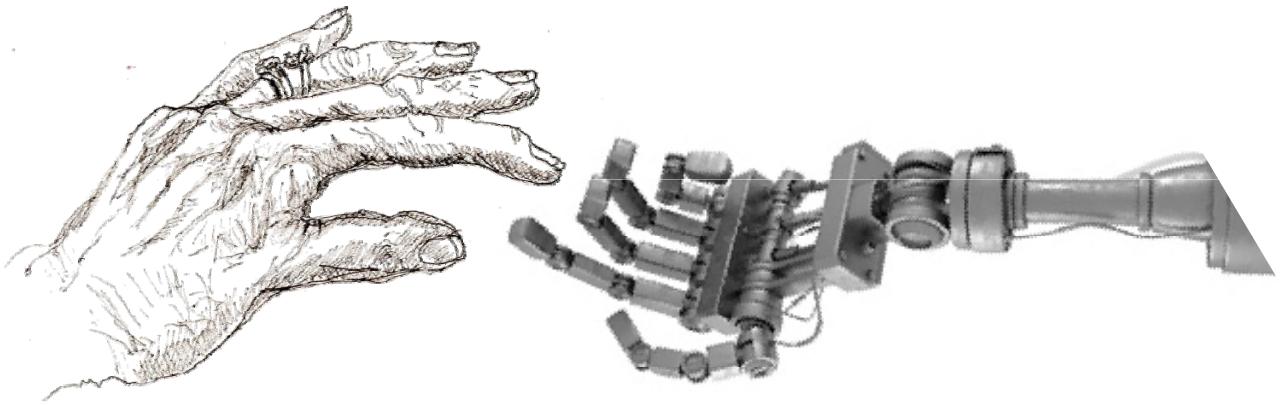
We also assessed the expertise of the predictor.

When, oh when, will we have AGI?

