

# Introduction to **Cognitive Neuroeconomics**



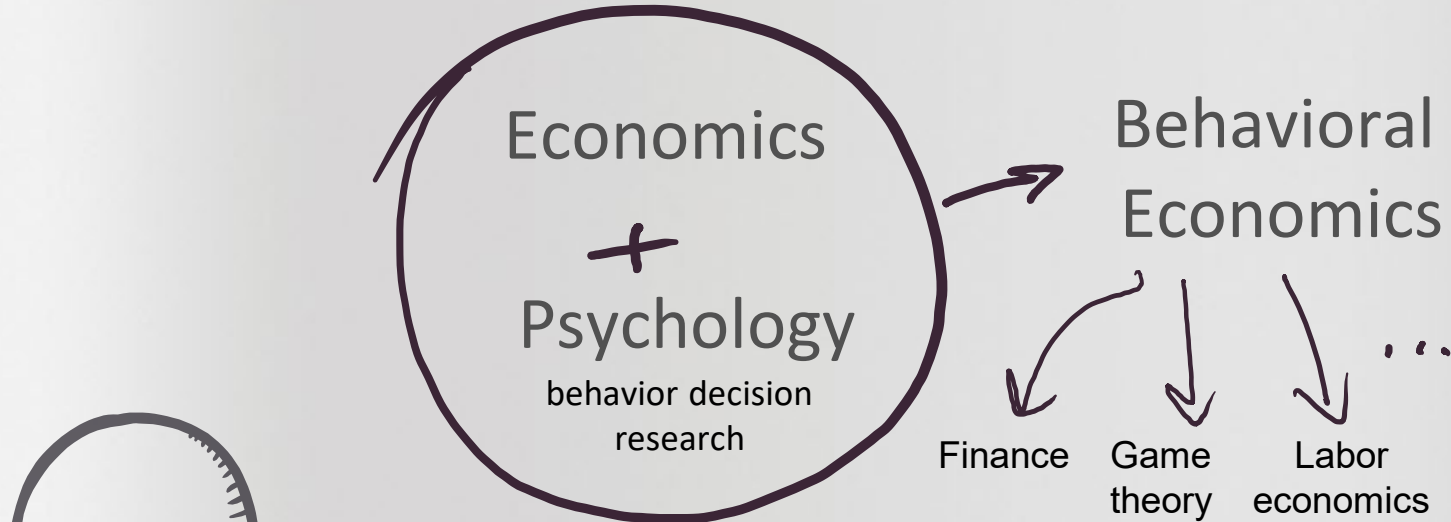
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# Neuroeconomics: How Neuroscience Can Inform Economics

COLIN CAMERER, GEORGE LOEWENSTEIN, *and* DRAZEN PRELEC\*

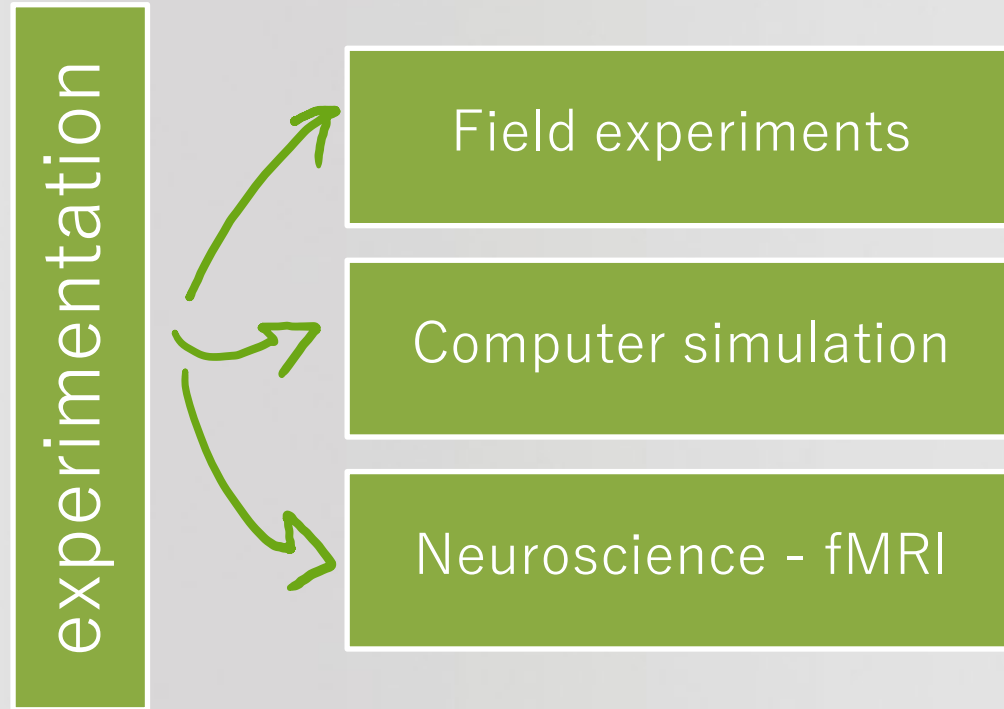
Who knows what I want to do? Who knows what anyone wants to do? How can you be sure about something like that? Isn't it all a question of brain chemistry, signals going back and forth, electrical energy in the cortex? How do you know whether something is really what you want to do or just some kind of nerve impulse in the brain. Some minor little activity takes place somewhere in this unimportant place in one of the brain hemispheres and suddenly I want to go to Montana or I don't want to go to Montana. (*White Noise*, Don DeLillo)

