Future Directions in Information Access

FDIA 7

- 7th Future Directions in Information Access
- A forum for students to present their research topics
- Fun, Friendly, Informal but Informative

- **PC Chairs**: Leif and Max
- **General Chairs:** Ioannis, Theodora, Symeon, Stefanos
- Thanks to all the reviewers
- And of course thanks to all our students

FDIA 7

The Search for Knowledge

Leif Azzopardi
University of Glasgow

ASK

- **A**nomalous
- **S**tate of
- **K**nowledge

- **A**lways
- **S**eek
- **K**nowledge

Question More

KNOWLEDGE IS POWER

Francis Bacon

Read More

THE ONLY SOURCE OF KNOWLEDGE IS EXPERIENCE

Albert Einstein

Do More

THE SCIENTIST IS NOT A PERSON WHO GIVES THE RIGHT ANSWERS

BUT
ONE WHO ASKS THE RIGHT QUESTIONS

Claude Levi-Strauss

Argue More

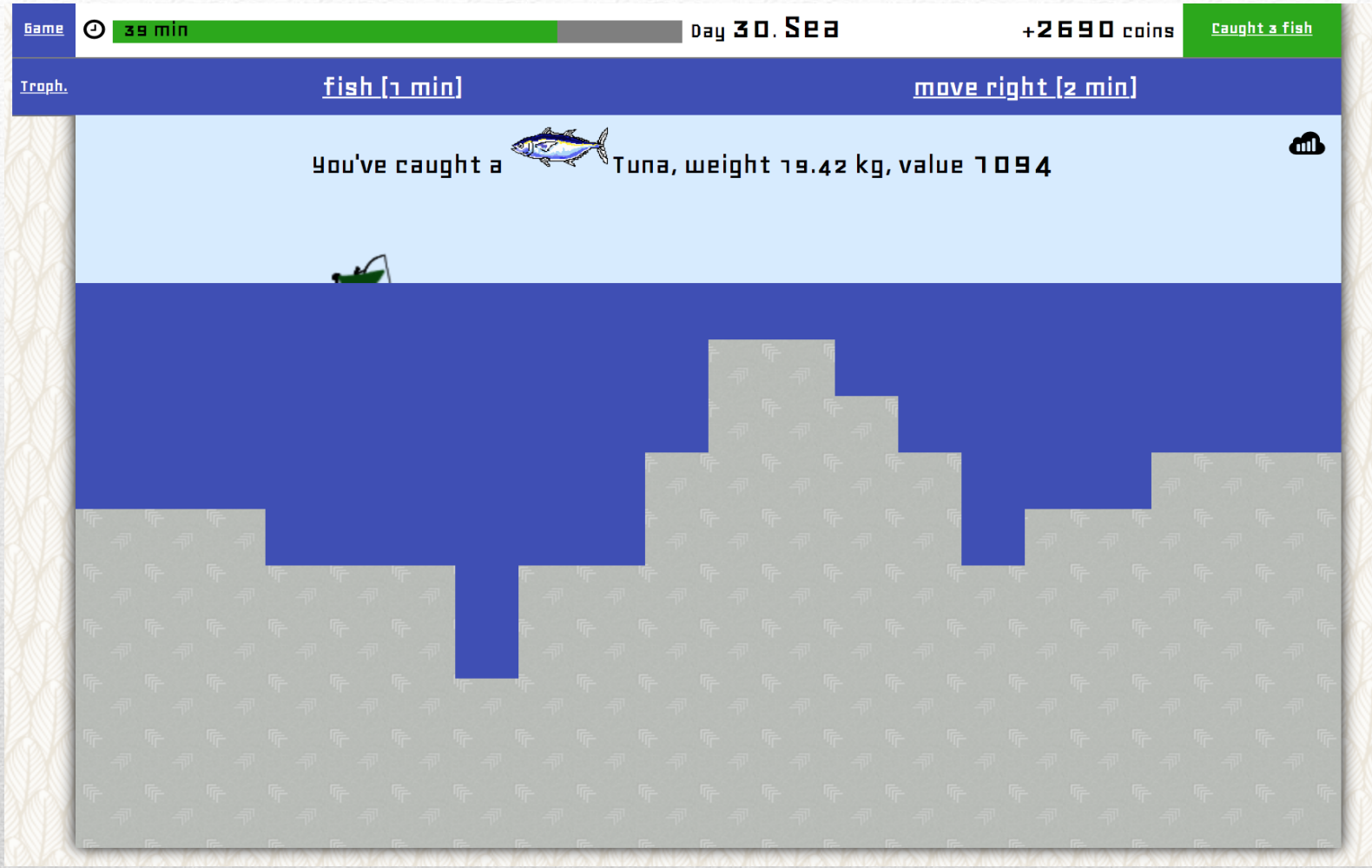
One of the greatest joys known to man is to take the fight into ignorance in search of knowledge.

