

Rational Social Learning Makes Group Hiring More *Efficient* and *Biased*

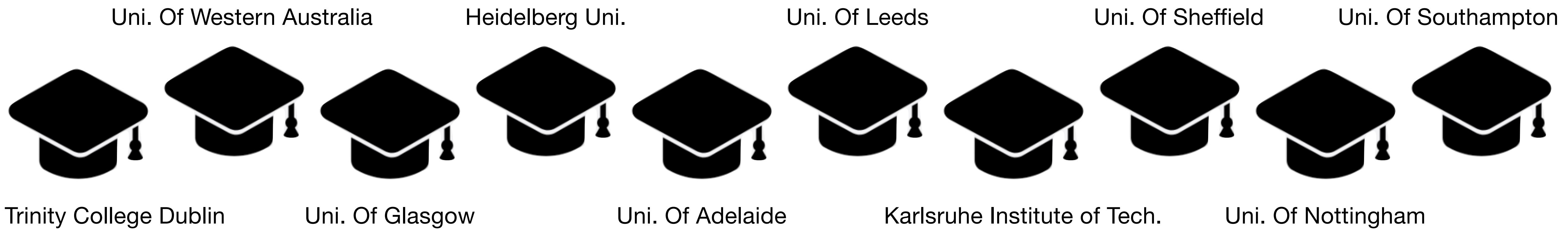
Xuechunzi Bai

Department of Psychology, The University of Chicago

APS, May 28-30, Barcelona, Spain, Symposium on Advances in Computational Social Cognition

Hiring: Iterative and collaborative

Hiring: **Iterative** and collaborative



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Uni. Of Western Australia



Trinity College Dublin

Uni. Of Glasgow



Heidelberg Uni.



Uni. Of Adelaide

Uni. Of Leeds



Karlsruhe Institute of Tech.