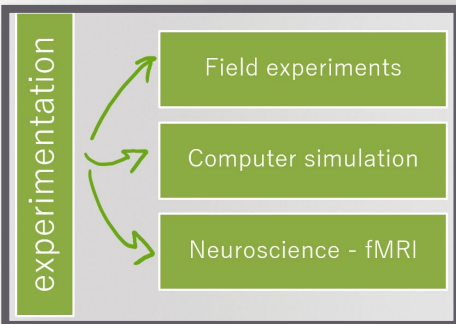
# Economics and Psychology – 20 year old relationship:



**Behavioral Economics** looks at the difference between the *choices people actually make* under conditions of uncertainty and those choices predicted by **Standard Economic** models.

# The Methods used in Behavioral Economics



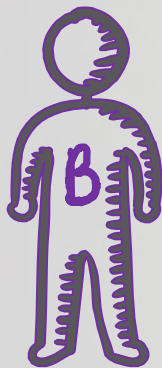


# Why experiment?

distinguish between:

**Behavioral Economics:**

Psychology +  
Standard Economics



BE  
Behavioral  
Economics

Standard  
Standard  
Economic  
Theory



**Standard Economic Theory:**

Assumes that people are rational, act based on full information and have stable preferences while always maximizing utility.



*Homo  
Economicus*

1

Fully aware of **all** the options they have

2

People are **rational**: will *maximize utility*



3

*Always and consistently:* rank their options according to their **preferences**

4

**Always** choose the option they like **best**



People act with full information

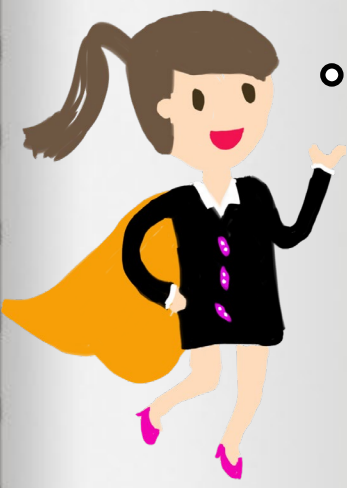
I act with full **external** knowledge




No matter how complex the situation,  
a human can always figure out which  
choices are available & which are unavailable.

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## People have known preferences





I have full  
**internal**  
knowledge



Always and consistently:  
rank their options  
according to their  
**preferences**