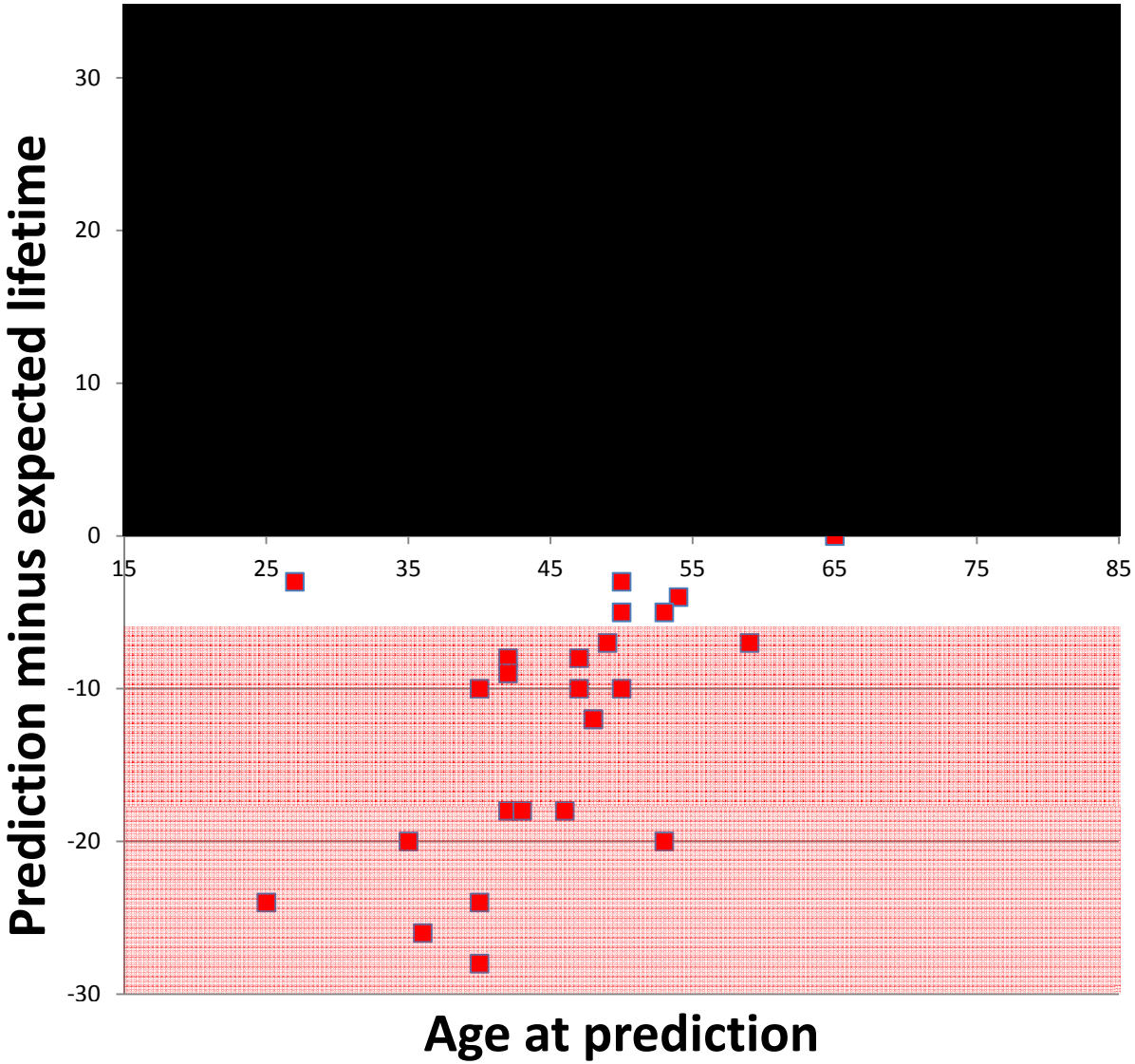


One AGI to see before you die

"Maes-Garreau law"

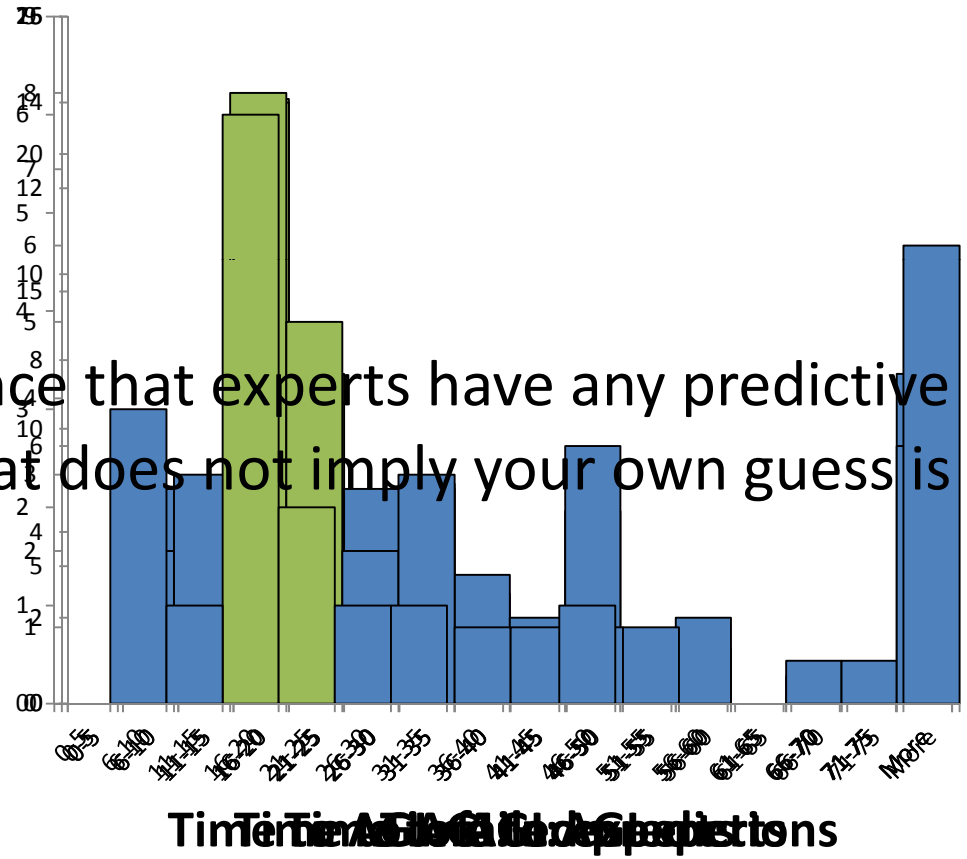


One AGI to see before you die



Tomorrow never gets any closer...