Uni. Of Sheffield



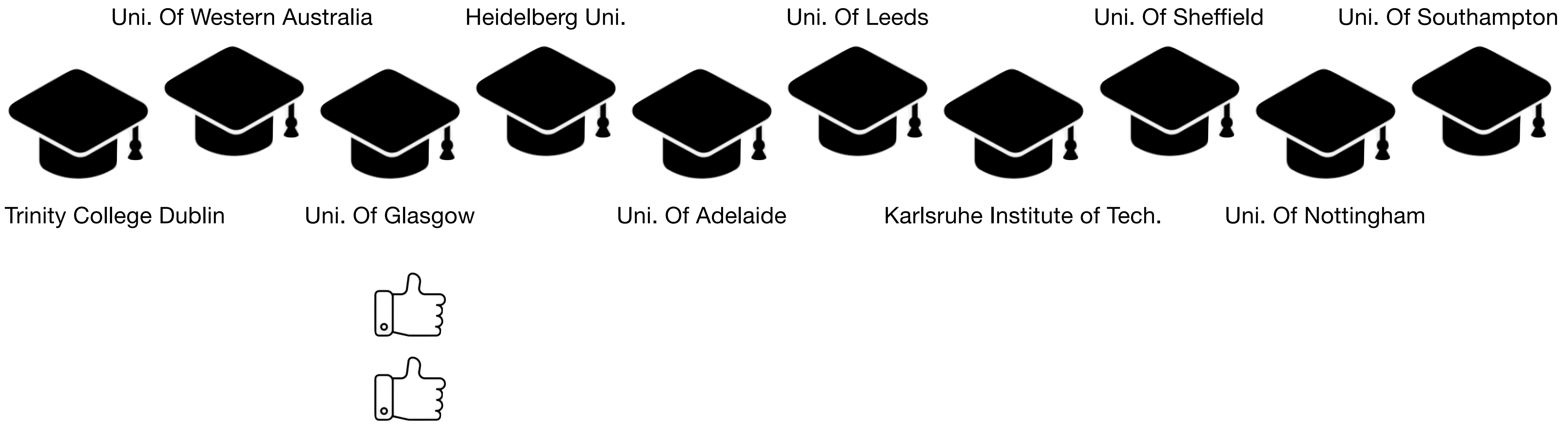
Uni. Of Nottingham

Uni. Of Southampton

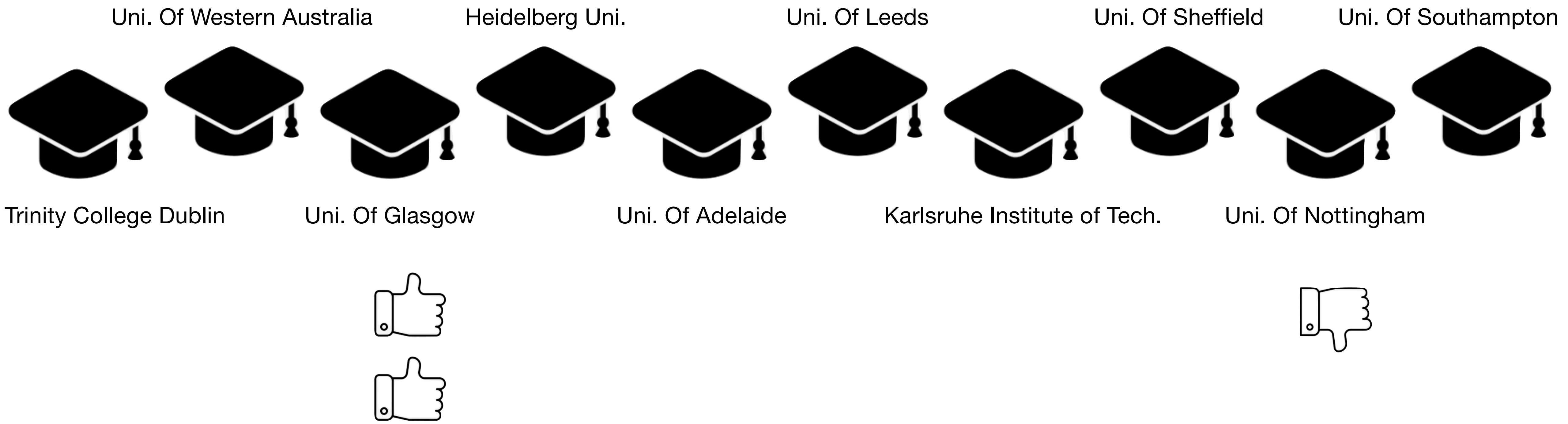