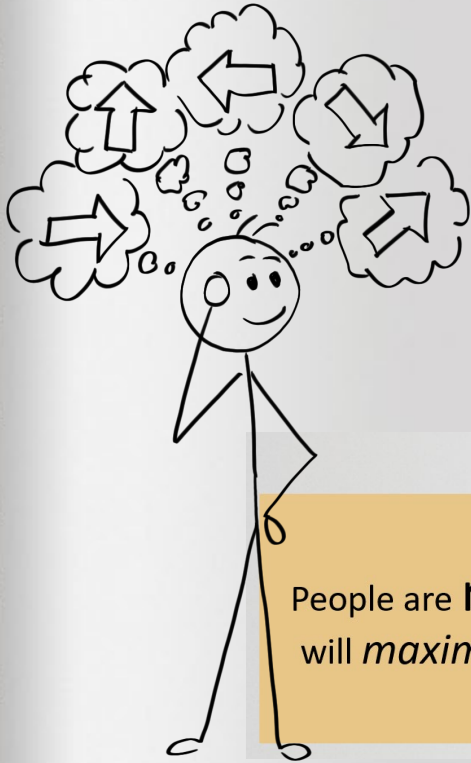
3



 No matter what set of choices are put  
before a person, they will be able to  
rank the choices from best to worst.



People choose the best option available



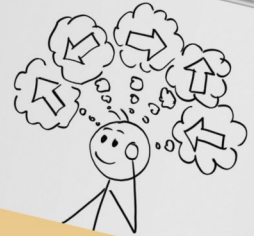
# rational choices

2

People are **rational**:  
will *maximize utility*



A person will always pick the  
highest ranked available choice



Always choose the  
option they like **best**

4

# Advantages of the Standard Model:

## Assumptions:

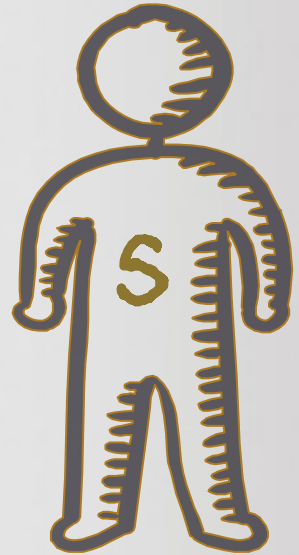
No matter how complex the situation, a human can always figure out which choices are available & which are unavailable.

No matter what set of choices are put before a person, they will be able to rank the choices from best to worst.

A person will always pick the highest ranked available choice

1. Logically consistent theory of consumer behavior
2. The theory can make predictions about consumer behavior
3. Predictions can be tested with actual behavior

The models **frequently** correspond to actual behavior



but,  
not  
always!

when → ~~false~~

No matter how complex the situation,  
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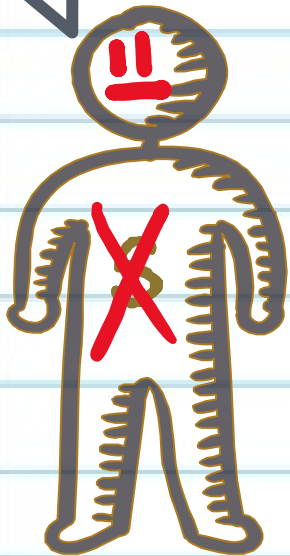
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## 3 unavoidable constraints:

Bounded  
Rationality!!



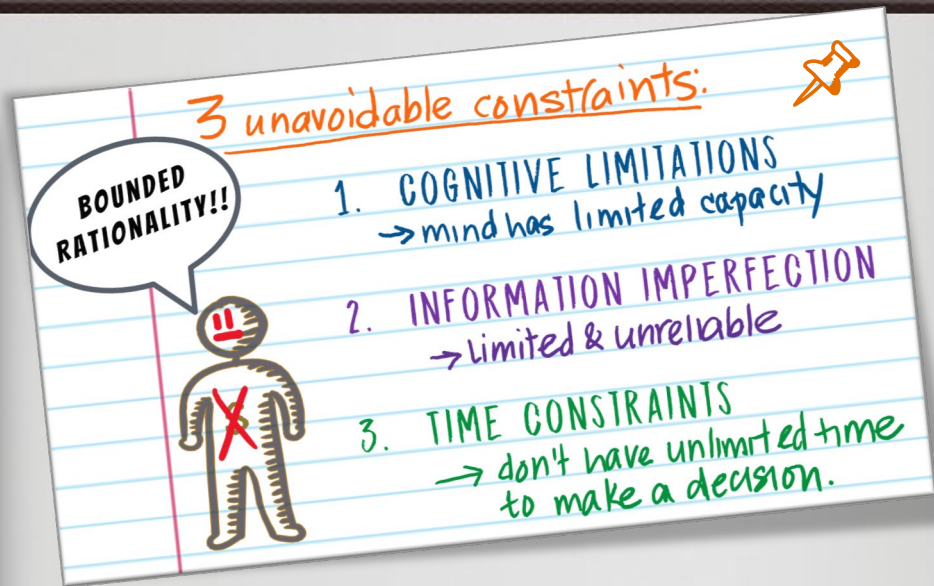
1. Cognitive limitations  
→ mind has limited capacity
2. Information imperfect  
→ limited & unreliable
3. Time constraints  
→ don't have unlimited time to make a decision.