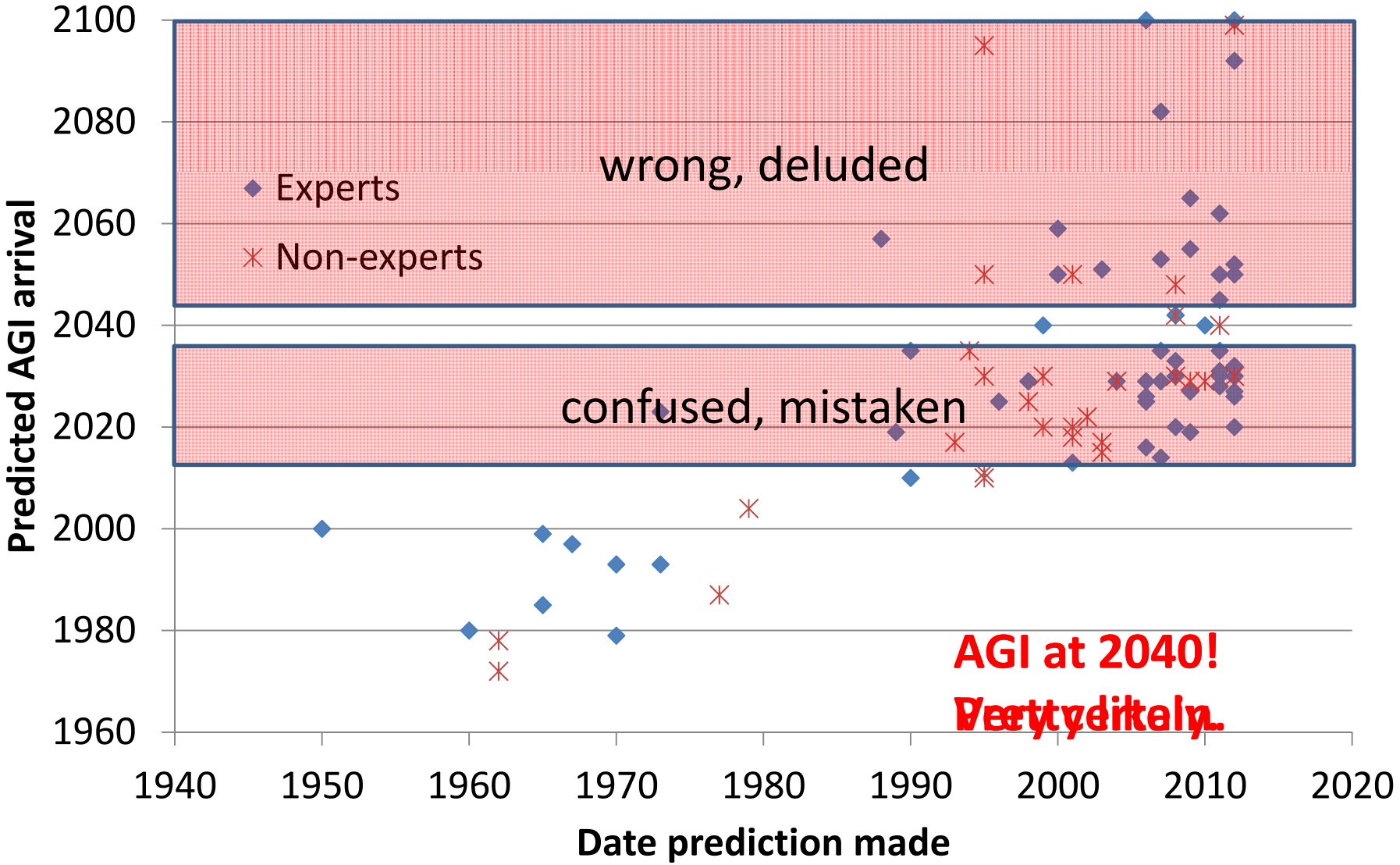
15-25 years time: not soon, not too far



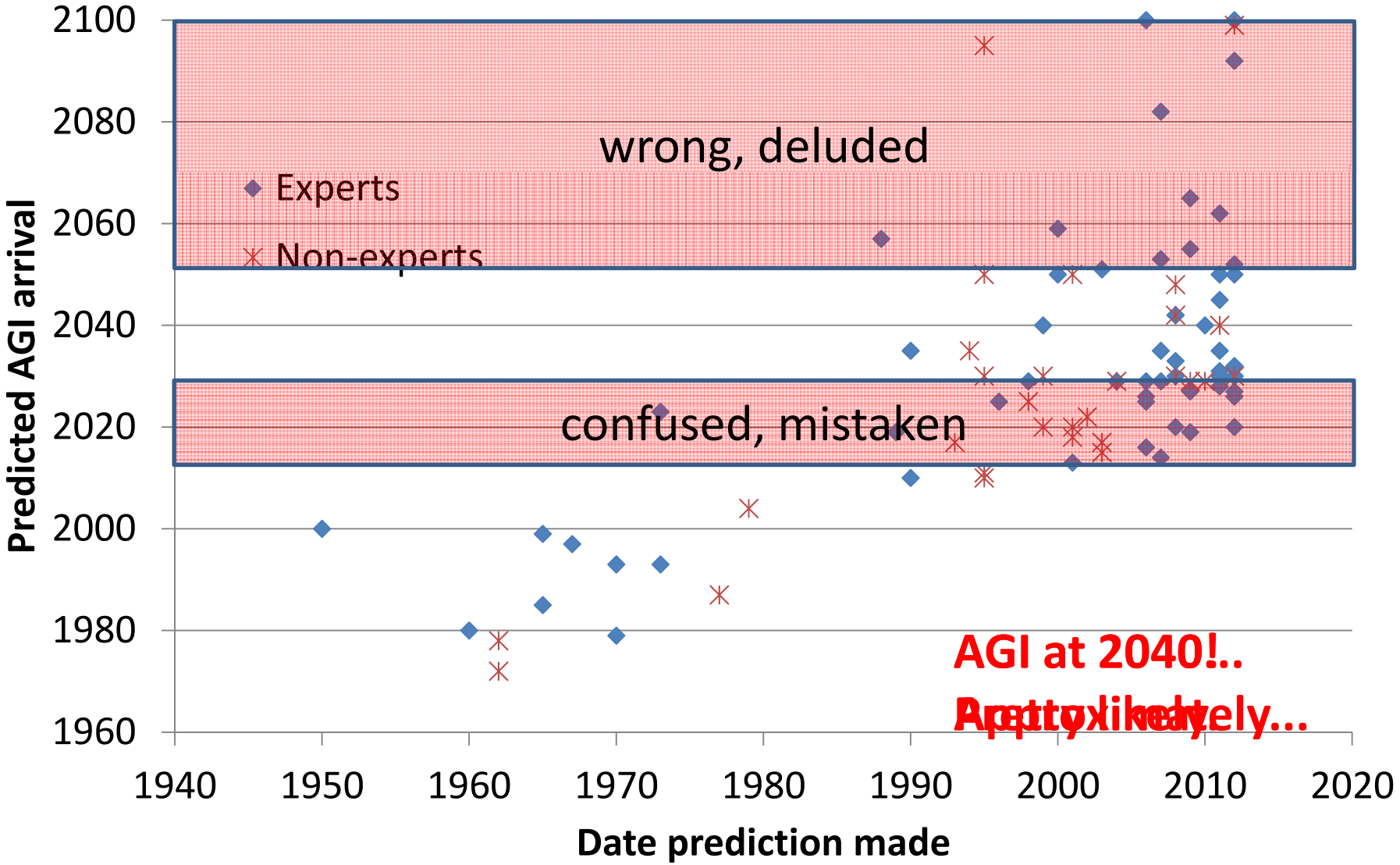
No evidence that experts have any predictive advantage

(but that does not imply your own guess is better!)

