

**The tribulations of Rationality
in Philosophy, Economics and
Biology**

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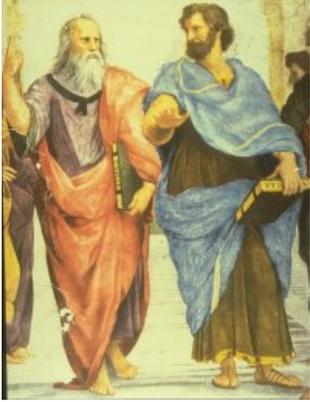
Human uniqueness and rationality

Intuition tells that human uniqueness involves **rationality**, but..

- Are humans **really** rational?
- Is anybody else?
- If we (and all other species) can live without it, **why, when and how** did rationality evolve?

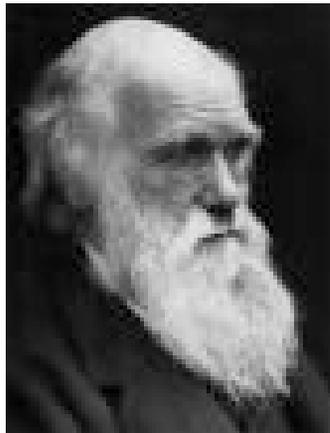
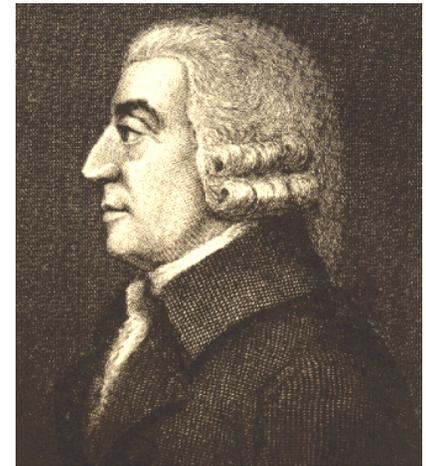
What is “**rationality**”?

Rationality? Whose rationality?



Philosophy (PP-Rationality)

Economics (E-Rationality)



Biology (B-rationality)

Philosophy: PP-Rationality

“A feature of cognitive agents that they exhibit when they adopt beliefs on the basis of appropriate reasons. Aristotle maintained that **rationality** is the key that distinguishes human beings from other animals. [...]Rationality can be contrasted with either **non-rationality** or **irrationality**. [...]Rational beliefs are contrasted with beliefs arrived at by emotion, faith, authority or arbitrary choice.”

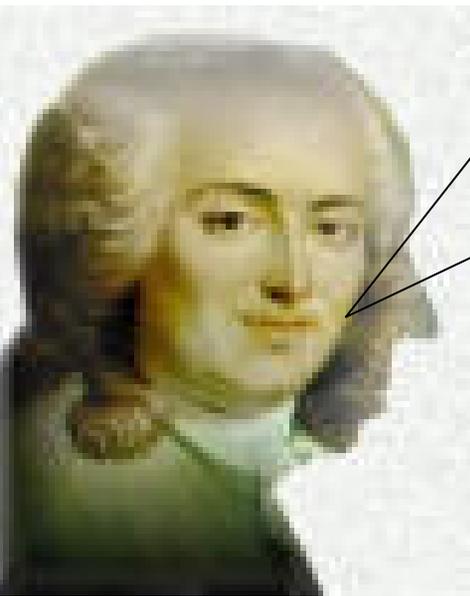
(H.I.Brown, Oxford Companion to Philosophy)

- *Emphasis on process (how beliefs originate), not outcome.*
- *Deals with mental entities (beliefs), not behaviour.*

The snags of PP-rationality for natural scientists

- It is about *mental entities*, not about behaviour.
- It excludes too much: Processes causing beliefs are inaccessible to the holder of the beliefs. If we use this definition, the empirical study of rationality is thwarted.
- The endeavours of Josh and Betty suggest that we may be able to infer reason from action.
- More on this later, but for now let's visit **Economy**.

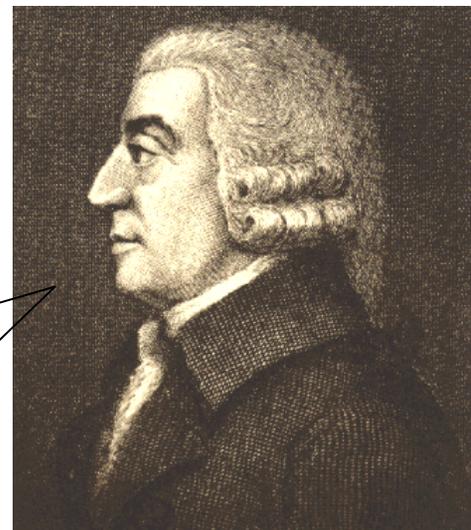
Economics: E-Rationality



ARJ Turgot
(1727-1781)

If one of the wine sellers were offering only four quarts for a bushel, the owner of the wheat will not give it to this wine seller if he knows that another will give him six or eight quarts for the same bushel (1766)

It is not from the benevolence of the butcher, the brewer, or the baker, that we can expect our dinner, but from their regard to their own interest (1776)



A. Smith 6
(1723-1790)

E-Rationality today

- **‘Rationality** in decision making process is generally interpreted as the **maximization of utility for the individual ...’** (*Arrow, K. J., Rationality of self and others in an economic system. Journal of Business, Vol.59, 1986*)

The general idea is that everybody pursues his/her interests, and that the overall economy is the resulting equilibrium. Appealing, but there are problems.