Robert Staughton Lynd

Think More

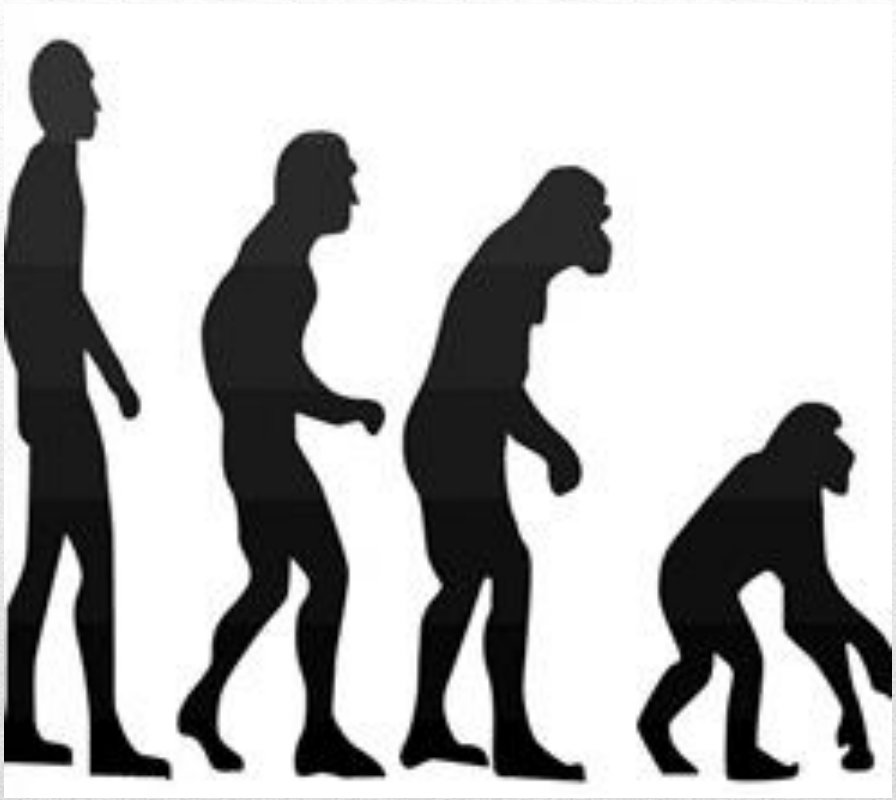
MY FUN INTERRUPT YOUR FISHING

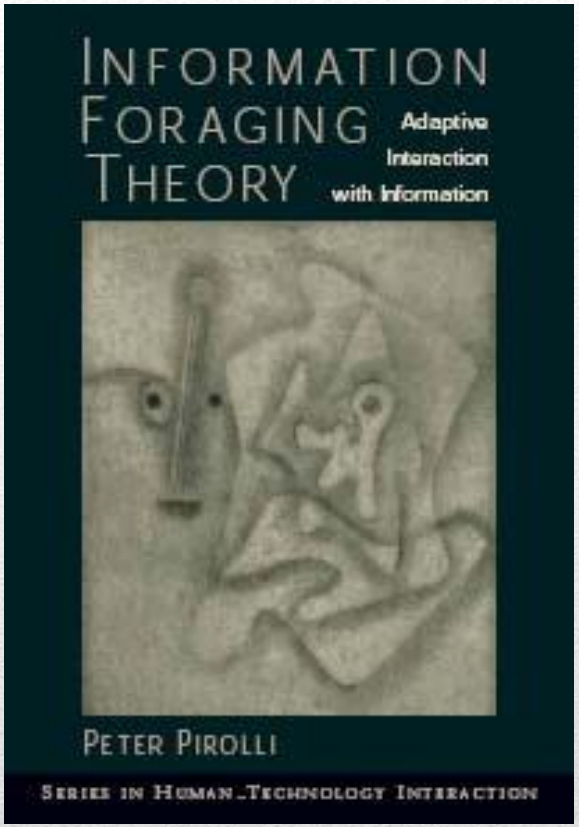
Sabretooth, X-men



http://bit.ly/go-fish-game

Fish More





A Theoretical Interlude

INFORMATION FORAGING THEORY

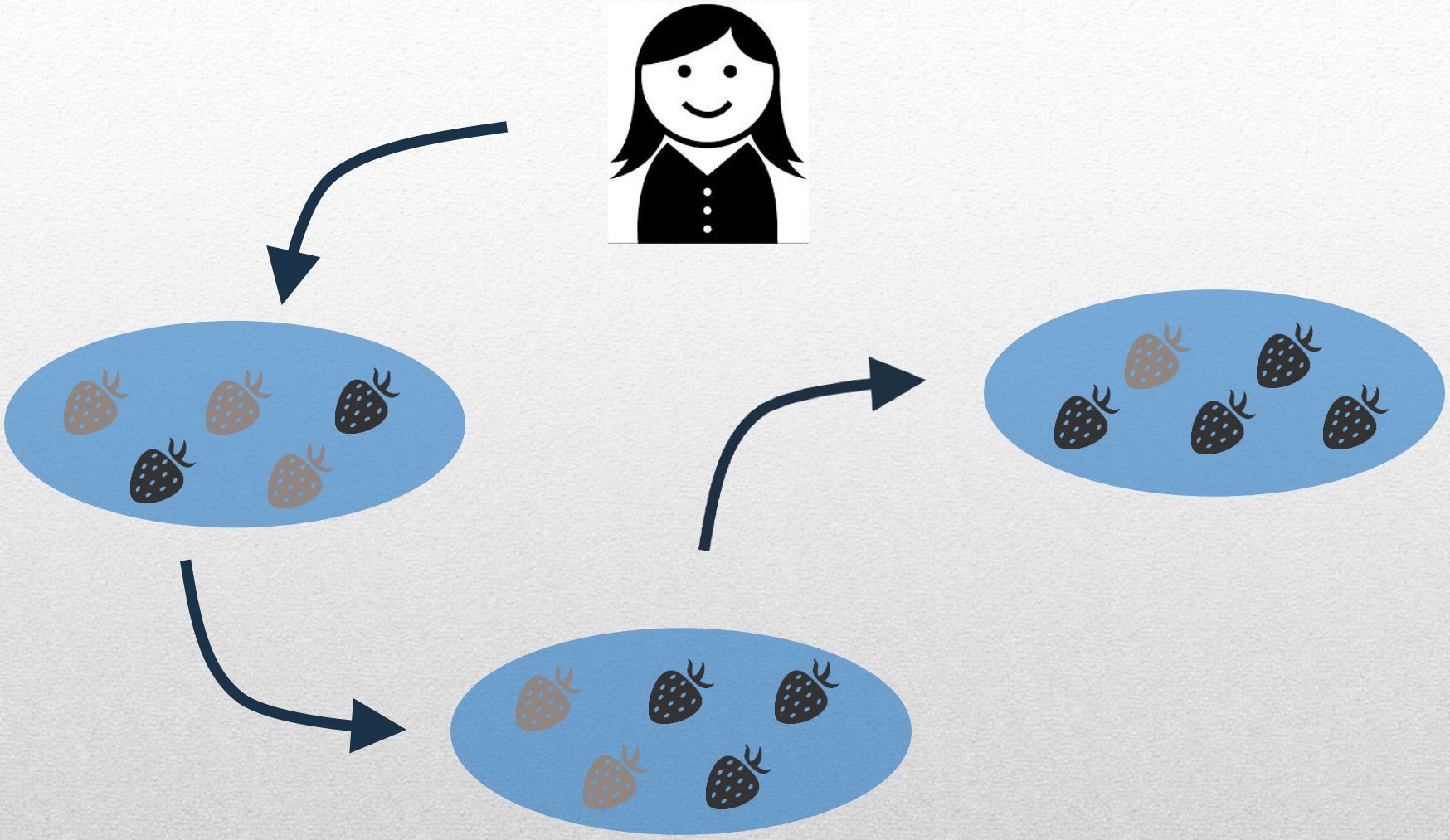
For a good overview of OFT see Sinervo (2006)

Optimal Foraging Theory

- **Foraging theory** aims **to understand** the **rules** that **shape** the foraging **behavior** of animals.
  - A key assumption is that animal aim to **maximize** the **energy gain per unit of time**, as this resource is likely to increase their chances of survival and reproduction.

- **Foraging Theory** has been proposed by a number of researchers including:
  - Resnikoff (1989), Russell et al (1993), Sandstrom (1994,1999), Pirolli & Card (1999)