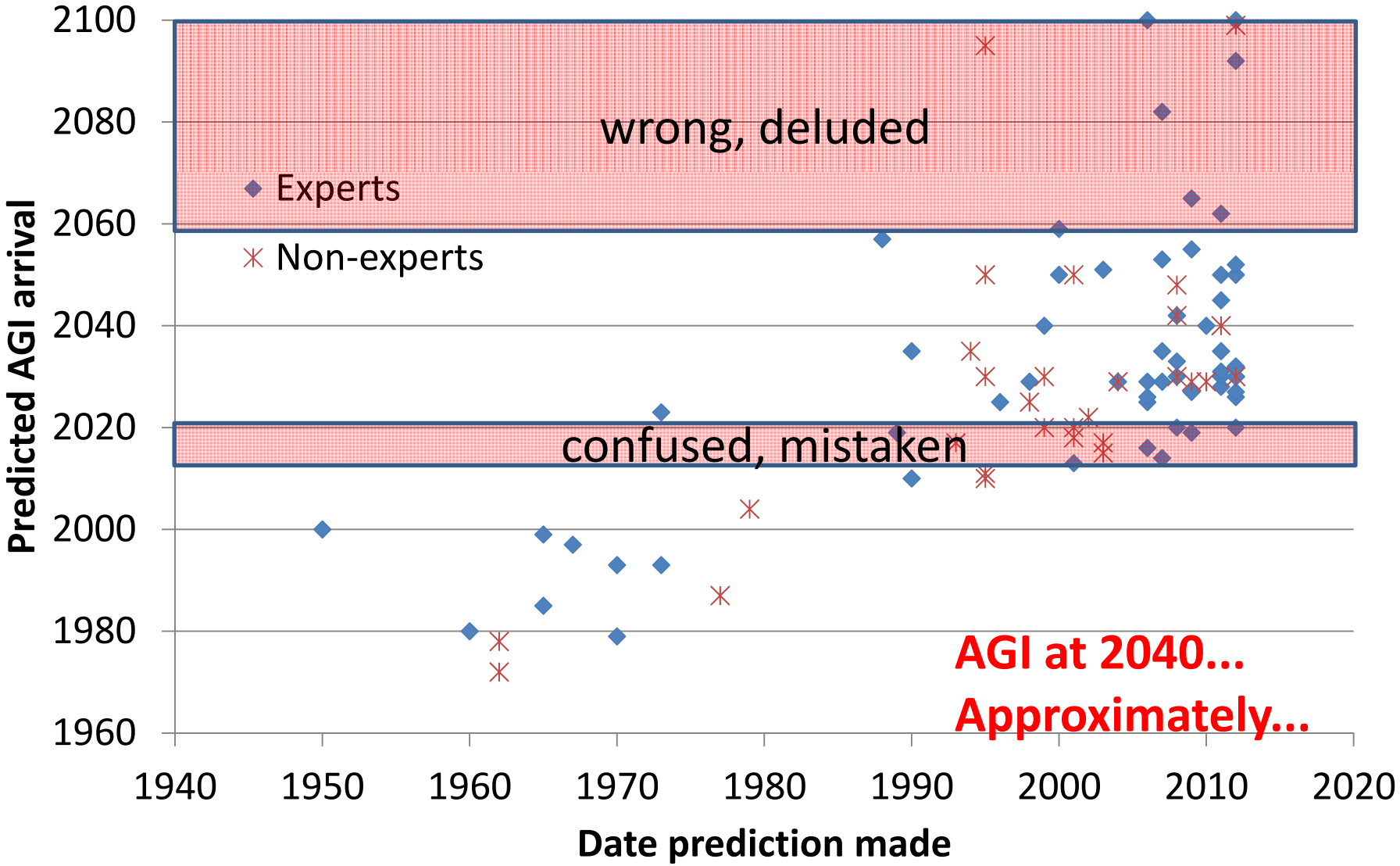
Spread your wings of uncertainty



Spread your wings of uncertainty



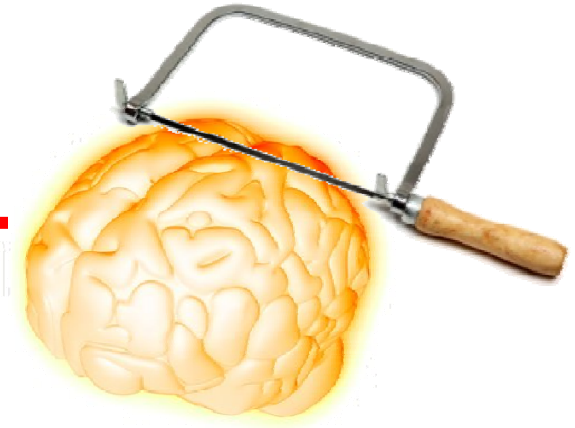
Spread your wings of uncertainty



Current best timeline prediction

Whole brain emulations (Uploads)

Fix a brain, slice it up, scan it, construct a model, instantiate it on a computer.



Very decomposed.

Justified grind.