Take, for example, co-operation.

E-Rationality today

- **‘Rationality** in decision making process is generally interpreted as the maximization of utility for the individual ...’ (*Arrow, K. J., 1986*)

Microeconomic theory is built on the assumption that everybody pursues his/her interests, and the overall economy is the resulting equilibrium. Appealing, for modelling, but there are problems.

The snags of E-Rationality

Fehr's demonstrations of **strong reciprocity** challenge economy's orthodoxy by showing that humans are not driven by myopic, self-interested rationality. This expectation fails in other paradigms as well.

Another example, from our : **Risky Trust**

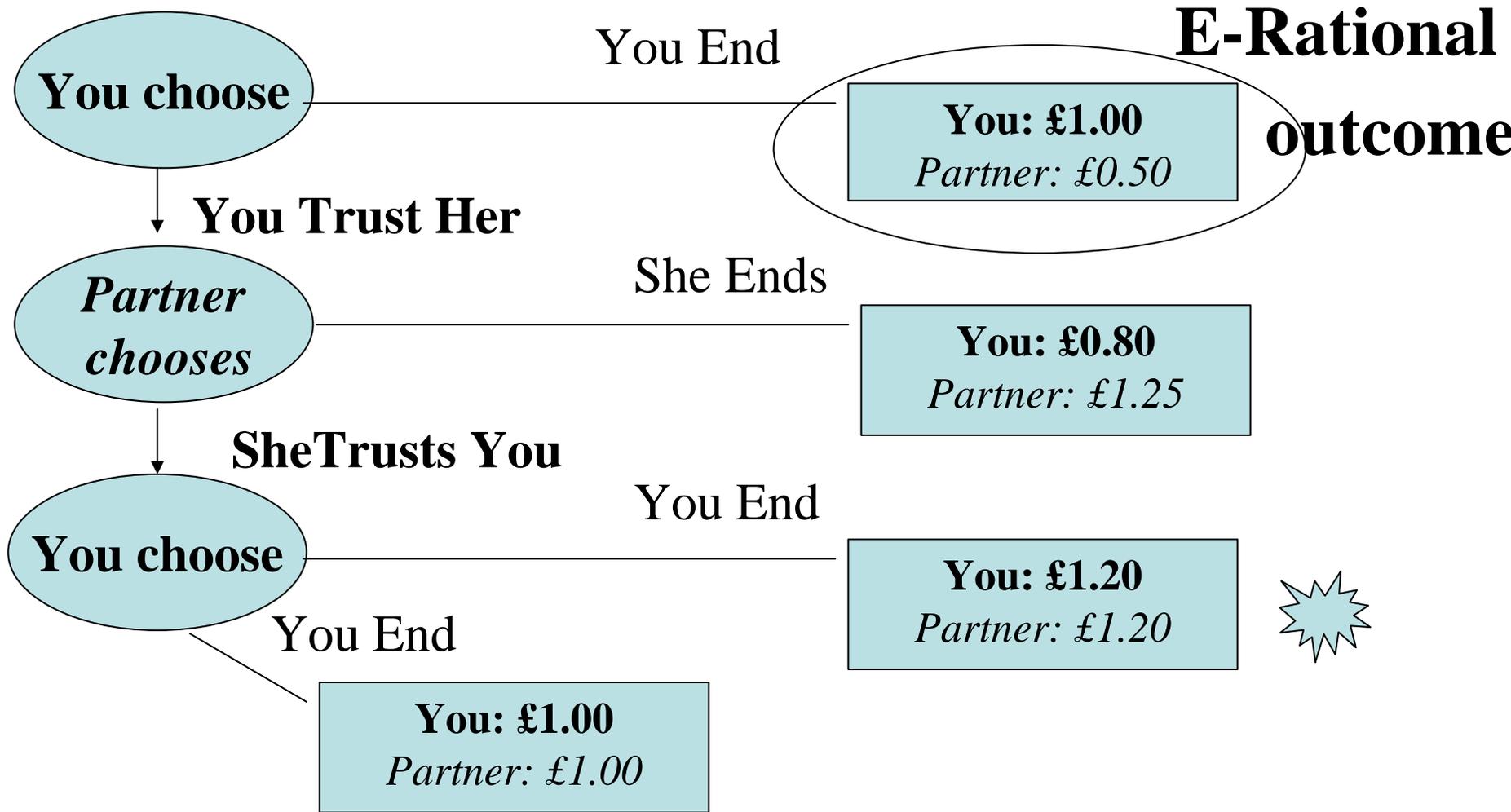
Trust

Suppose you face a stranger in a situation where both of you may benefit from mutual trust.

Would you trust the stranger?

A simple game implements this choice.