# Herbert Simon



Nobel Prize, 1978



“Simon held that when making choices all people deviate from the strictly rational, and described companies as adaptable systems, with physical, personal, and social components. Through these perspectives, he was able to write about decision-making processes in modern society in an entirely new way.”



# Bounded Rationality- Herbert Simon

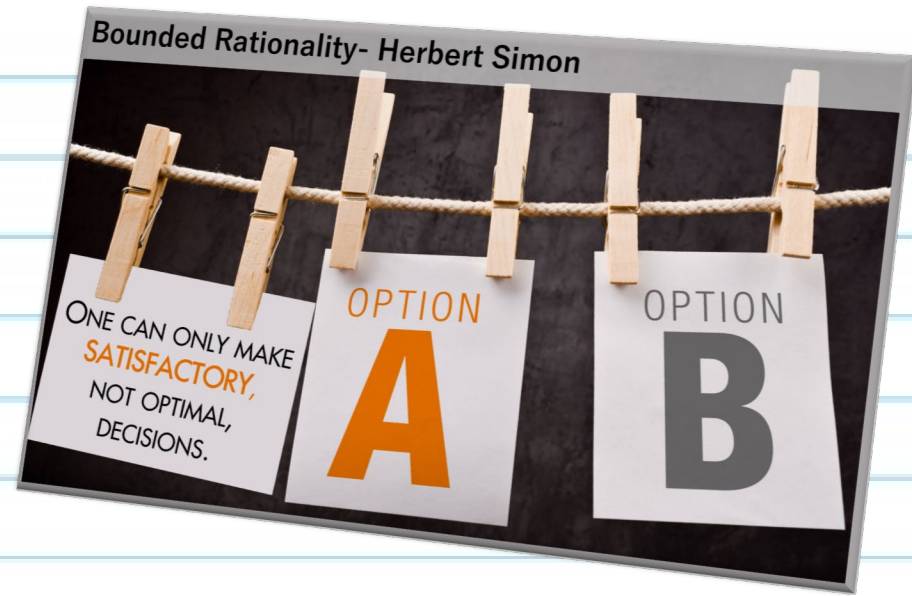
ONE CAN ONLY MAKE  
**SATISFACTORY,**  
NOT OPTIMAL,  
DECISIONS.

OPTION  
**A**

OPTION  
**B**

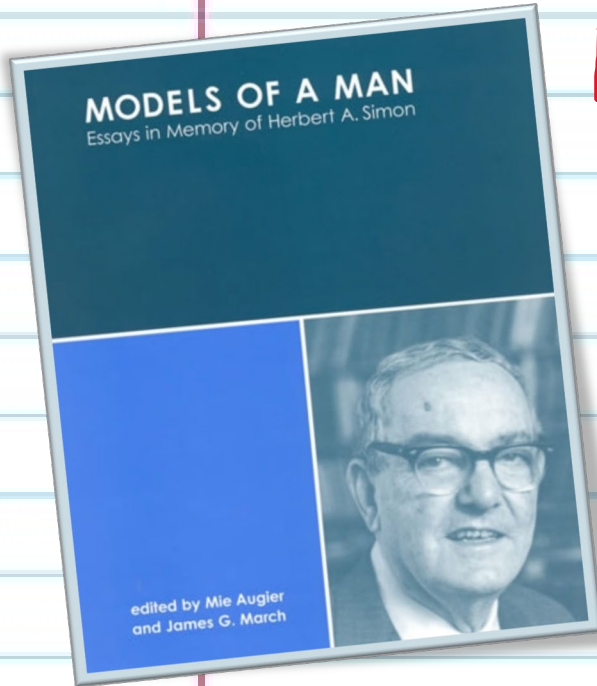
# Bounded Rationality

On average, considering a large population, can people make rational decisions according to their preferences?