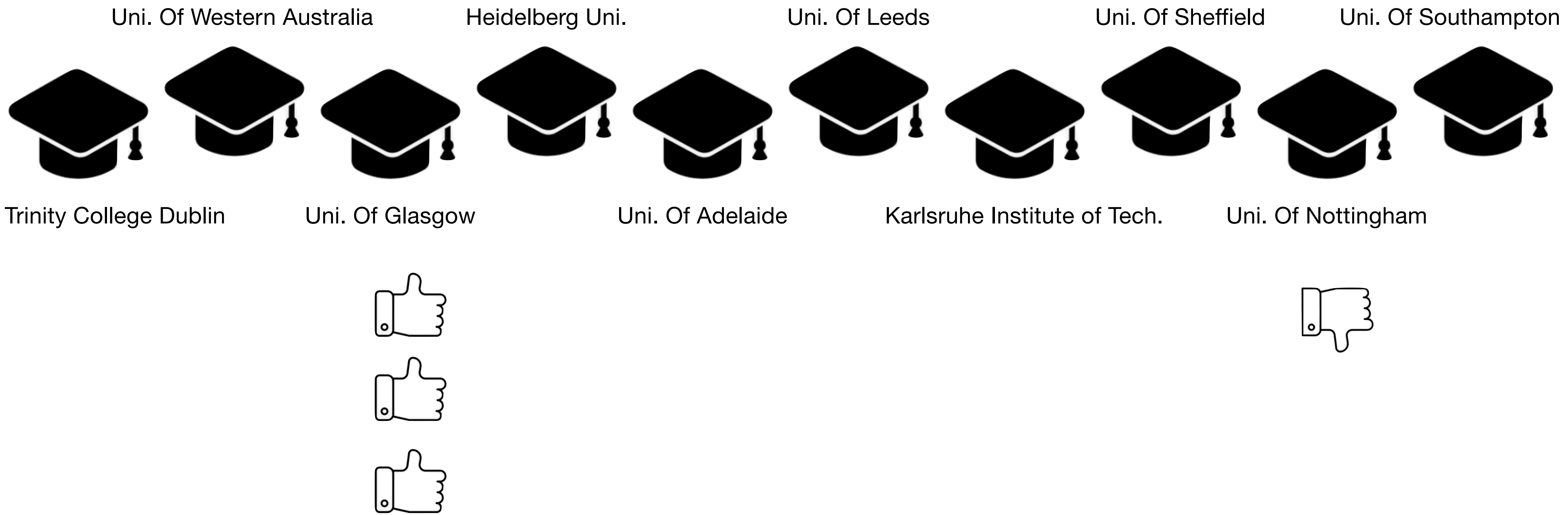
Hiring: **Iterative** and collaborative



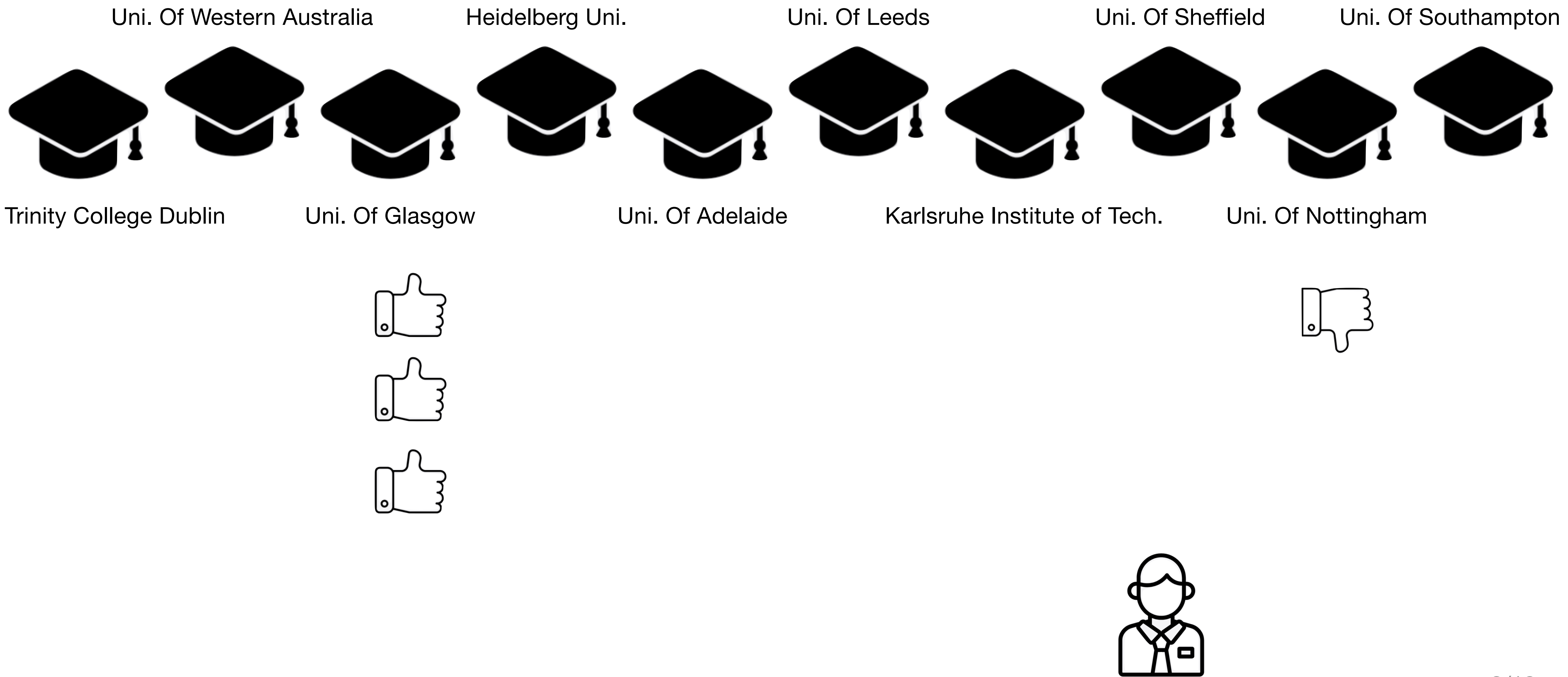
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