The Oyster Catcher



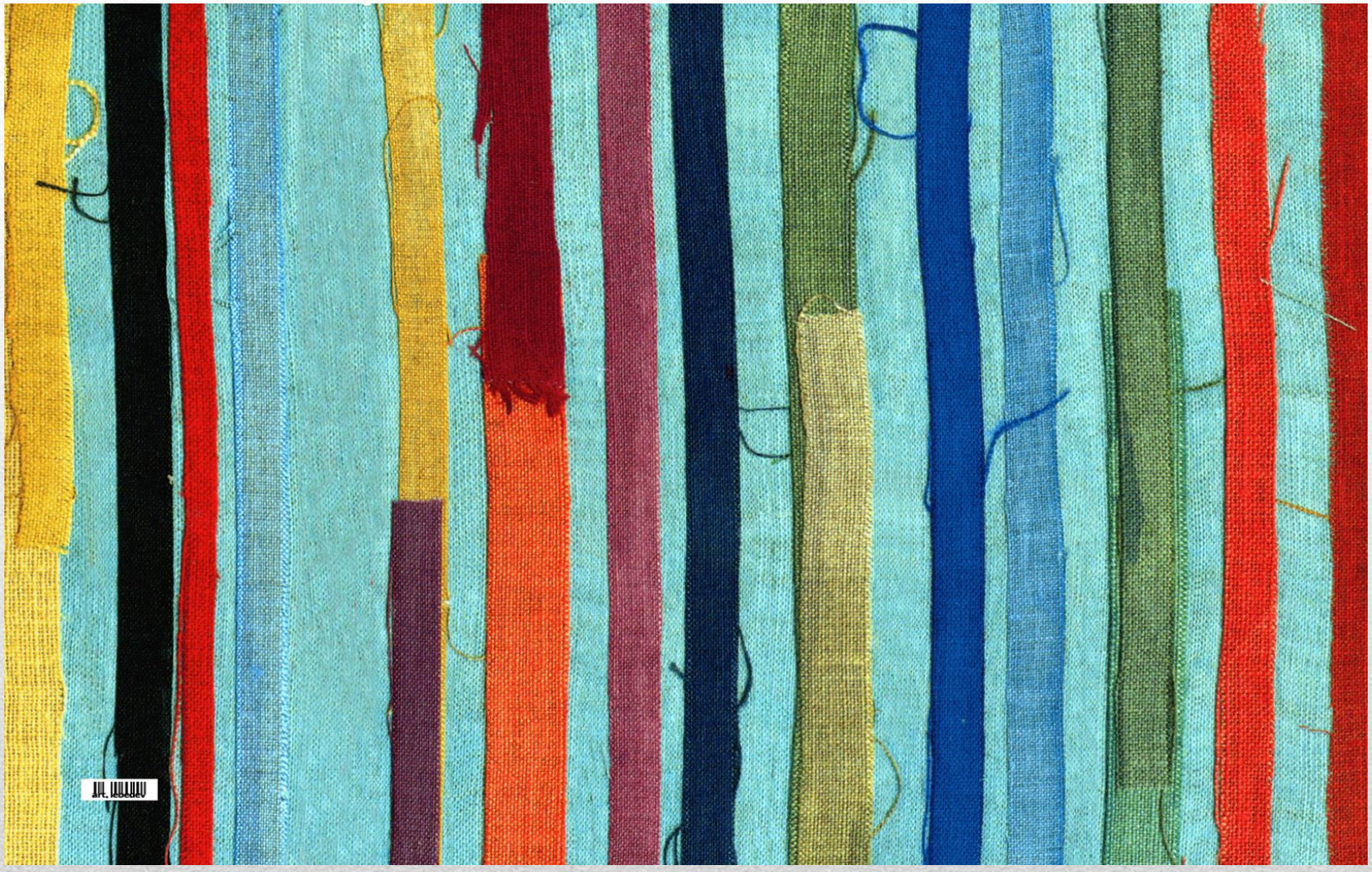
Bates' Berry Picking Models

Bates (1989)

- **People** will **modify** their **strategies** in order to **maximize** their **rate** of gaining **valuable information**.
- **Information systems** will **evolve** so as to **maximize** the **gain** of **valuable information per unit cost**.
- One **strategy/system** is **superior** to another if it **yields more valuable information per unit cost**.

Information Foraging Theory

Resnikoff (1989) **Russell et al (1993)** **Pirolli & Card (1999)**



Information Patch Model

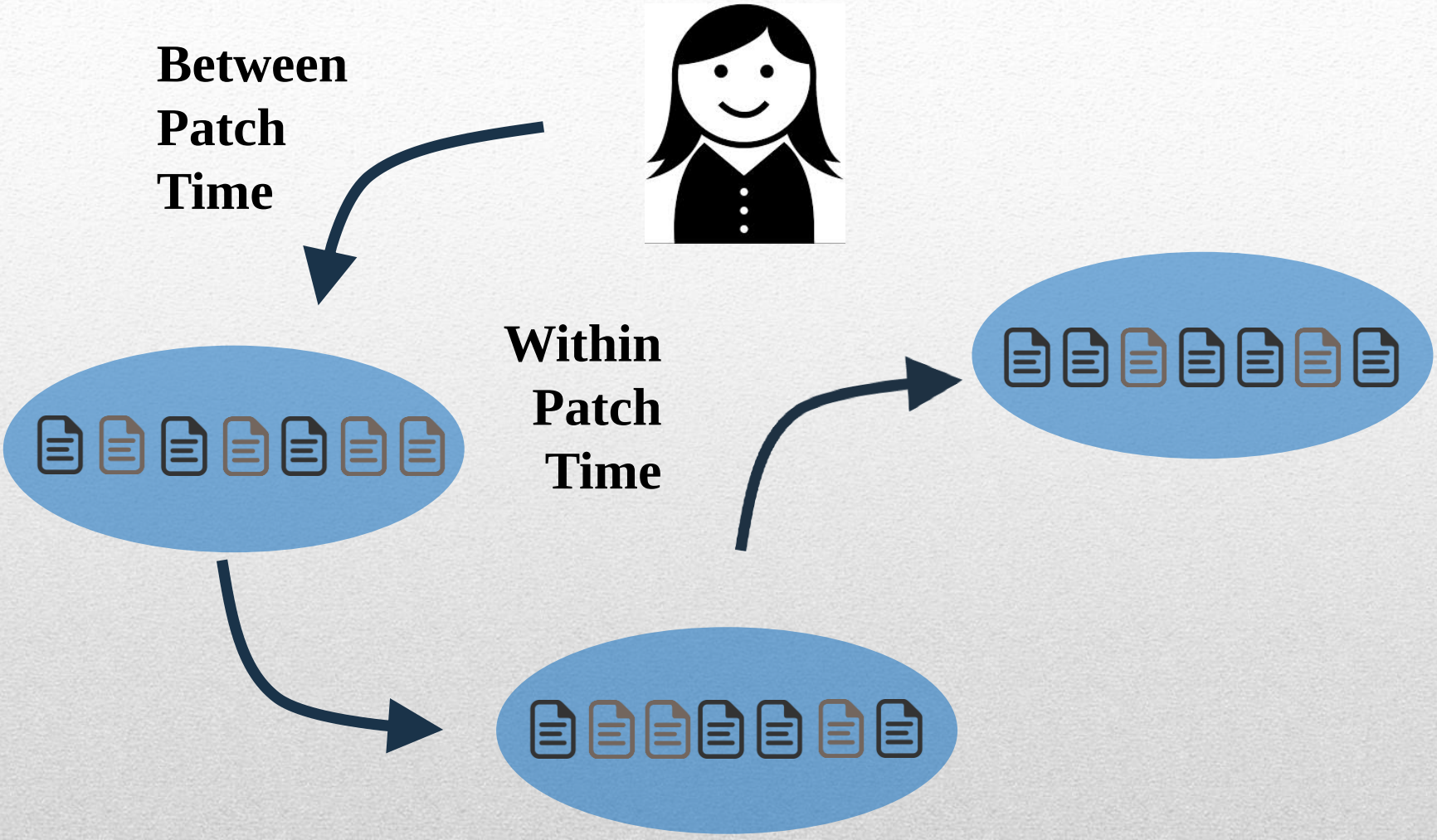
Pirolli & Card (1999)