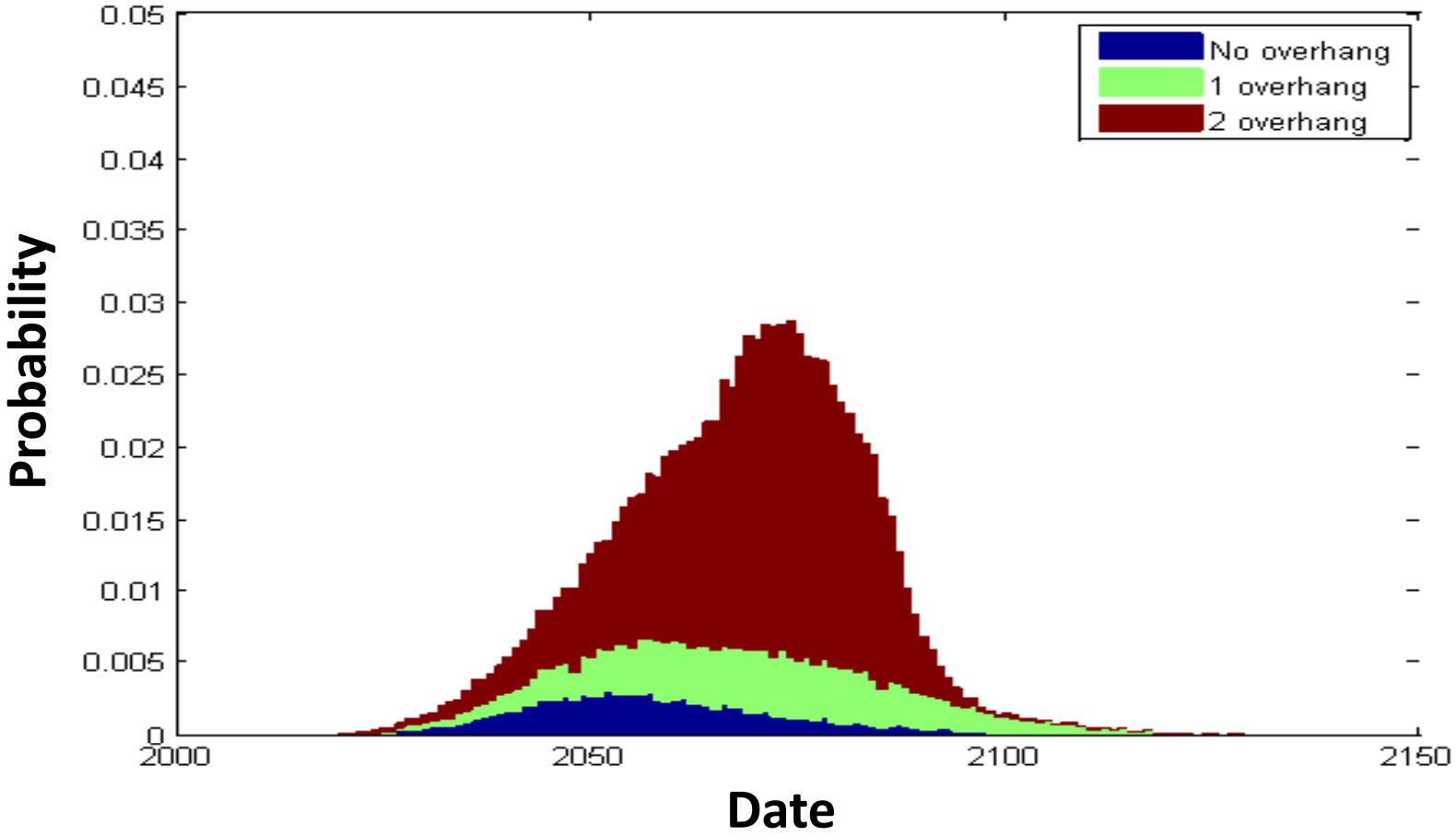
Clear assumptions and scenarios.

Integrates new data (partial feedback).

Multiple pathways.

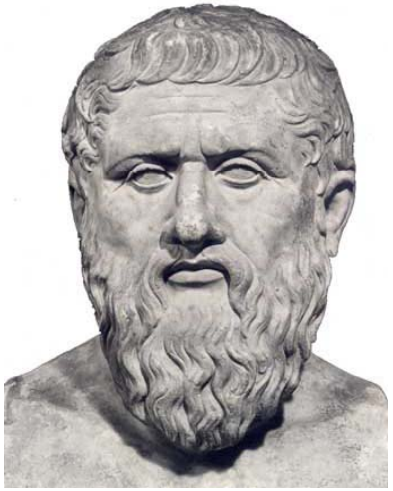
Current best timeline prediction

Whole brain emulations (Uploads)



What *can* we say about AGI?

- Timeline predictions are pretty poor.
- Other types of predictions (such as plans for how to build AGIs) have similar problems.
- But we can get good ideas about AGI from...



...Philosophy!

Ugh, philosophy – what's it good for?

Gödel's theorem proves AGI is impossible!