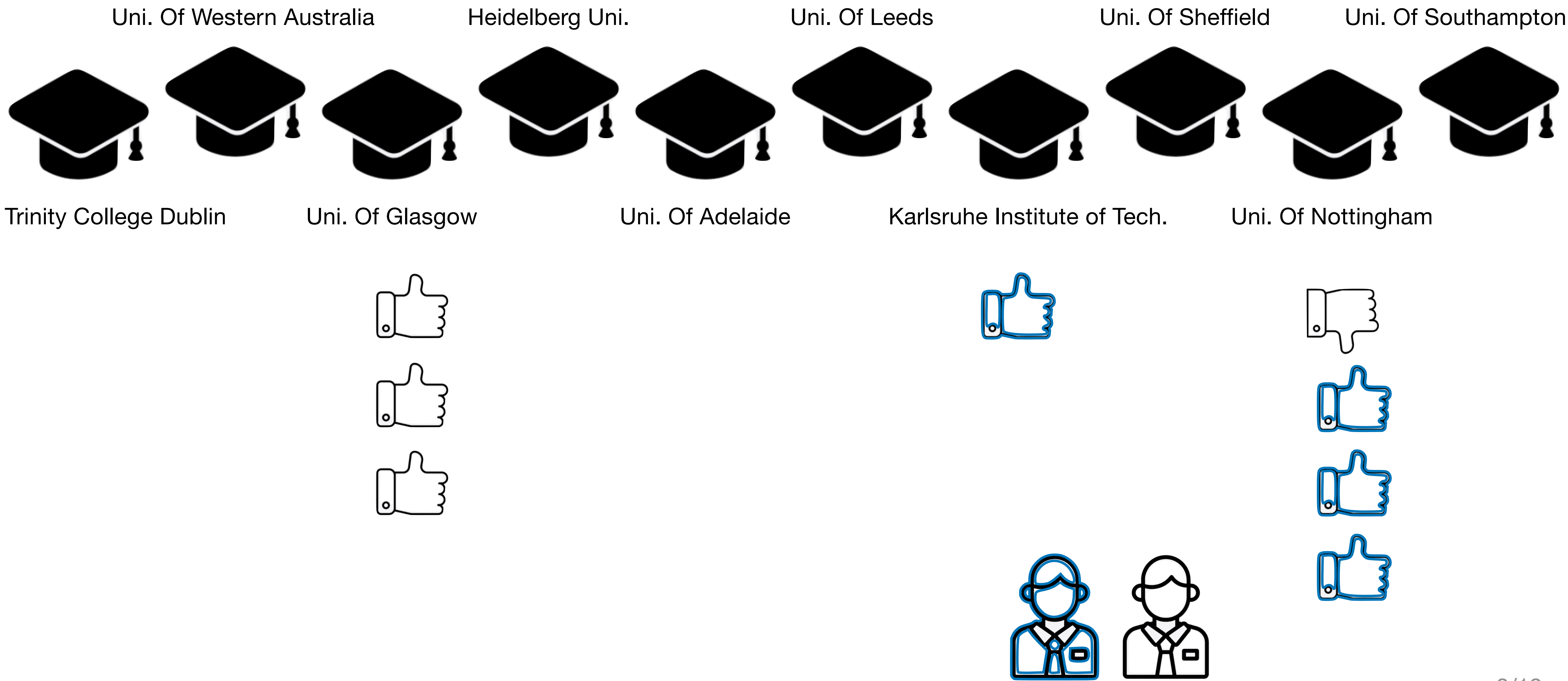
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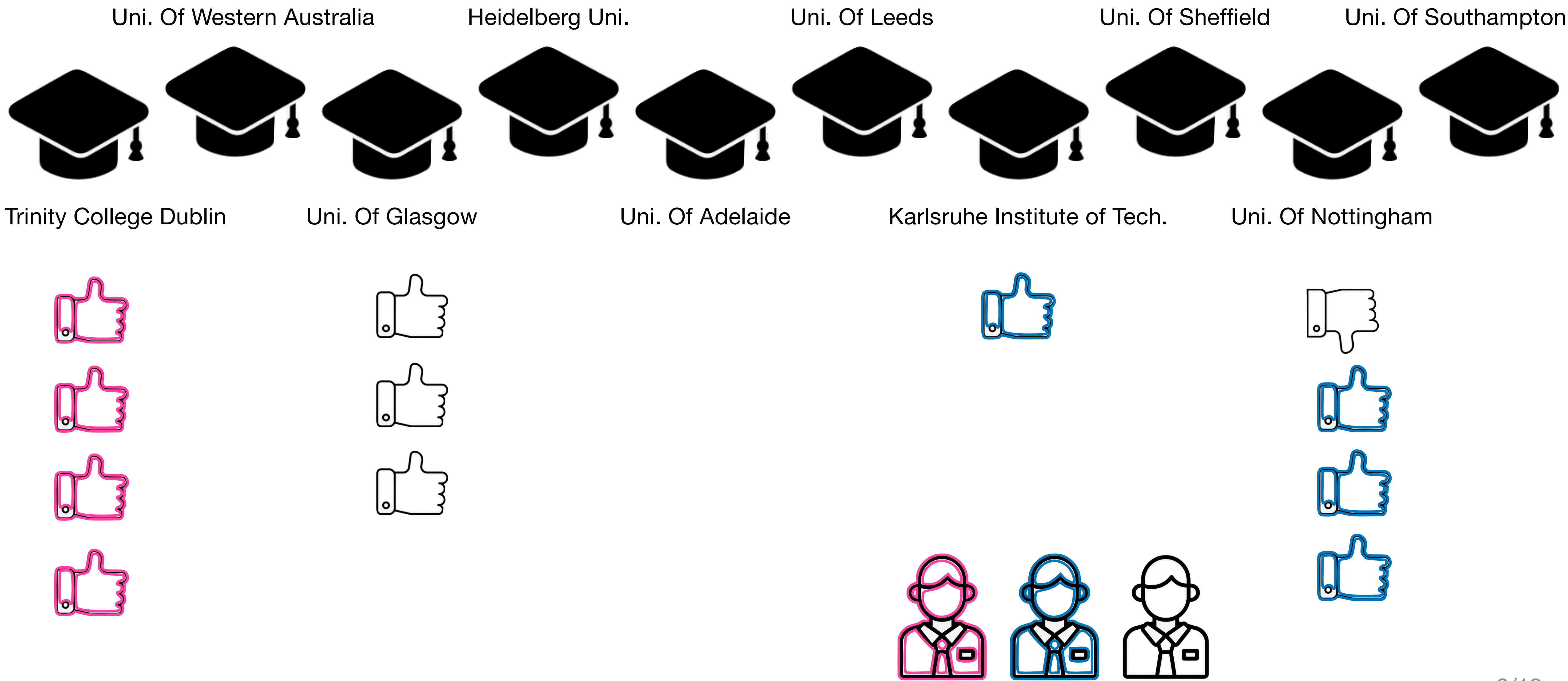
Hiring: Iterative and collaborative