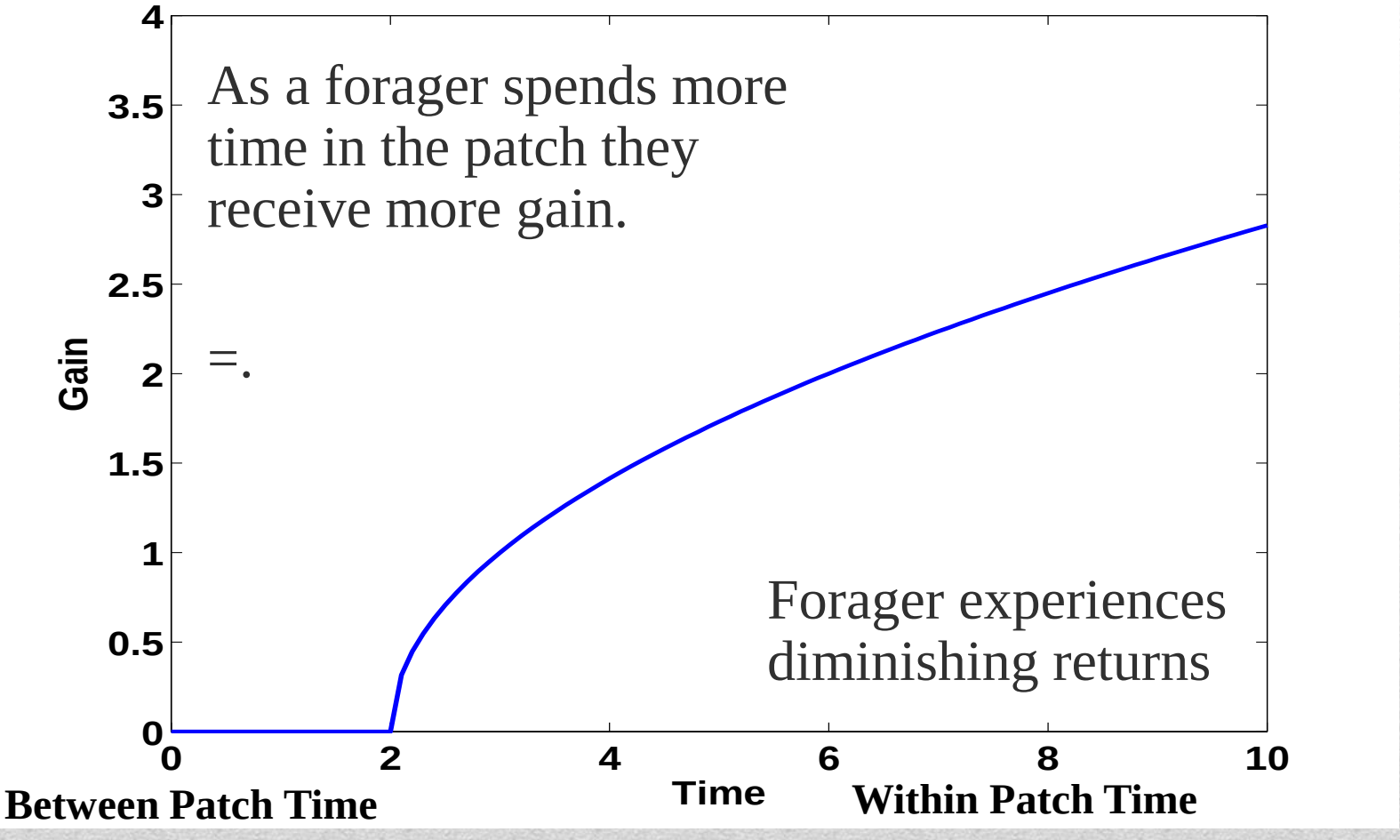
Information Patch Model

- **Describe how foragers move between and within information patches.**
  - When **information** is **distributed** in a **number** of **patches** the **forager** needs to **decide** which patch to go to, and **how long to stay in a patch**
- **Predicts** the **amount of time a forager** would/**should spend within** a **patch**
  - **Assumes** that the **forager** will go the patch that they expect to yield the **highest profitability**, **first** then next.

Pirolli & Card (1999)