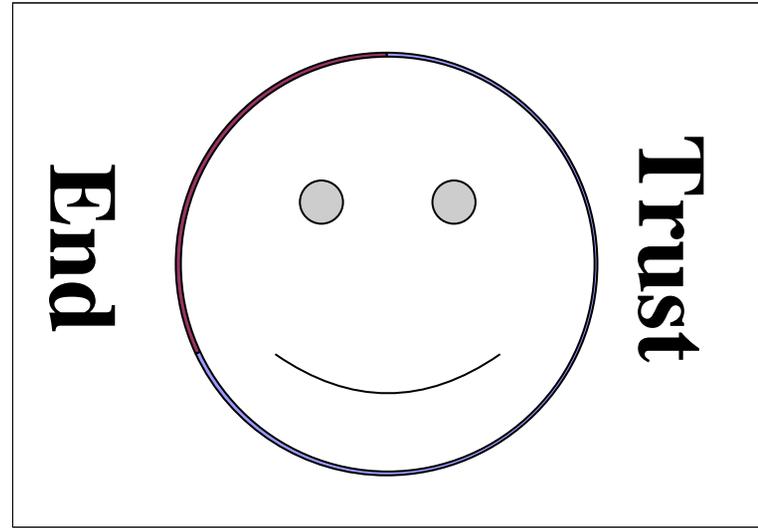
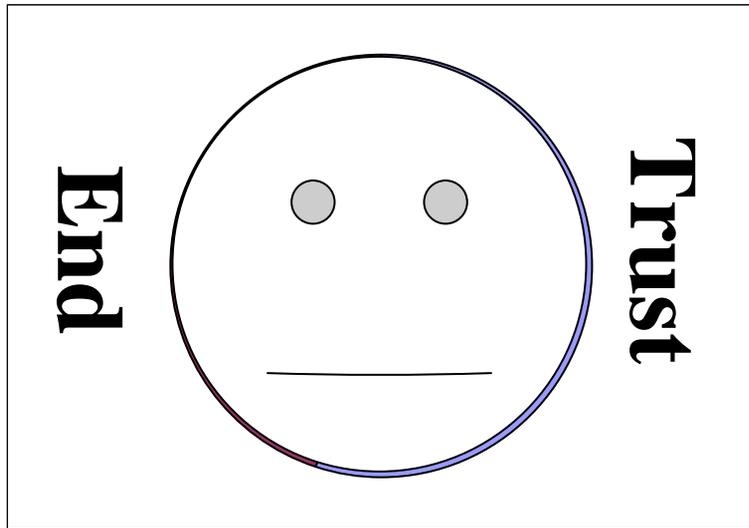
The TRUST Game



E-rational players should not trust, even if this means a loss for all!

An experiment on trust

Subjects played TRUST for real money against neutral or smiling photos. Did they behave E-rationally?



Over 50% of subjects trusted to the neutral partner.

Close to 70% trusted a smiling partner.

Here too, orthodox expectations are rejected.

Do these violations of E-rationality challenge Biological Evolutionary Theory?

BIOLOGY: B-Rationality



- **Natural Selection is a stubborn myopic modifier of gene frequency.**
- **B-rationality: an individual's maximisation of its own genes' future frequency, or fitness.**
- **Unlike utility in economics, fitness is defined *a priori*.**
- **Unlike philosophy's focus on beliefs, B-rationality addresses behaviour and is open to empirical test.**
- **Overall, B-rationality is a better-mannered concept than its counterparts in philosophy and economics (but you'd expect me to say that!)**

The snags of B-Rationality

- Evolutionary Theory predicts B-rationality, but only **for average past circumstances, not for every present problem.**
- Local B-irrationality (or non-rationality) is common and unproblematic to evolutionary theory.
- Two examples:
 1. **Brood parasitism**
 2. **Comparative Choice**

Violations of rationality and their meaning

- Natural selection produces mechanisms of behavioural control that **on average under natural conditions** produce adaptive behaviour.
- These mechanisms can produce costly errors in **infrequent or new situations**, such as brood parasitism or laboratory experiments where context is manipulated.
- In humans, a social species probably evolved in groups where repeated interactions among individuals were commonest, some of these mechanisms cause inappropriate responses to strangers, such as trusting, responding to smiles or costly reciprocations.
- Laboratory experiments expose behavioural mechanisms, not the costs and benefits of the behaviours under the conditions of their evolution.

Back to PP- Rationality

- Can animals solve problems by reasoning rather than learning?
 - **Learning:** Repeat what works.
 - **Reasoning:** Solve new problems using principles of causality.
- As research progresses, we find that humans' are less rational than we thought and other species much more.
- The use of tools by great apes and by New Caledonian crows has exposed capability previously unsuspected. So has logical inference in African Grey Parrots, and in dolphins.

Does rationality have a future?

- **No single-discipline notion of rationality survives theoretical analysis and empirical research.**
- **The confluence of economics and evolutionary biology is in an exciting phase.**
- **I expect that humans will continue to give away many of their claims for supremacy, and that greatest understanding of human behaviour, rational or otherwise, will come from interdisciplinary perspectives.**