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Prior mechanisms: Bias in transmission

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- People **compress** or **distort** what they share (Lyons & Kashima, 2003)

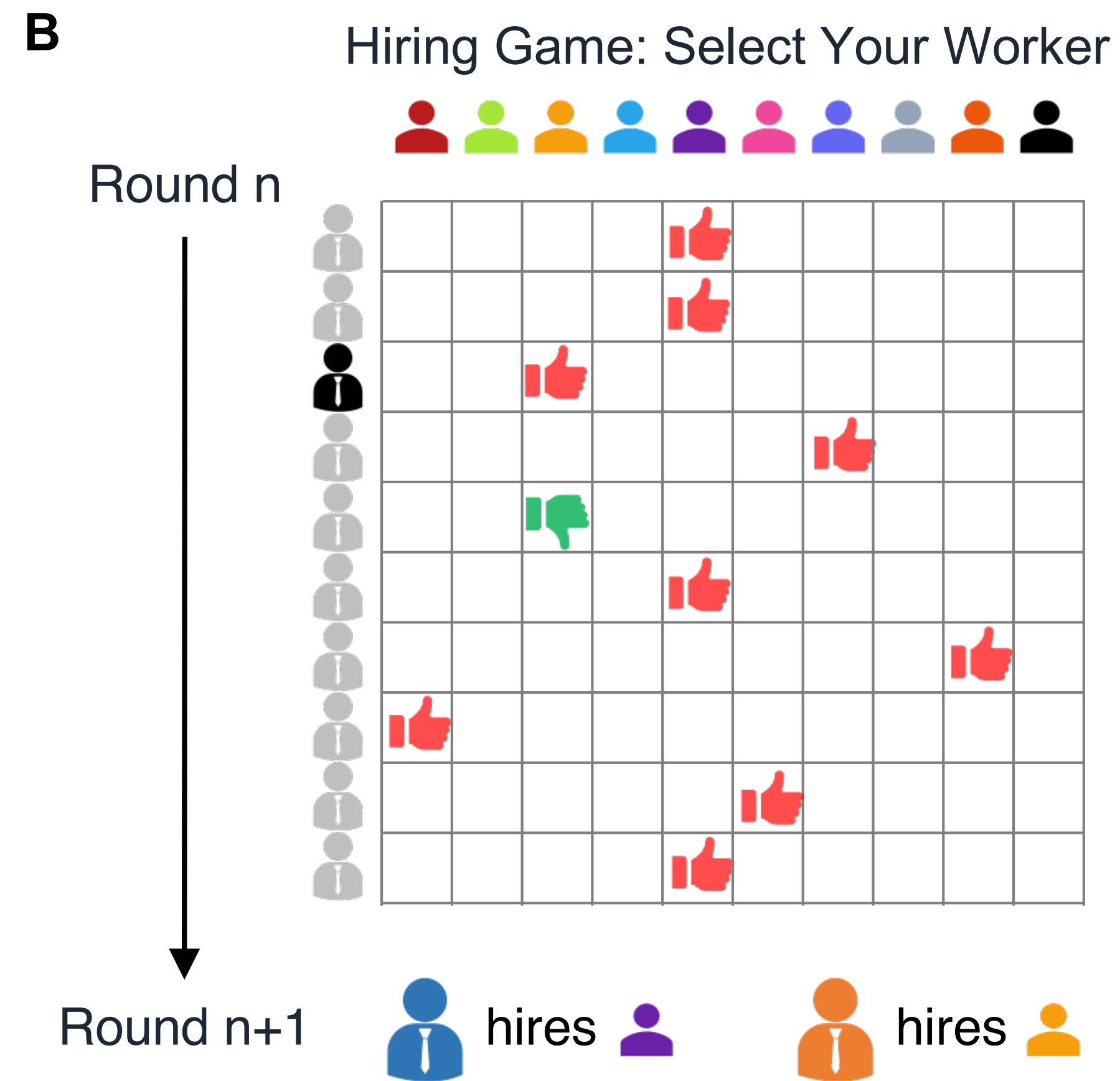
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- People share information **selectively** (Bikhchandani, Hirshleifer, & Welch, 1992)
- People **compress** or **distort** what they share (Lyons & Kashima, 2003)
- People are **not connected to everyone** in a given network (McPherson, Smith-Lovin, & Cook, 2001)