Information Patches





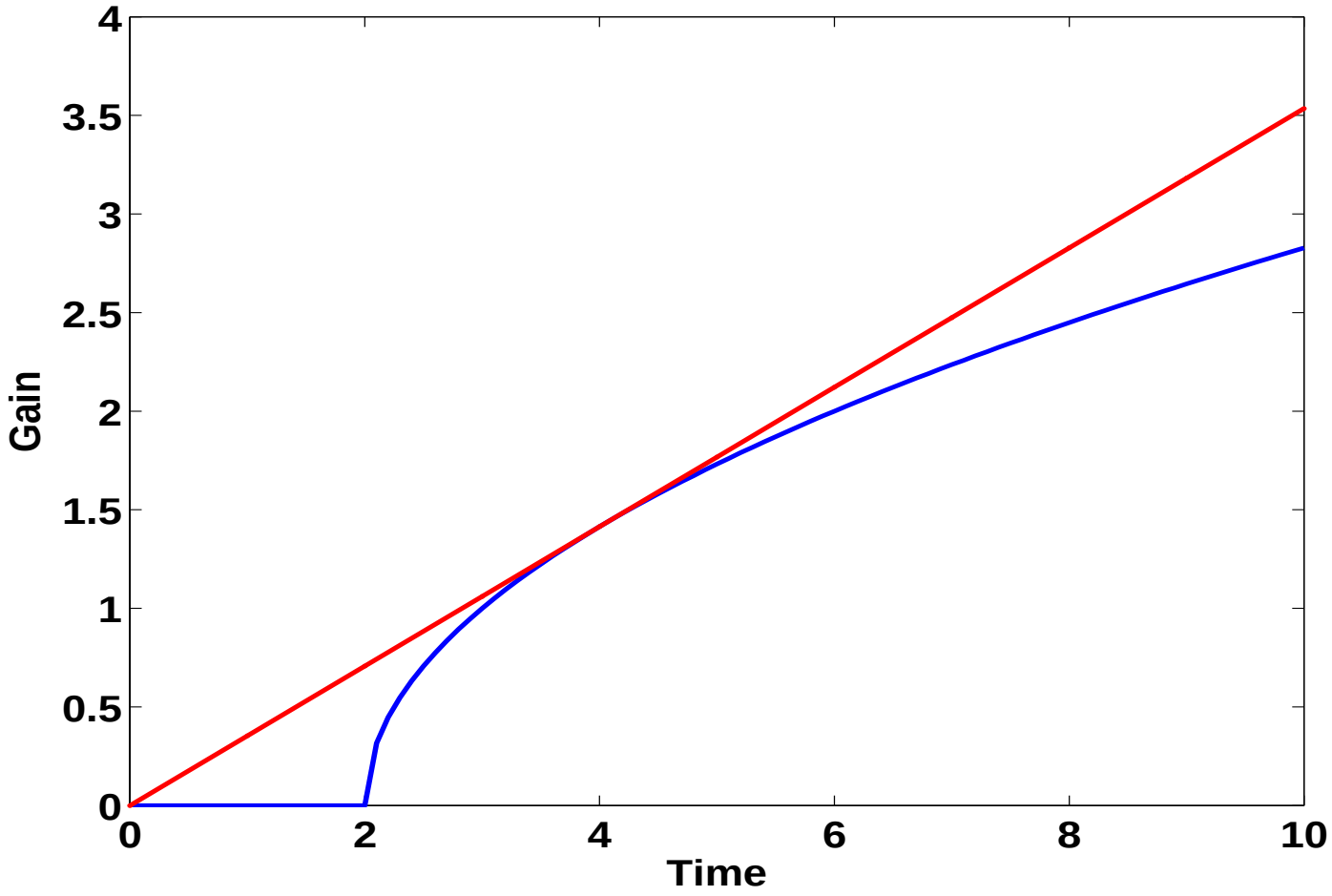
Patch Example

Charnov's Marginal Value Theorem

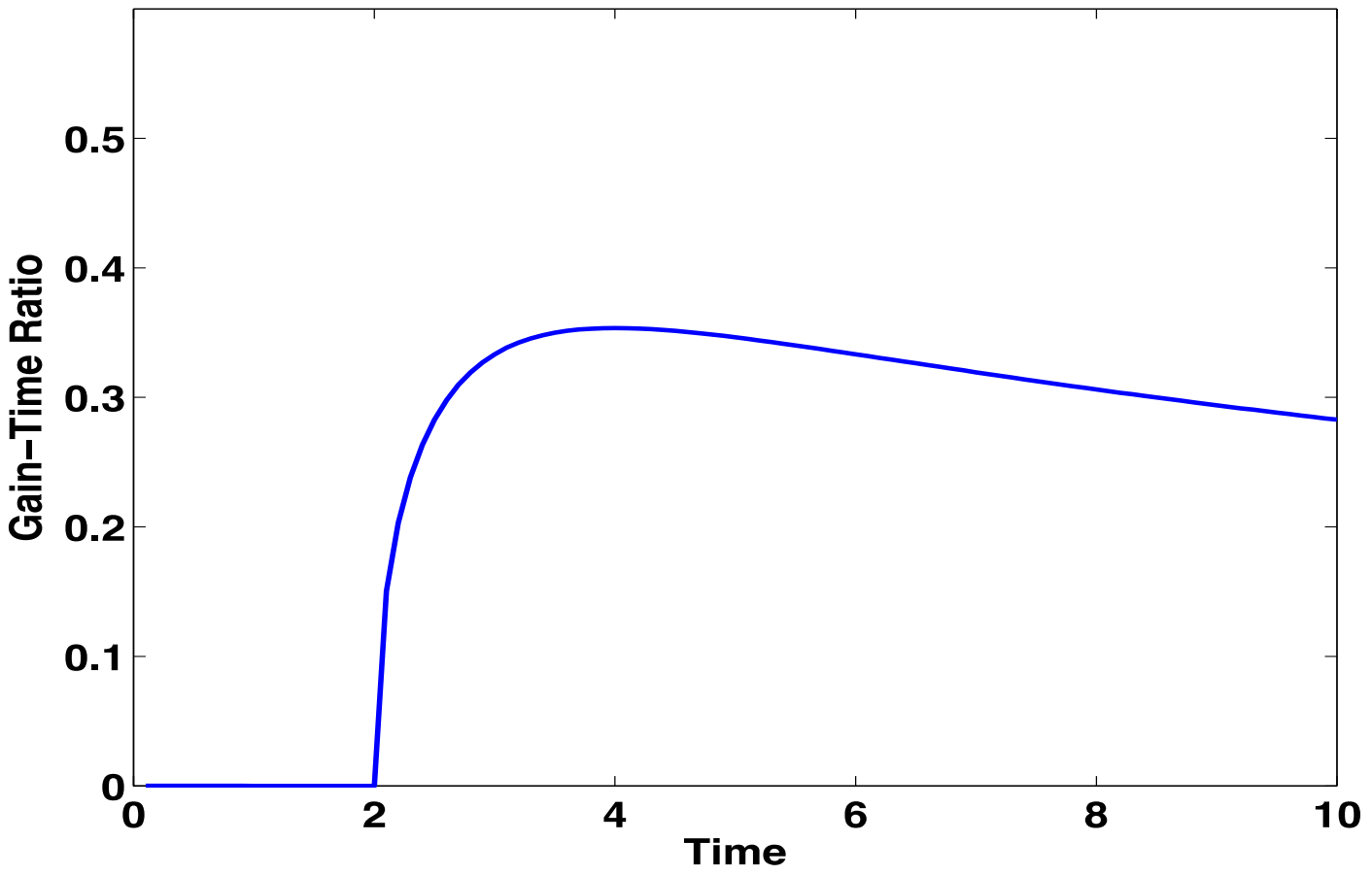
- The theorem was developed to deal with the analysis of time allocation for patch that yield diminishing returns.

- The theorem predicts that a **forager** should **remain** in a patch so long as the **slope** of the **gain function** is **greater** than the **average rate** of **gain** in the **environment**.
  - i.e. a forager wants to maximise the gain per unit of time

Charnov (1976)



When to stop searching



Change in Gain over Time

Insights from the Patch Model

- If the **between-patch (query) time increases**
  - Foragers will spend more time within the patch.
- If the **average gain** in a **patch (result list) increases**,
  - Foragers will spend less time within patches
- If the **average gain** in the **patch** is **constant**
  - Foragers will stay in the patch, until they have ran out of time, reached their saturation point, or exhausted the patch.

- **Information Foraging Theory**

  Pirolli & Card (1999)

- **Interactive Probability Ranking Principle**

  Fuhr (2008)

- **Search Economic Theory**

  Azzopardi (2011)

- **Card Playing Model**

  Zhang & Zhai (2015)

