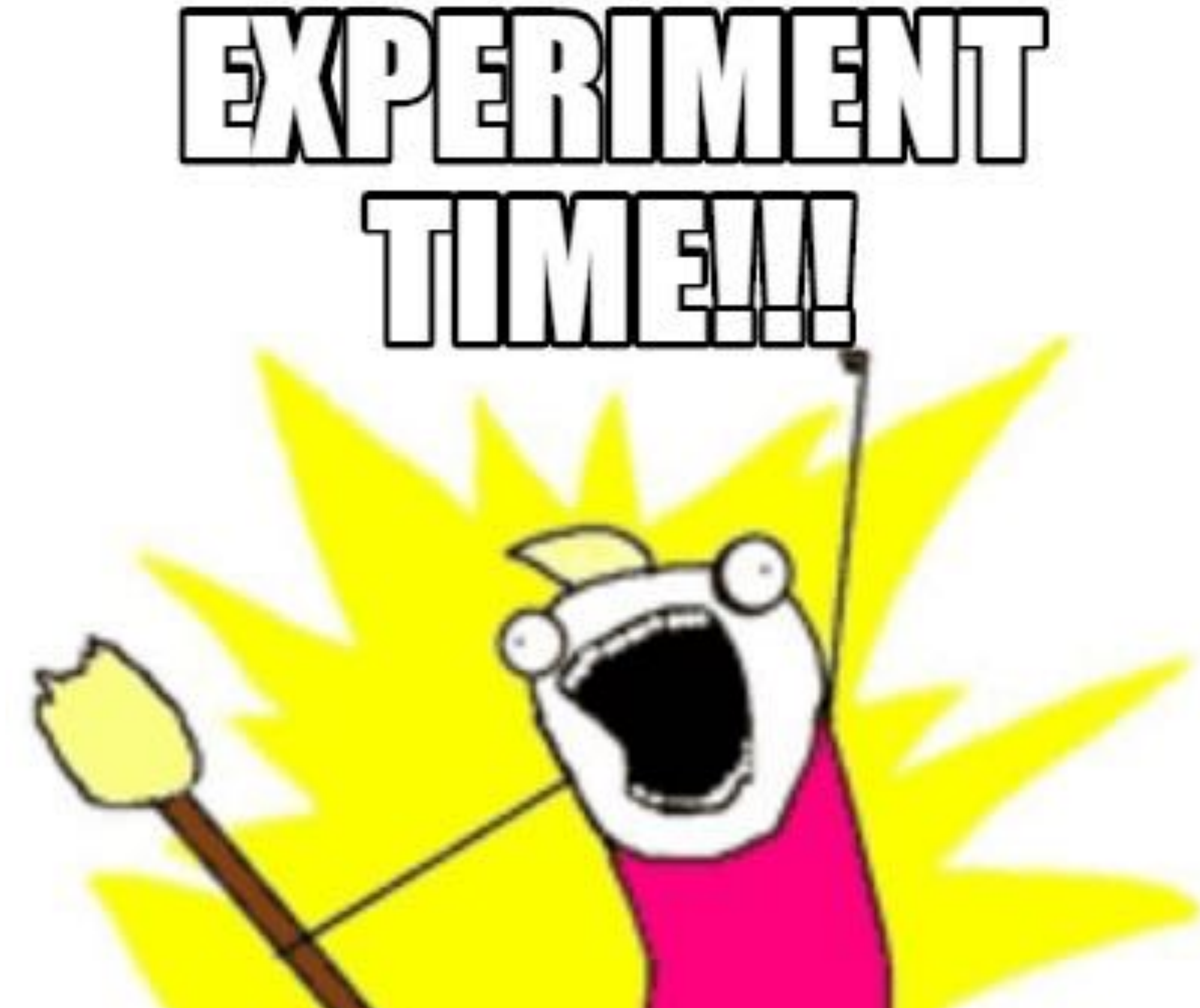
Agents Behaviour Part II


EXPERIMENT
TIME!!!