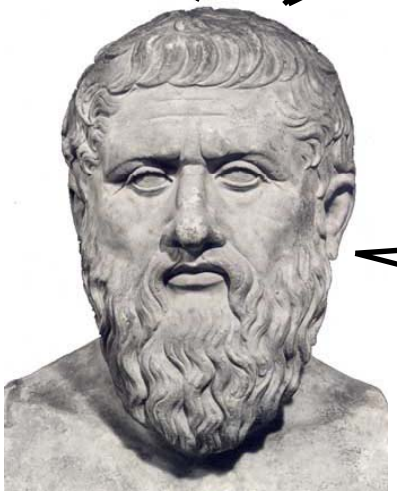
I don't think it does...

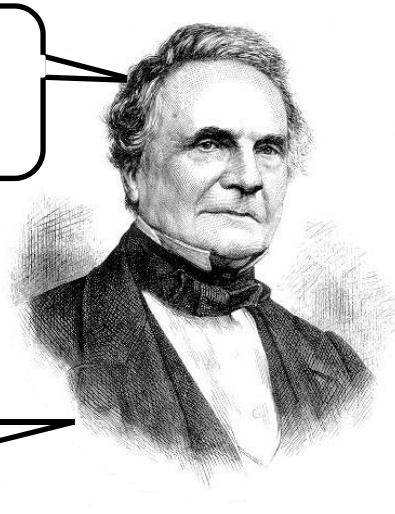
Does too! My argument is sound!

Does not! The argument is not convincing!

Does too!

Does not!

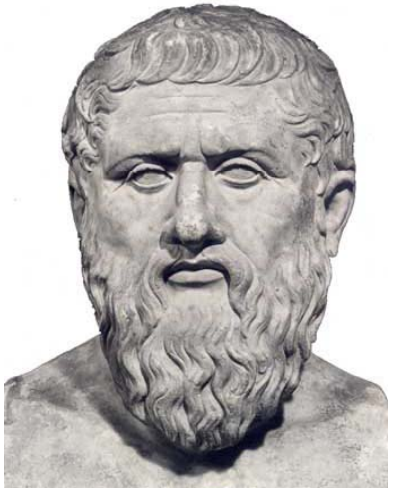


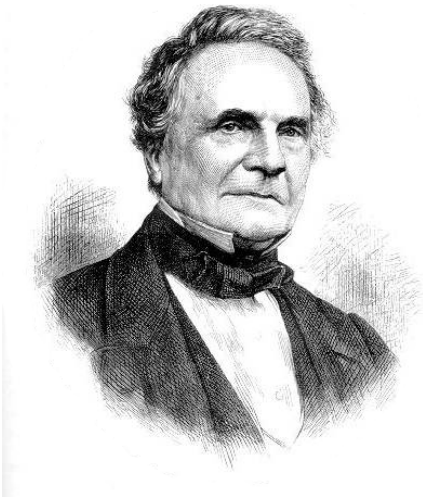


Ugh, philosophy – what's it good for?

Philosophers are also very overconfident!

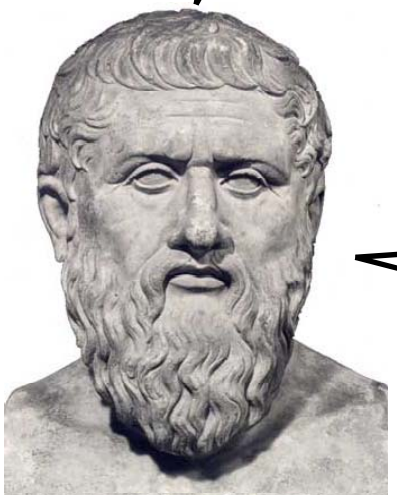
Their arguments need more caveats, uncertainty, and decomposition…





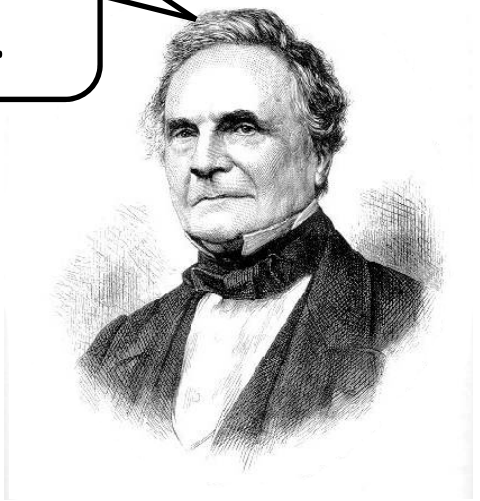
Ugh, philosophy – what's it good for?