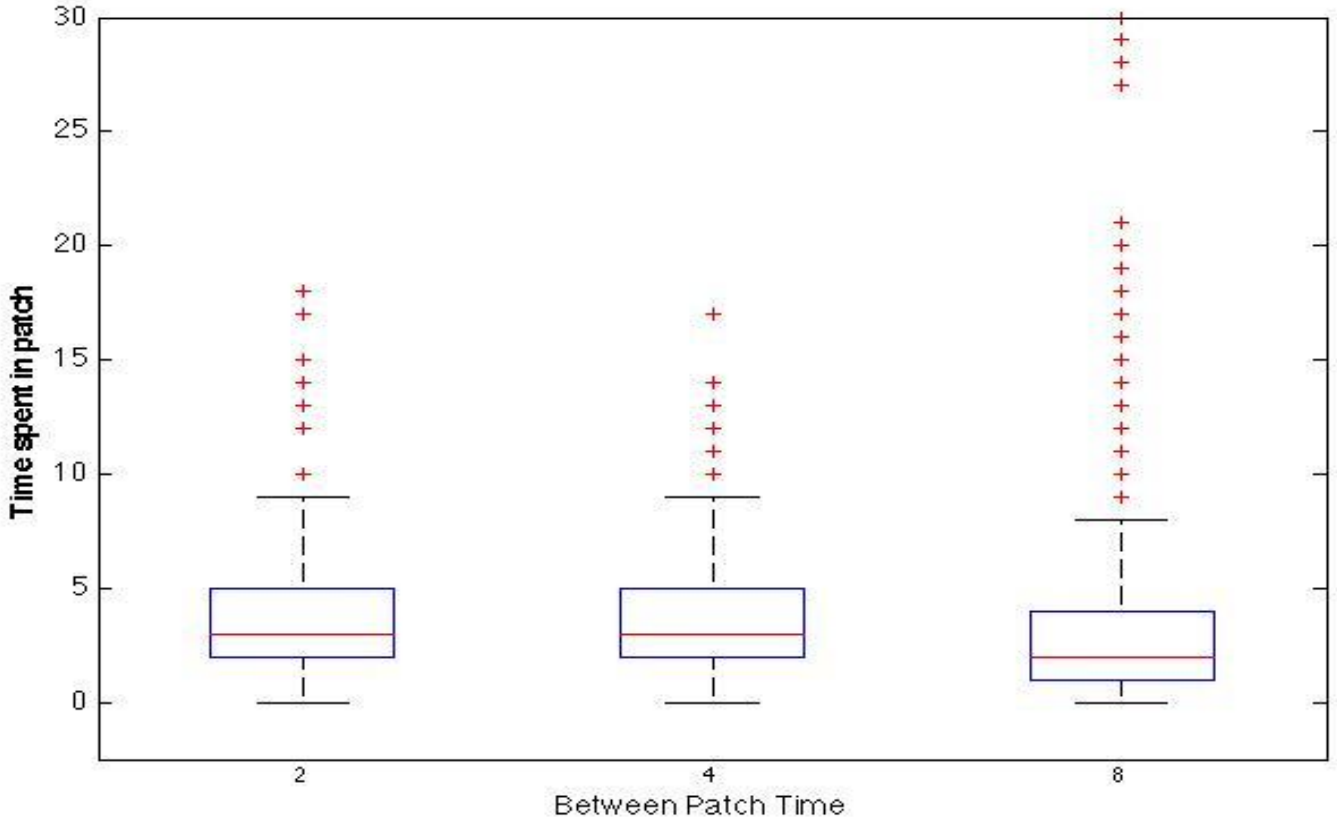
Other Theoretical Models

http://bit.ly/models-of-search

Theorise More
Model More

GO FISH

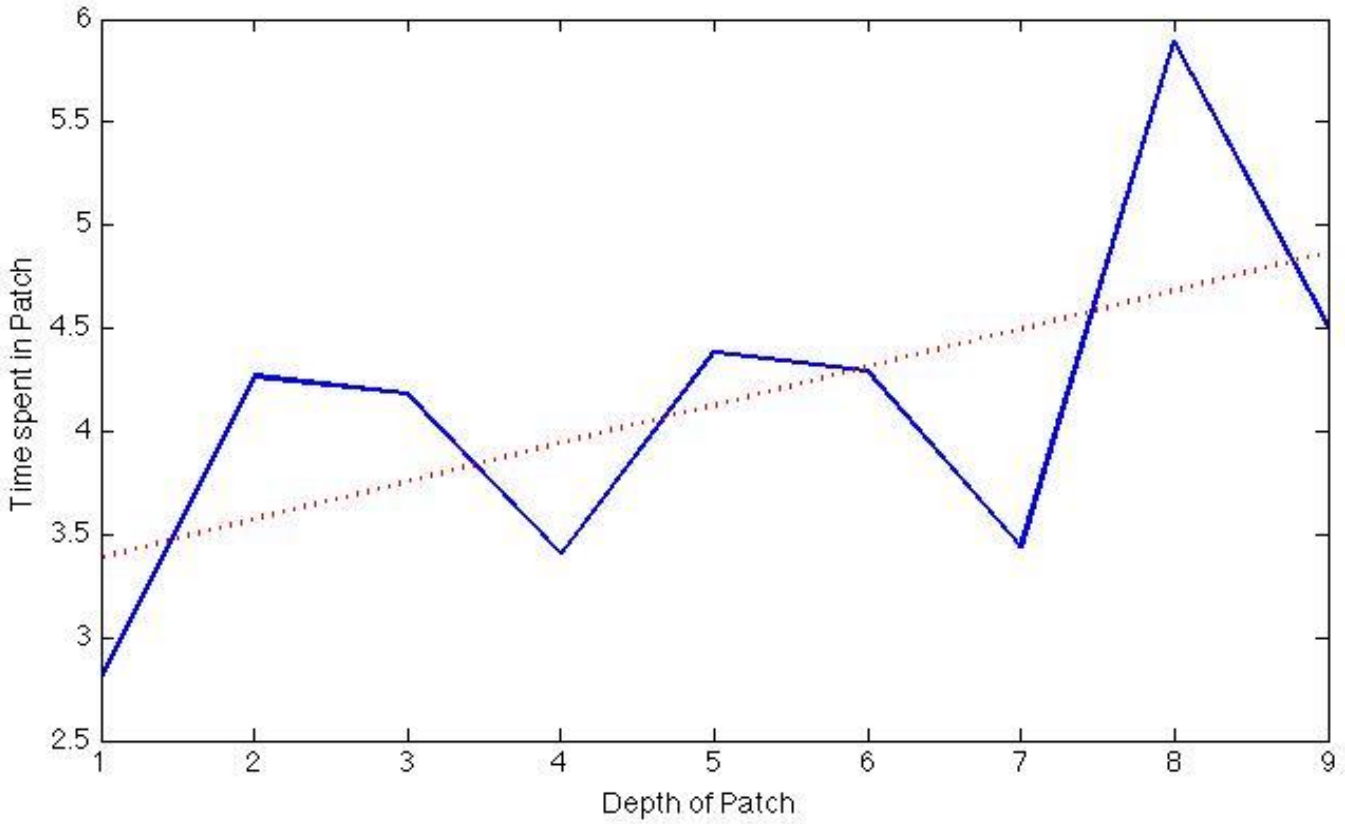
Do ESSIR 2015 participants search optimally?



How long it took to move to a new patch (2 , 4 and 8)