GROUP 1

Site: www.sli.do

Code: 301384

PROBLEM 1

The Scottish government is planning the next move to fight the next wave of covid-19. The government **expects 12000 people to die** as a consequence of the new wave, and they are **preparing 2 intervention programs**. Which one do you favour?

Program A - if chosen, **4000 people will be saved**

Program B - if chosen, there is **1/3 chance that 12000** people will be **saved**, and a **2/3 chance that nobody** will be saved

PROBLEM 2

Suppose that you are asked to participate in one of the following two games, which one would you prefer to play?

Game A - a **sure gain** of **£250**
Game B - **25%** chance to **gain £1000**, **75%** chance to **gain nothing**.

GROUP 2

Site: www.sli.do

Code: 243075

PROBLEM 1

The Scottish government is planning the next move to fight the next wave of covid-19. The government **expects 12000 people to die** as a consequence of the new wave, and they are **preparing 2 intervention programs**. Which one do you favour?

Program A - if chosen, **8000 people will die**

Program B - if chosen, there is **1/3 chance that nobody** will **die**, and a **2/3 chance that 12000 people will die**

PROBLEM 2

Suppose that you are asked to participate in one of the following two games, which one would you prefer to play?

Game A - a **sure loss** of **£750**
Game B - **75%** chance to **lose £1000**, **25%** chance to **lose nothing**

Learning outcomes

Learn about **decision-making**
Understand **risk attitudes**
Introduction to **cognitive biases**

Bonus: Become a master of digital marketing

Back to full rationality

Agents are fully informed about the environment
Agents have unbounded time and computational power
Agents are consistent

Back to full rationality

Agents are fully informed about the environment

Agents

Preferences are well defined

al power

Agents are consistent

If I prefer

a over b,

and

b over c,

I will prefer

a over c

Me

PROBLEM 1 (BOTH GROUPS)

Program A - if chosen, **4000 people will be saved**

Program B - if chosen, there is **1/3 chance that 12000** people will be **saved**, and a **2/3 chance that nobody** will be saved

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PROBLEM 1 (BOTH GROUPS)

Program A - if chosen, **4000 people will be saved**

Program B - if chosen, there is **1/3 chance that 12000** people will be **saved**, and a **2/3 chance that nobody** will be saved

70%

Program A - if chosen, **8000 people will die**

Program B - if chosen, there is **1/3 chance that nobody** will **die**, and a **2/3 chance that 12000 people will die**

PROBLEM 1 (BOTH GROUPS)

Program A - if chosen, **4000 people will be saved**

Program B - if chosen, there is **1/3 chance that 12000** people will be **saved**, and a **2/3 chance that nobody** will be saved

77%

Program A - if chosen, **8000 people will die**

Program B - if chosen, there is **1/3 chance that nobody** will **die**, and a **2/3 chance that 12000 people will die**

PROBLEM 2 (BOTH GROUPS)

Game A - a **sure gain** of **£250**
Game B - **25%** chance to **gain £1000**, **75%** chance to **gain nothing**.

Game A - a **sure loss** of **£750**
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PROBLEM 2 (BOTH GROUPS)

75%

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PROBLEM 2 (BOTH GROUPS)

Game A - a **sure gain** of **£250**
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87%