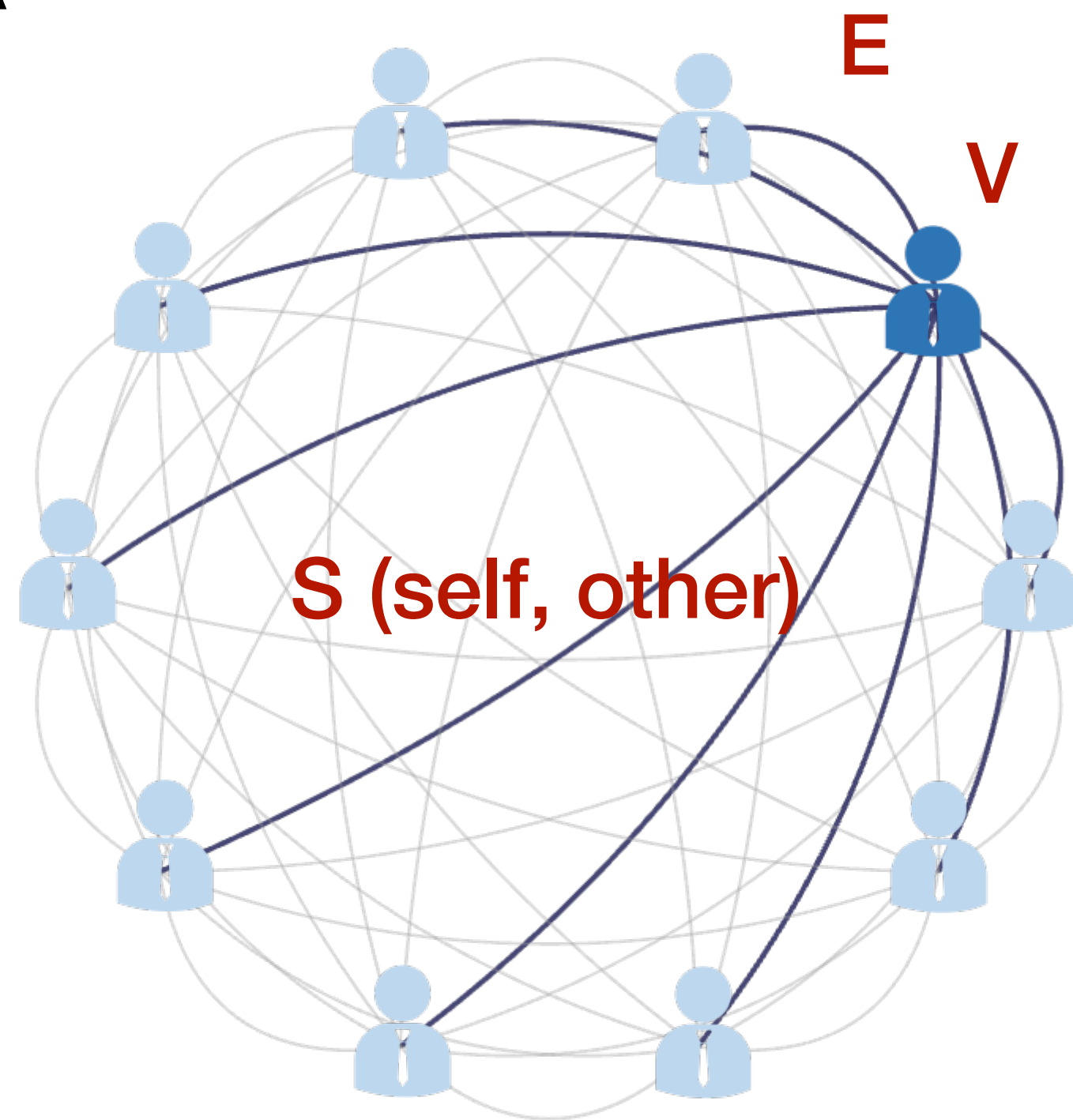
Our mechanism: Rational social learning

Formalism: Multi-Agent **Multi-Armed Bandit**



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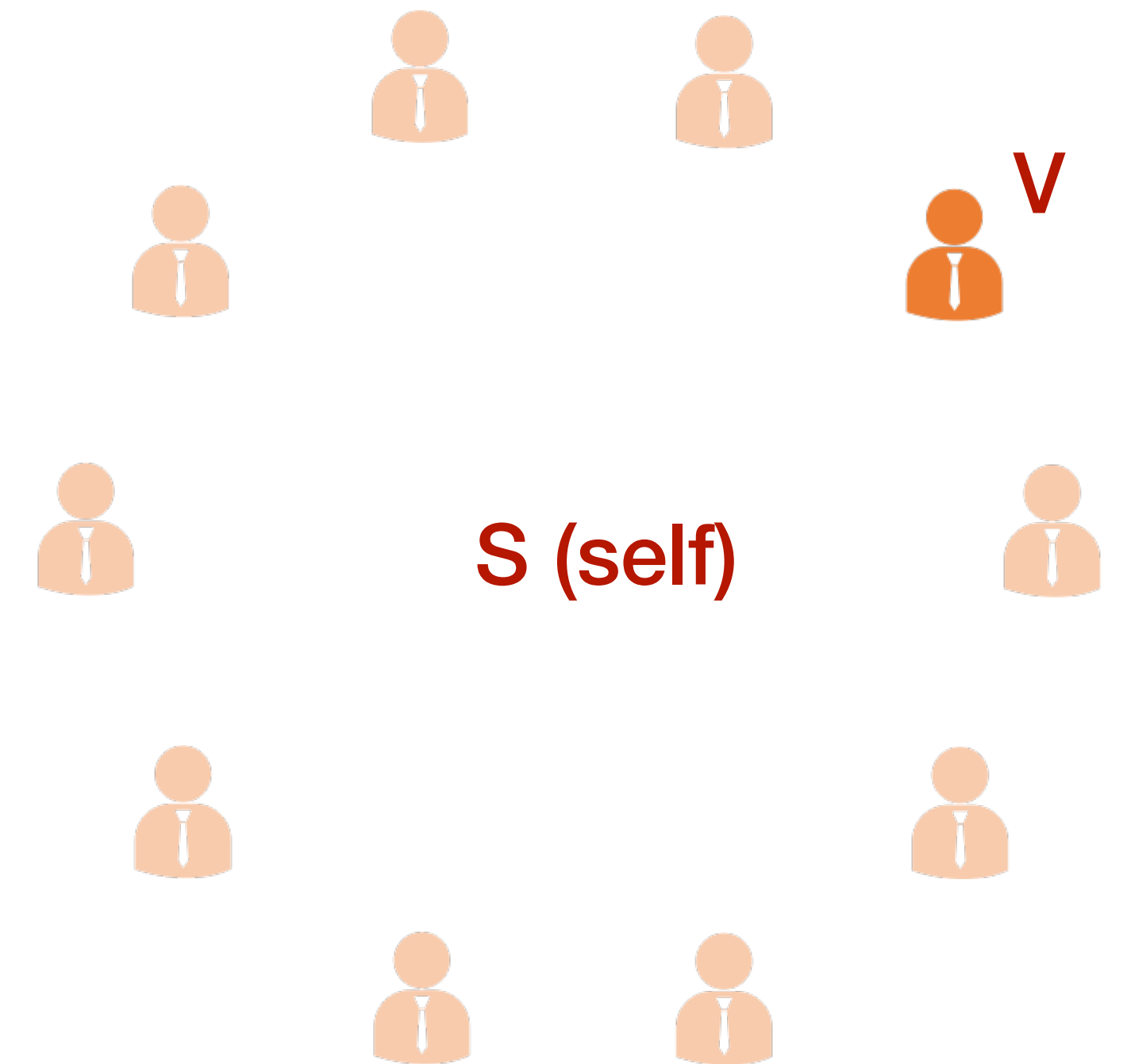