Time in patch v Move Cost

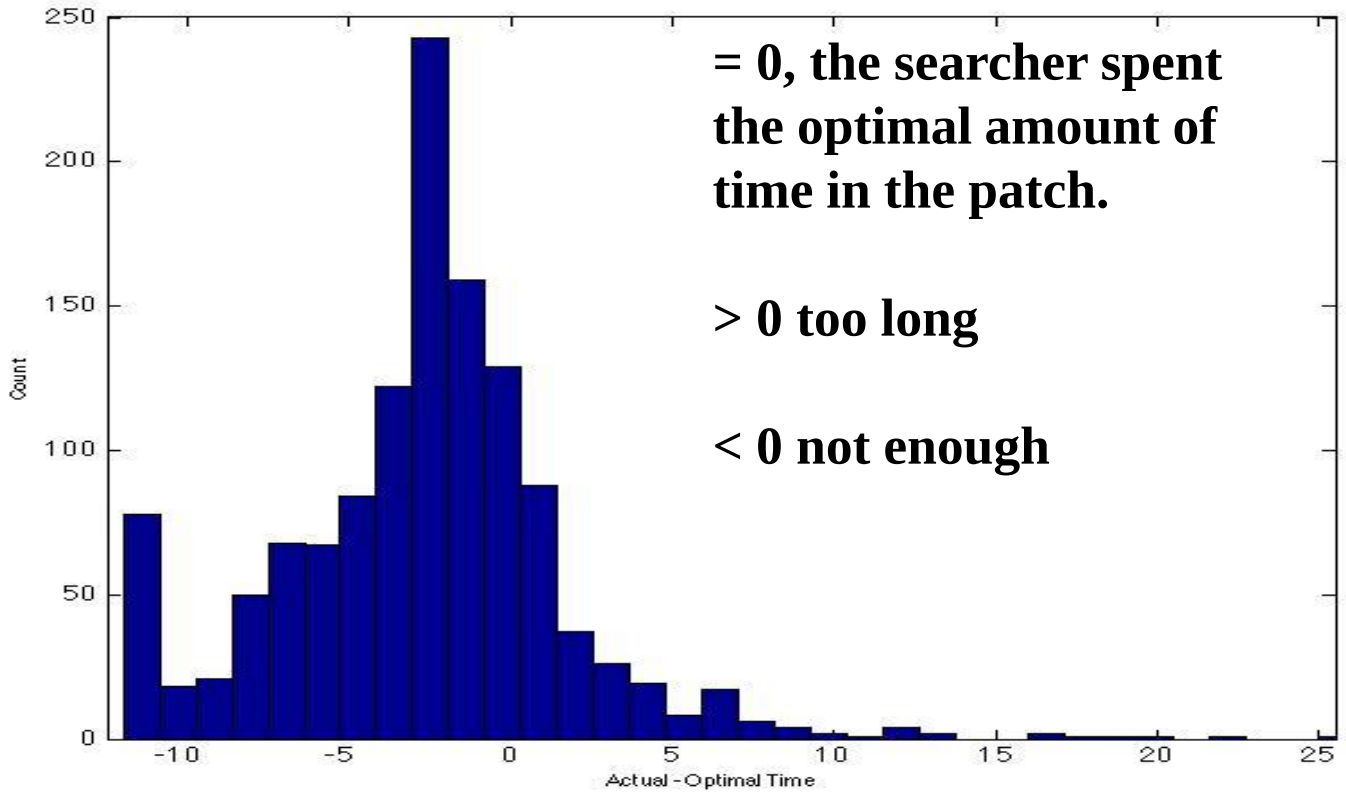
As move cost increases, foragers should spend longer in each patch. The players in the game were rather invariant to move cost!!



How deep the patch in the lake/river/sea was.

Time in Patch v Depth of Patch

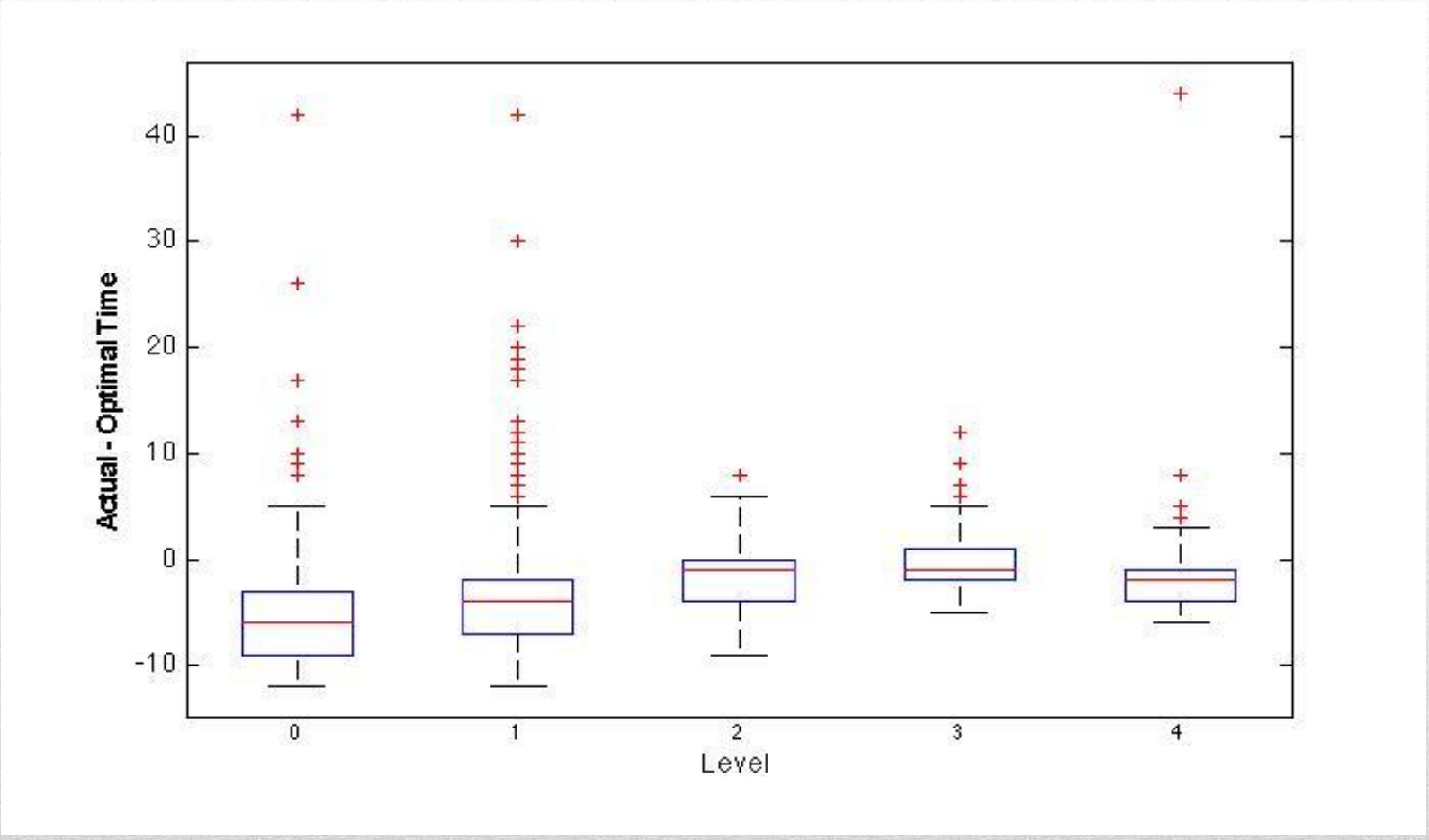
Depth in the patch has no bearing on how long one should stay. However, players tended to stay longer on deeper patches.



Most players stopped at -2, i.e. 2 less than the optimal.