1. Gödel's theorem applies to certain formal systems.
2. Those formal systems *could* be model for likely AGI designs.
3. Hence there *may* be a problem with self-reference in AGI.
4. AGI programmers should be aware of this.
5. But*, in my expert opinion*, that problem will still be insoluble.



Let's discuss some more...

Agree with 1-3, partially with 4, disagree with 5.



Ugh, philosophy – what's it good for?

A few minor philosophical results:

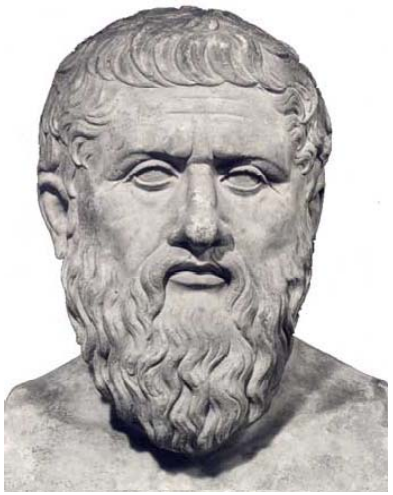
Occam's razor

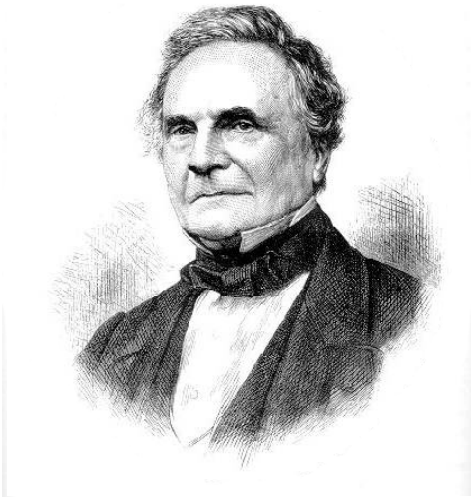
Church-Turing thesis

Decision theory

Formal logic

Scientific method





Ugh, philosophy – what's it good for?

Example of improved philosophical arguments:

Dreyfus: Computers can't cope with ambiguity...

→ ...using current [1965] AI approaches.

Gozzi: "Identifying the computer with a brain may be putting together things that don't belong [...] computing isn't thinking".

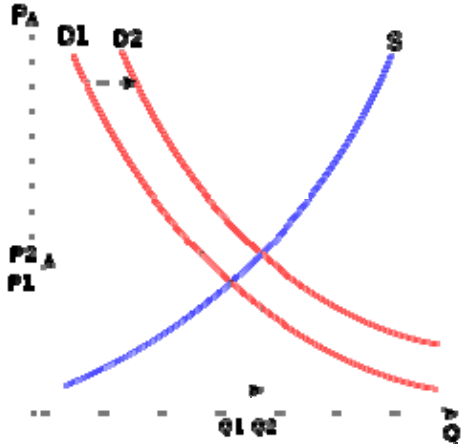
→ AGIs may be nothing like human brains.
We may go astray thinking that they are.

Current best philosophical prediction


Simplified “Omohundro-Yudkowsky thesis”:

Behaving dangerously is a generic behaviour for high-intelligence AGIs.

Economic model:
simplified model of what AGI will be.



Current best philosophical prediction


Simplified “Omohundro-Yudkowsky thesis”, refined and narrowed:

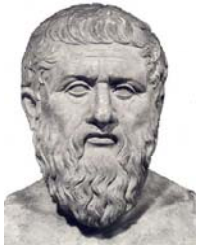
Many AGI designs have the potential for unexpected dangerous behaviour.

AGI programmers should demonstrate to (moderate) sceptics that their design is safe.

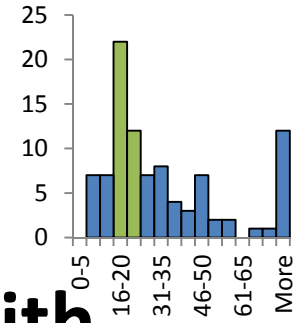
Is the thesis wrong, in your opinion?

Conclusions

- Our own opinions are not strong evidence
- Philosophy has some useful things to say



- AGI timeline predictions are problematic



- **It's very hard to know where to begin with existential risks – but we have to begin**