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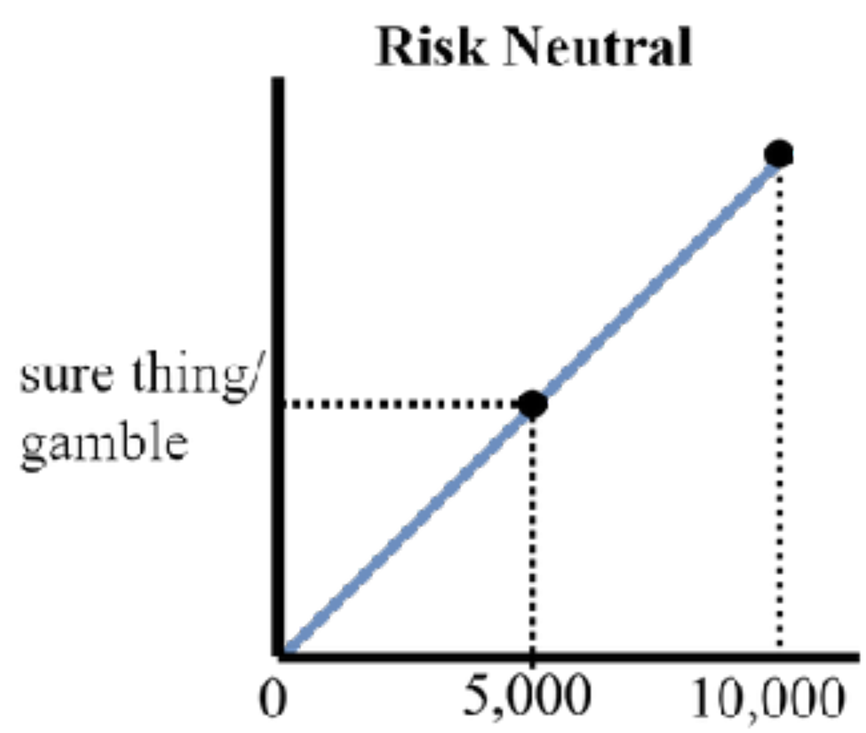