Actual – Optimal

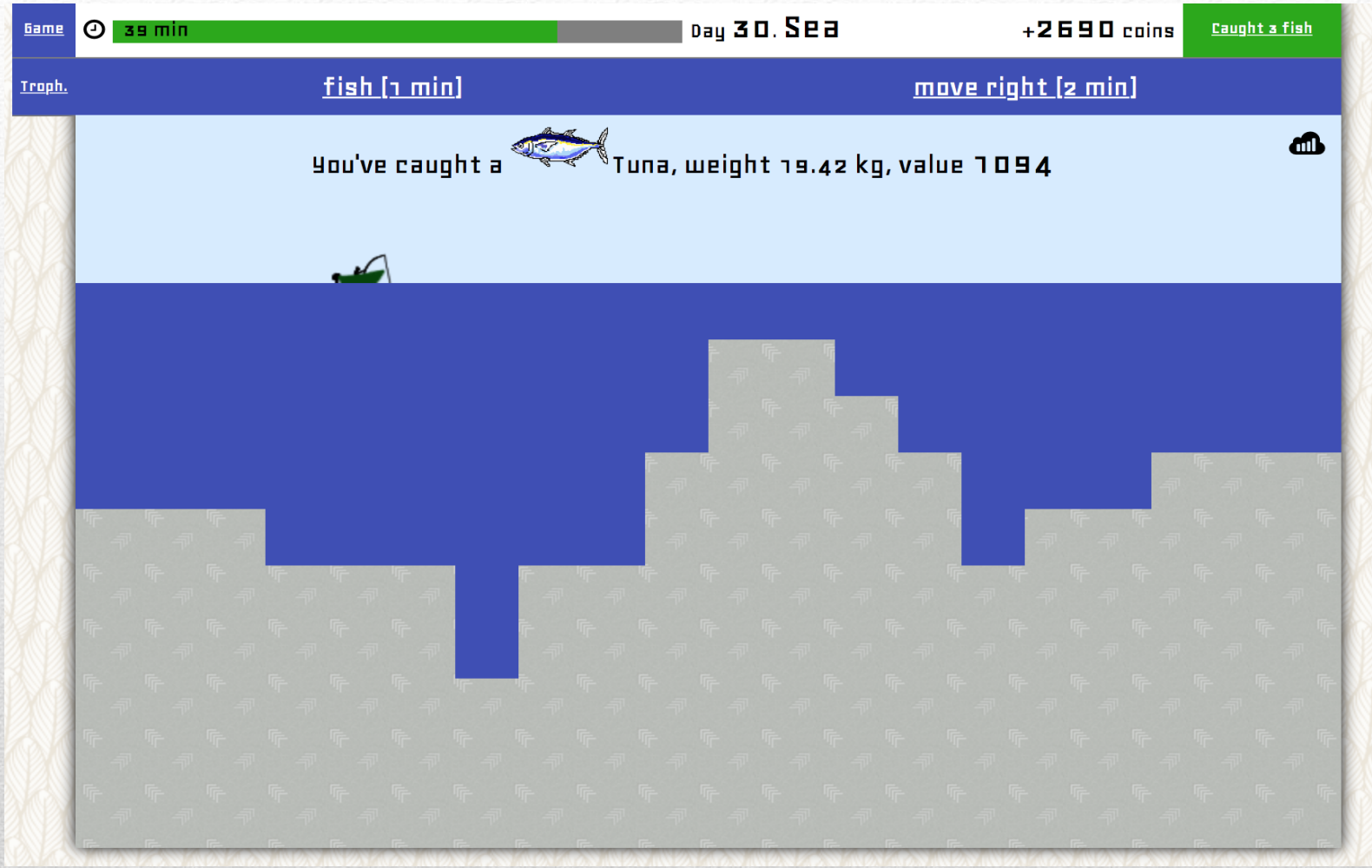
Most players don't spend long enough in the patch. Early stoppers!



Actual – Optimal over Levels

As level increases (more experience playing), the better players get.

Dig More



Depth vs. Breadth

A PhD is about depth. It is tempting and more exciting to go for breath!

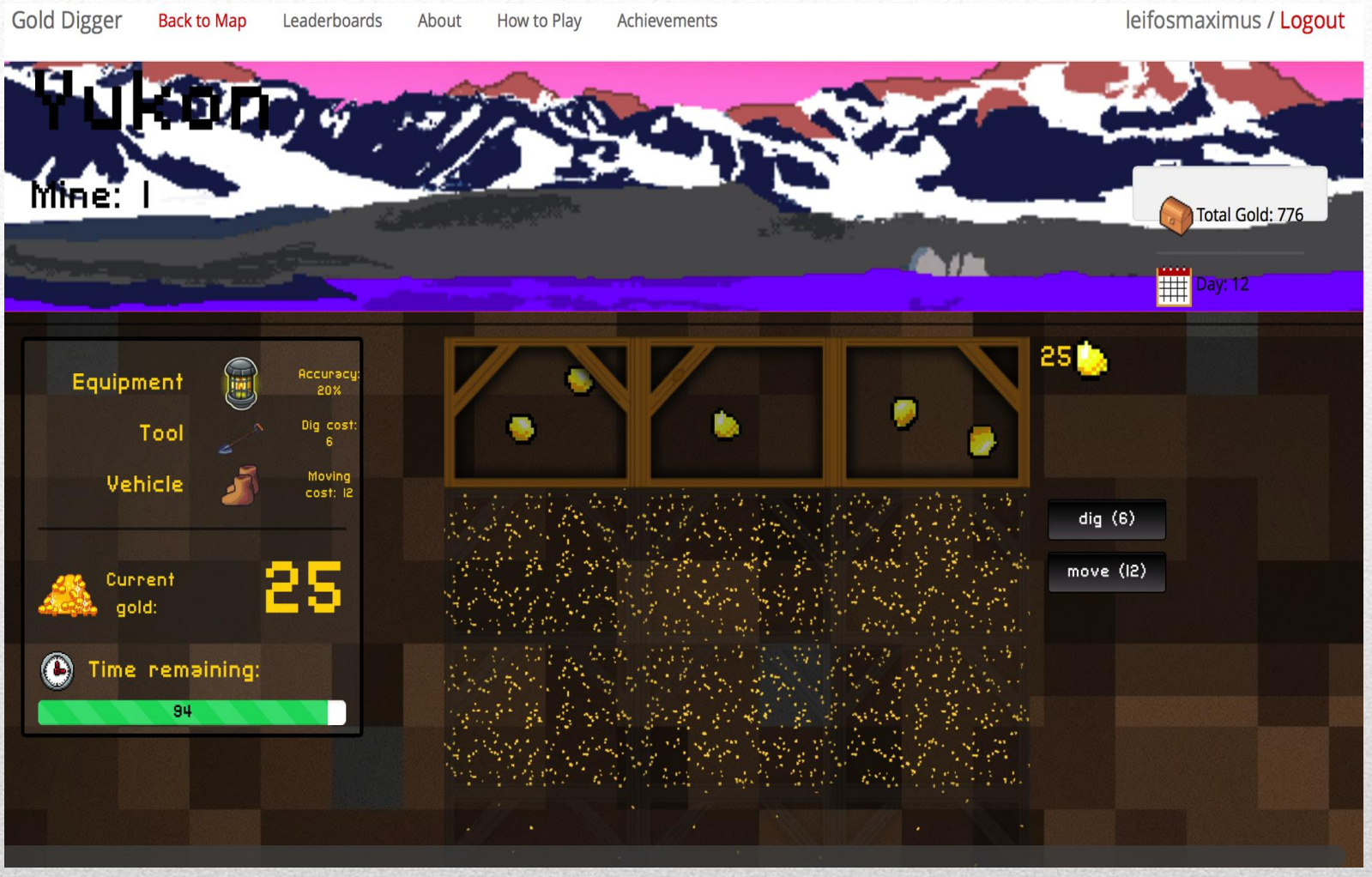
Twitter: @leifos

Web: www.leifos.org

Scholar: bit.ly/google-scholar-leifos

Shameless Self Promotion

Including your twitter handle, etc, lets people get in touch with you.



goldrush.pythonanywhere.com

Wants some more fun searching, this game has many more cues & tools!

References

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