A



Social Learning

$$G = (V, E)$$

C



Asocial Learning

$$G = (V, \emptyset)$$

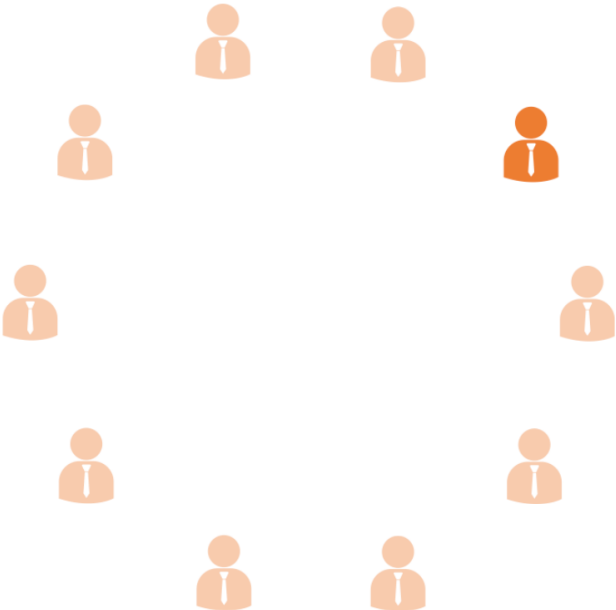
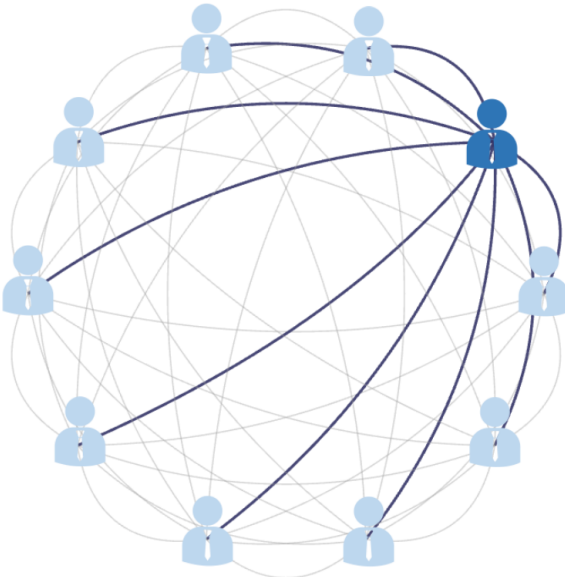
Hypothesis: 2 x 2 Design