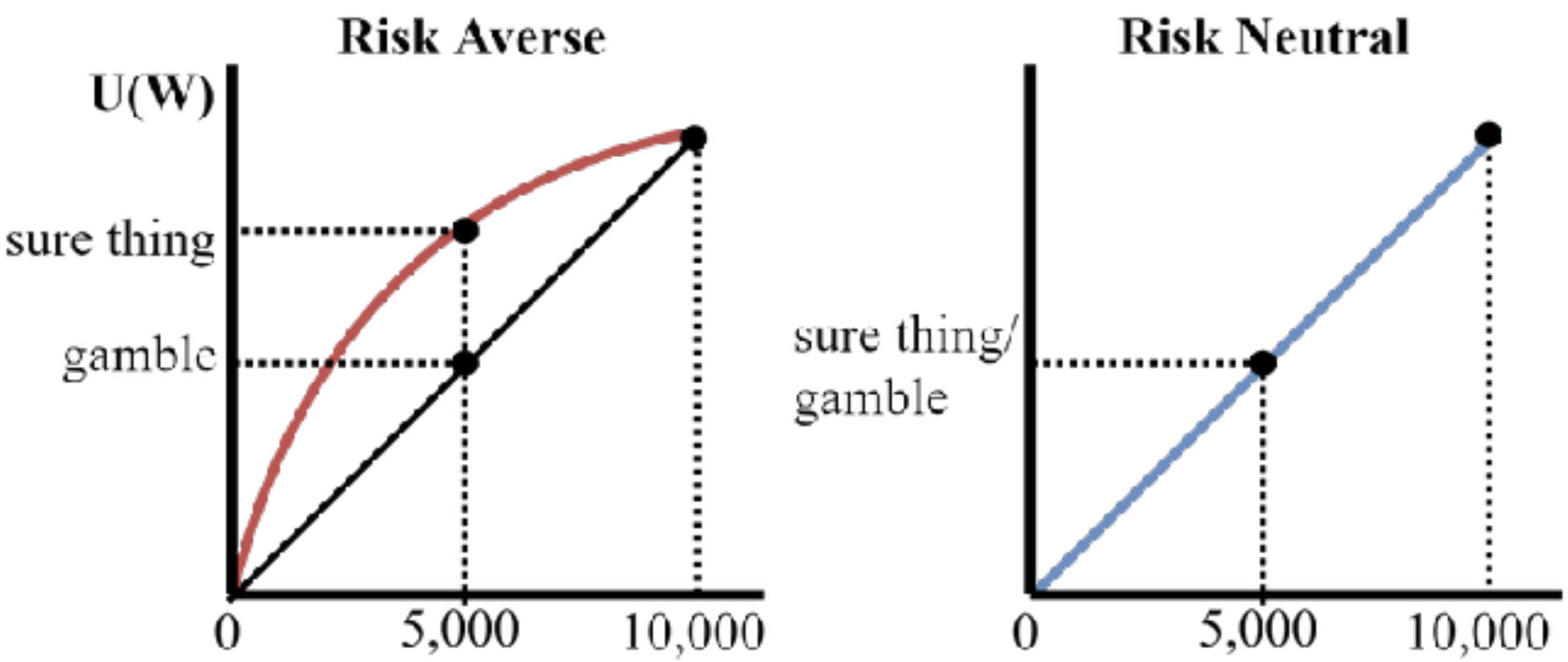
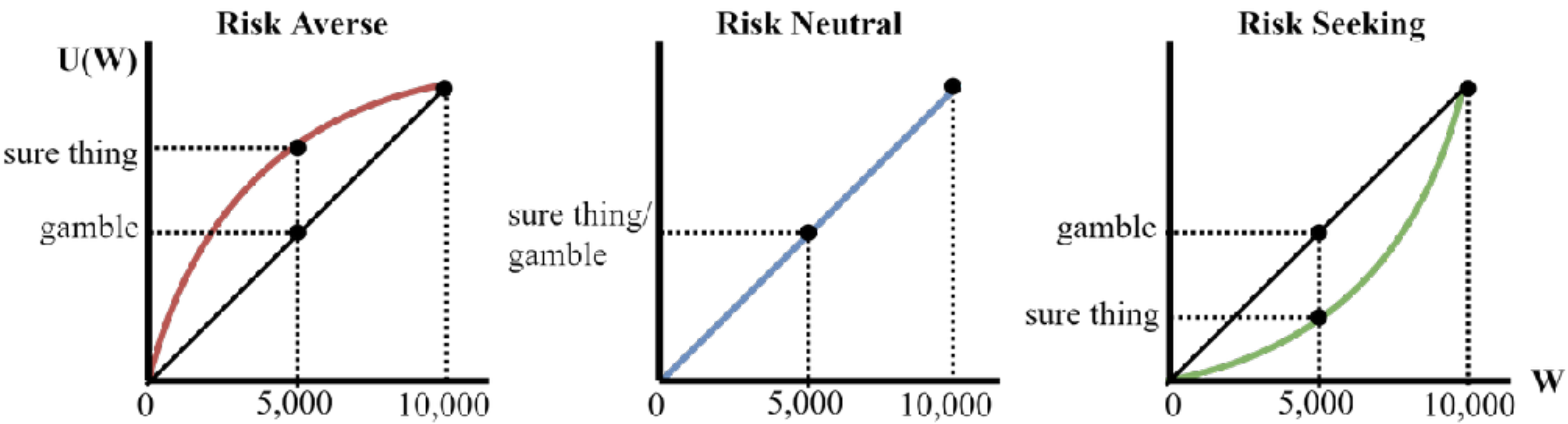
Utility function