People, even if they *try* to make a rational decision, cannot because it is *not really feasible* in practice.

# Simon: Bounded Rationality and Satisficing



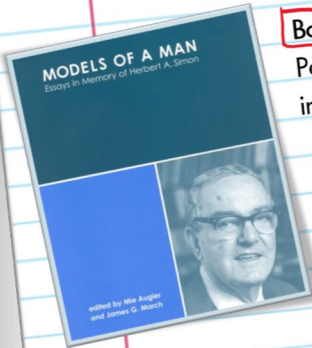
**Bounded rationality:** agents are only partly rational.

People make decisions on information which is inaccurate, erroneous and incomplete

**Satisficing:** is about the decision making process.

Rather than finding all the alternatives and weighing them against each other and making a decision which would give the best outcome, individuals seek out the best alternative.

## Simon: Bounded Rationality and Satisficing



**Bounded rationality:** agents are only partly rational.  
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Rather than finding all the alternatives and weighing them against each other and making a decision which would give the best outcome, individuals seek out the best alternative.

# heuristics



“ Human cognitive abilities are not infinite however, people sometimes respond rationally to their own cognitive limitations, minimizing the sum of decision costs and error costs.

To deal with limited memories we make lists.

To deal with limited brain power and time we use mental shortcuts and rules of thumb.

Even when the use of mental shortcuts is rational, it can produce predictable mistakes. ”



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# Rationalization in Decision Making

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*Why we don't always choose our favorite  
option*

Based on the research of Vadim Cherepanov, Timothy Feddersen  
and Alvaro Sandroni