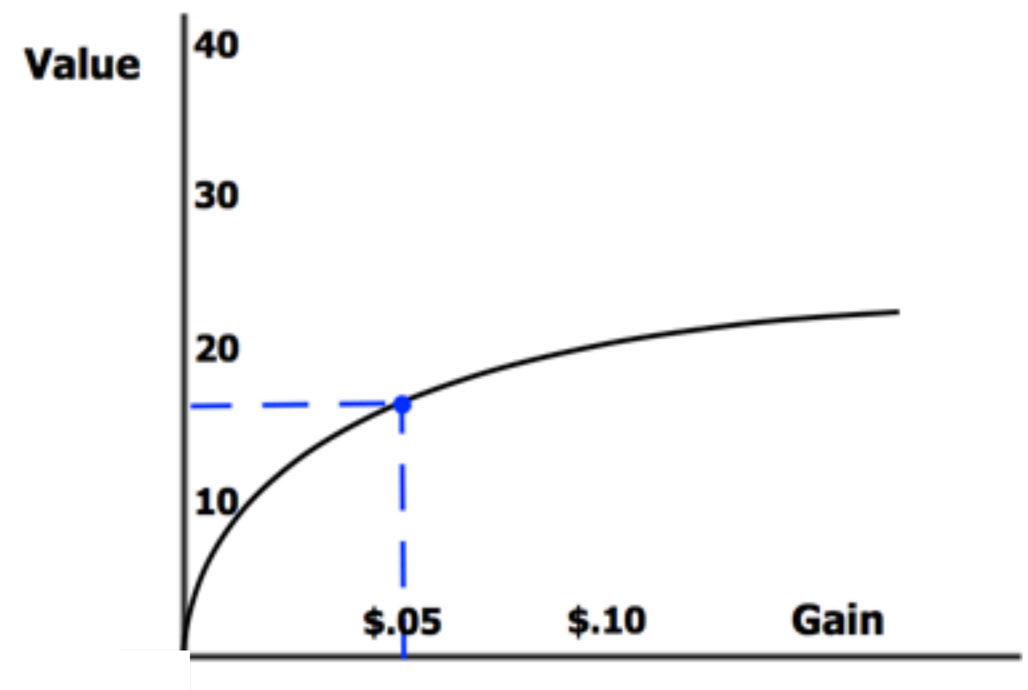
Utility function



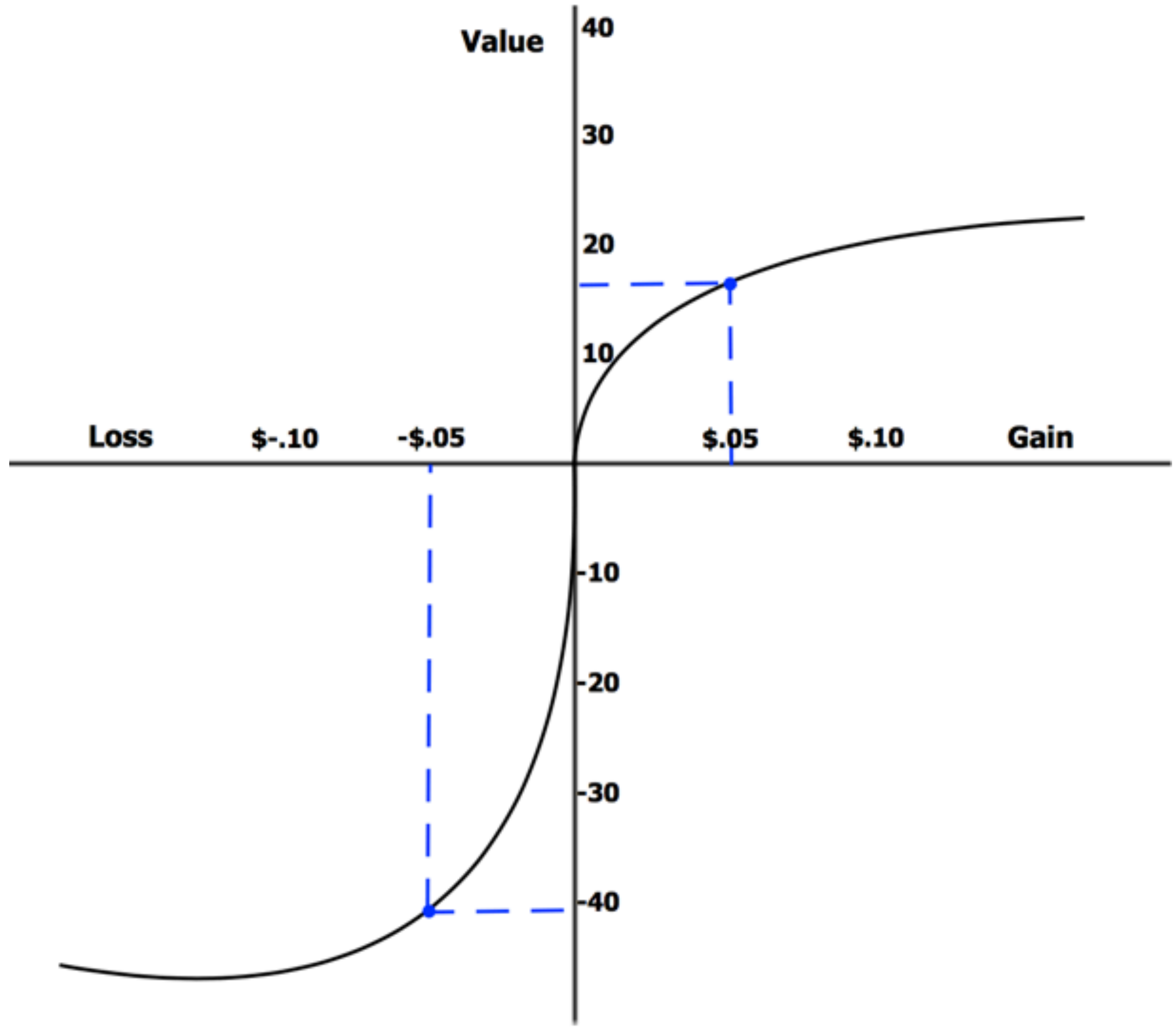
Utility function



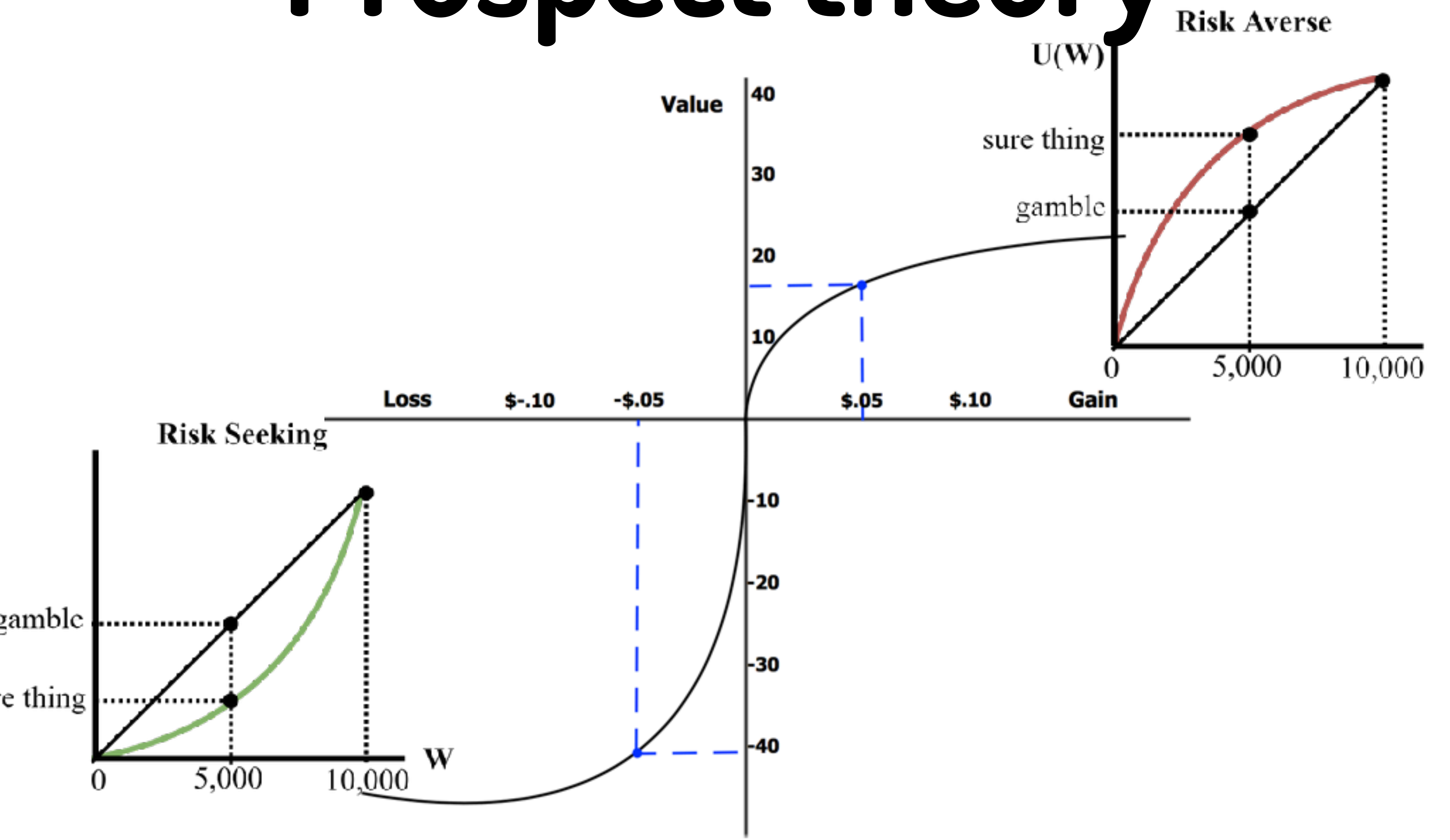
Prospect theory



Prospect theory



Prospect theory



Prospect theory

$$v(x) = \begin{cases} x^{\alpha} & if\ x \geq 0 \\ -\lambda(-x)^{\beta} & if\ x < 0 \end{cases}$$

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$$\alpha = \beta = 0.88 \qquad \lambda = 2.25$$

Financial Example: disposition effect

Traders are **more likely to sell** stock **after** they **gained** value and **less likely** to do so **after** they **lost** value

Heuristics


HEAR NOISE IN THE DARK AFTER WATCHING HORROR MOVIE
SERIAL KILLER
memecrunch.com

Tversky and Kahneman

Availability
Representativeness
Anchoring

Tversky and Kahneman

We tend to **overestimate** what's **“available"** in our memory

Availability

Representativeness

Anchoring

Tversky and Kahneman

“When you have a hammer, everything is a nail”

Financial example

Survey in 2012 with thousands of people, who were asked **whether in 2009, 2010, and 2011** the **S&P500 index was profitable**

Financial example

Survey in 2012 with thousands of people, who were asked **whether in 2009, 2010, and 2011** the **S&P500 index was profitable**

Most people said 2009 was **not profitable**, whereas in reality it saw one of the **highest returns ever**

Tversky and Kahneman

We fail at computing
conditional probabilities

Availability
Representativeness
Anchoring

Tversky and Kahneman

Steve is very **shy and withdrawn**, invariably **helpful**, but with **little interest in people**. A **meek and tidy** soul, he has a **need for order and structure**, and a **passion for detail**.

Tversky and Kahneman

What is Steve's job?

Librarian

Farmer

Tversky and Kahneman

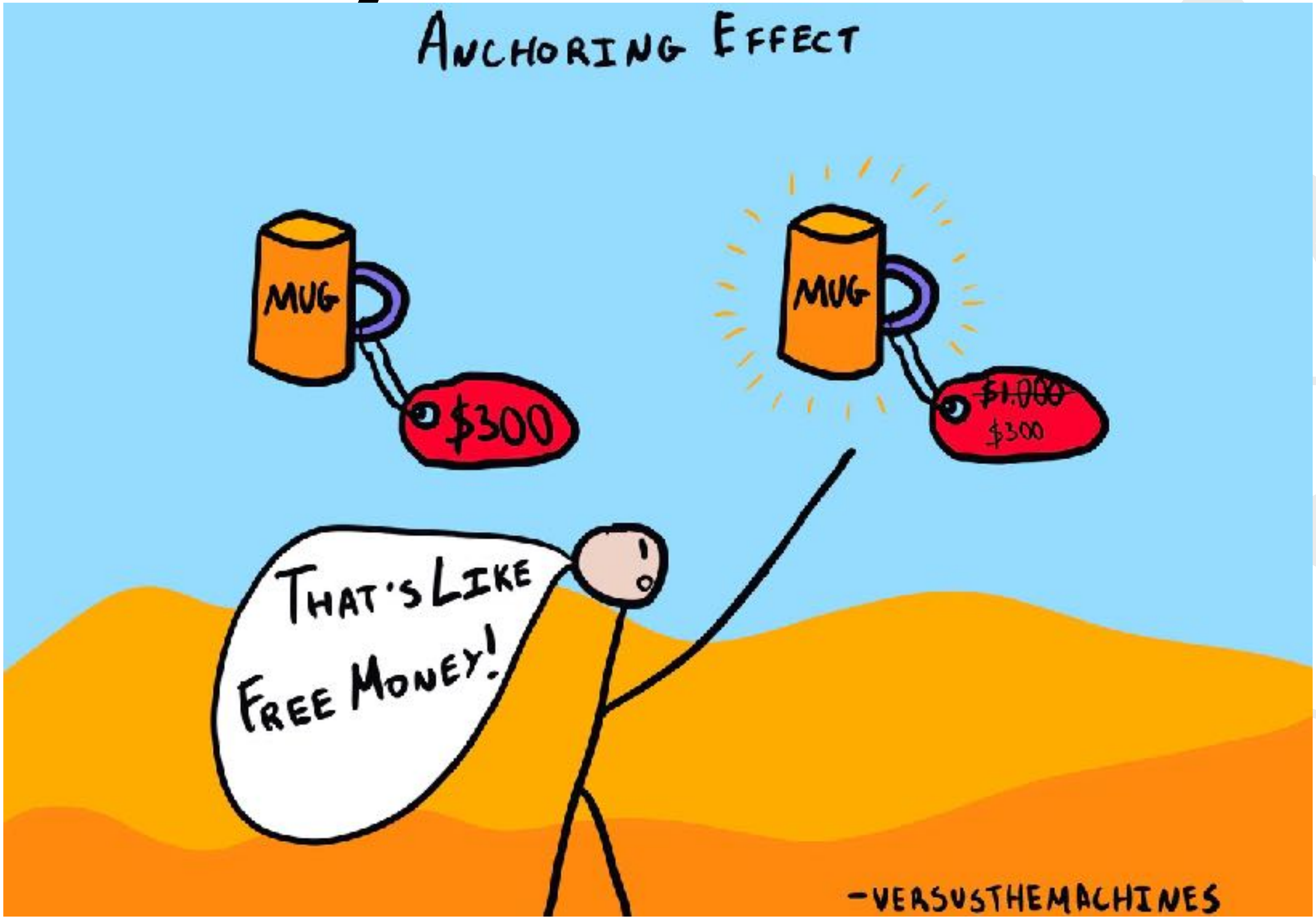
Availability

Representativeness

Anchoring

We often choose
a **reference point**

Tversky and Kahneman



The adaptive toolbox

Psychologic plausibility
Domain specific
Ecological rationality

The adaptive toolbox

Psychologic plausibility

The aim is to build a model that **accurately represents the behaviour** of humans

The adaptive toolbox

Domain specific

Heuristics should be **specific to the context**, rather than general

The adaptive toolbox

Ecological rationality

The success of the heuristic is based on
adaptation to the environment

The adaptive toolbox

Heuristics are composed of three building blocks

Search rules
Stopping rules
Decision rules

Example

Jane wants a job within a **reasonable distance** from Edinburgh

Jane wants a wage of at least w_j

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Stopping: search for jobs within 10km from Edinburgh

Example

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Jane wants a wage of at least w_j

Search: apply for all jobs that offer wage $w_i > w_j + tc$

Stopping: search for jobs within 10km from Edinburgh

Decision: maximise $\pi = w_i - (w_j + tc)$

If $\pi \leq 0 \forall w_i$ do not get any job

Summary

Overview of decision-making processes
Cognitive biases
Heuristics