**“an inability to rationalize a  
preference can constrain our ability  
to pick a favored option”**



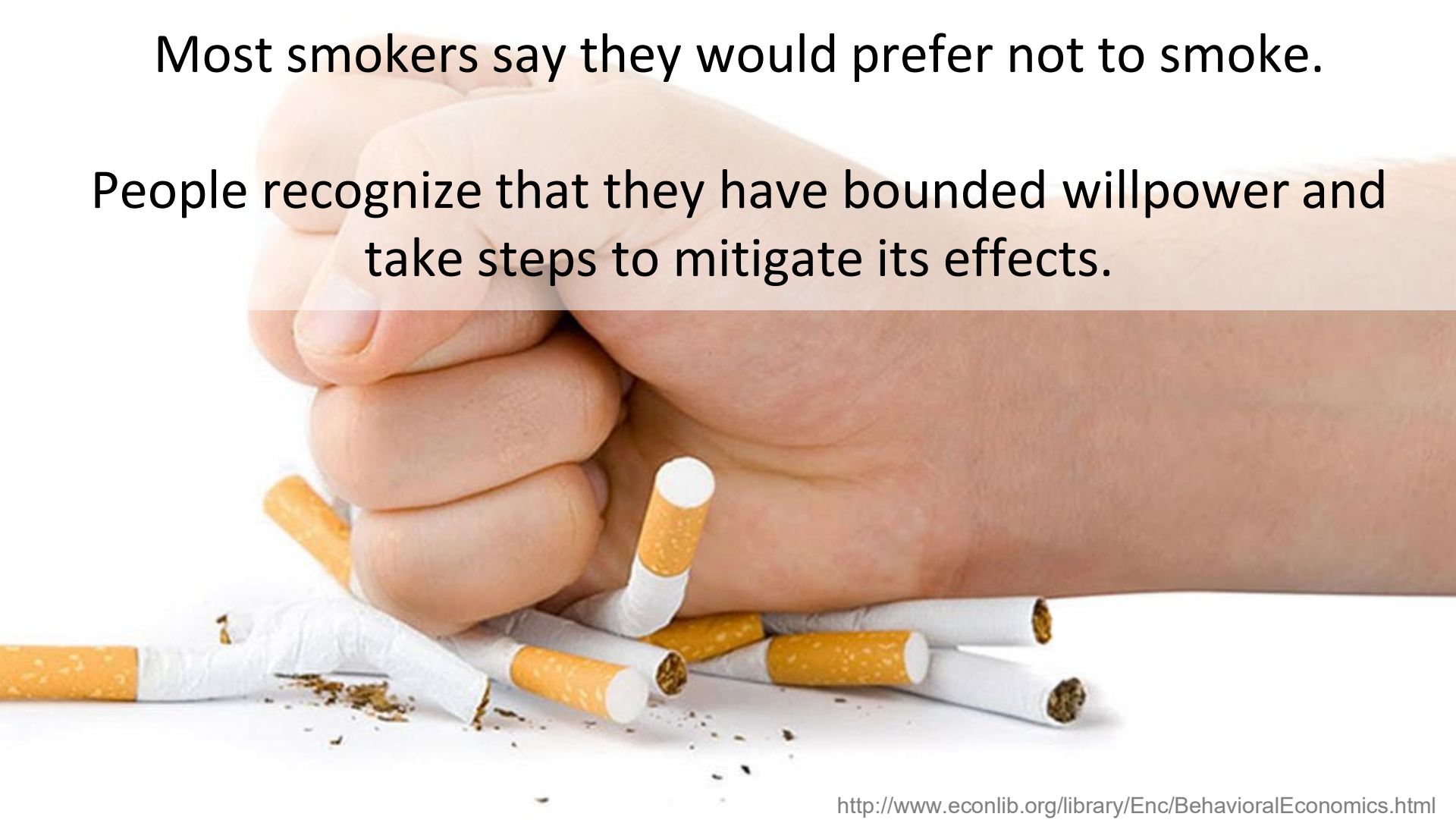
# Bounded Willpower



human beings often take actions that they know to be in conflict with their own long-term interests.

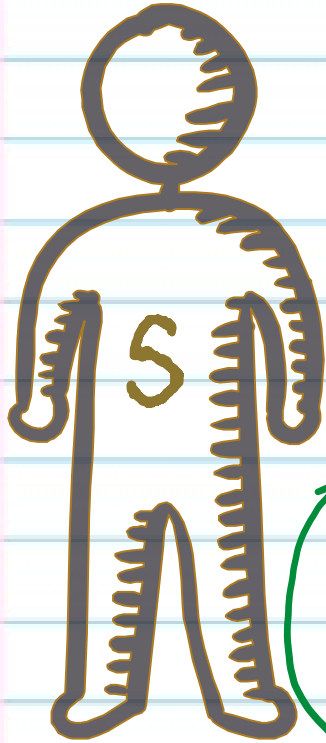
Most smokers say they would prefer not to smoke.

People recognize that they have bounded willpower and take steps to mitigate its effects.



# Bounded Selfishness

## Motivation: self-interest?



*Homo  
Economicus*

### Standard Economic Theory:

States that self-interest is the primary motivation for people's behavior.

IS IT  
REALLY??

But: people act selflessly – and behave in which are contrary to self-interest.

Consider: charity contributions, volunteer work and ultimatum games.

## Bounded Selfishness



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### MOTIVATION: SELF-INTEREST?

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Consider: charity contributions, volunteer work and ultimatum games.

“bounded selfishness” – a concern for the well-being of others

# Bounded Self-Interest



**Dalai Lama** ✓

July 11, 2011 · 🌐

My advice is that if you must be selfish, be wisely selfish. Wise people serve others sincerely, putting the needs of others above their own. Ultimately you will be happier. The kind of selfishness that provokes fighting, killing, stealing, using harsh words, forgetting other people's welfare will only result in your own loss.

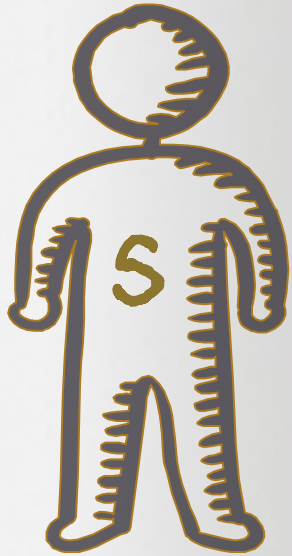
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# Is the standard economic model all wrong?

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1. Accept evidence from psychology
2. Don't want to abandon the assumption of rational behavior because of:

Inefficient  
financial  
markets

Learning

Darwinian  
evolution