Multiple Optimal Groups

Social Learning

Asocial Learning

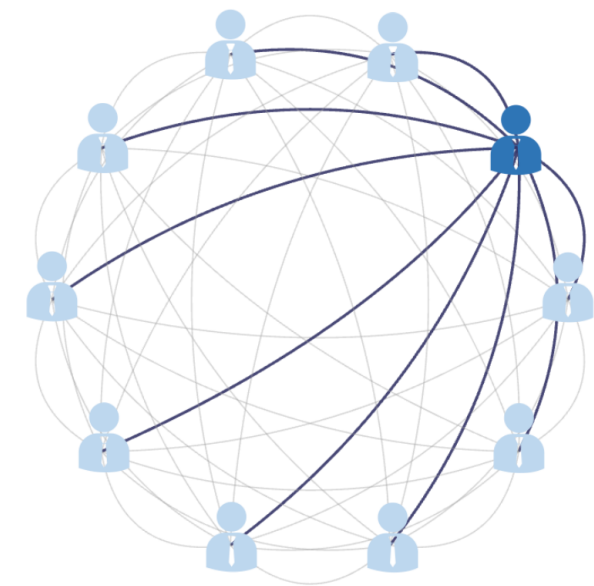


One Optimal Group

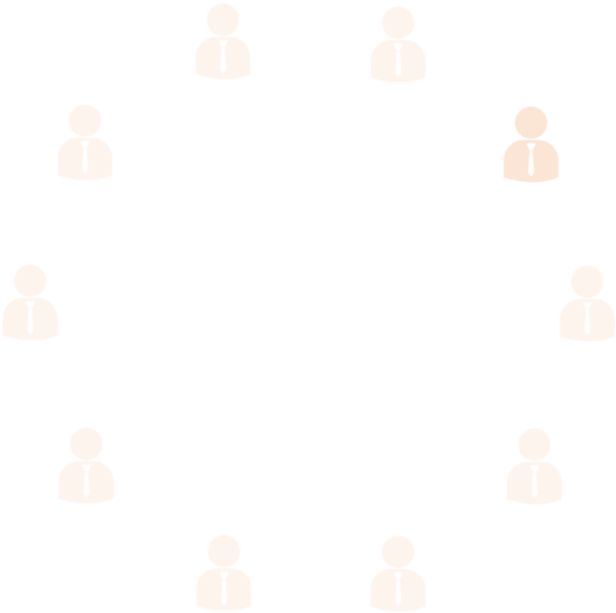
Hypothesis: 2 x 2 Design



Social Learning



Group hiring improves **efficiency**



One Optimal Group

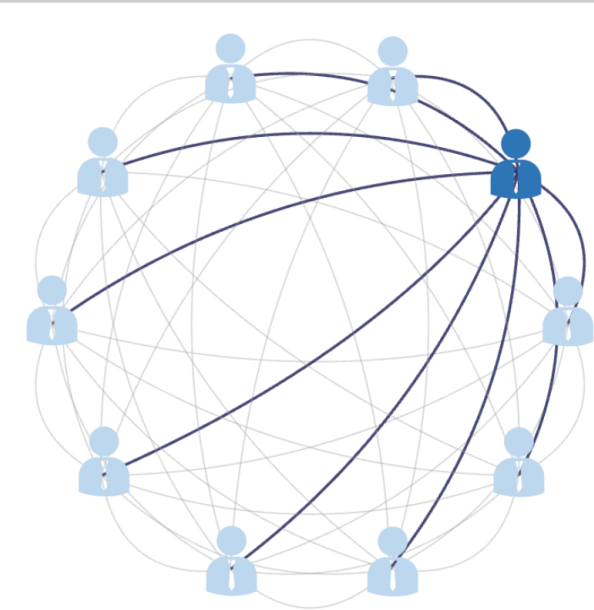
Hypothesis: 2 x 2 Design



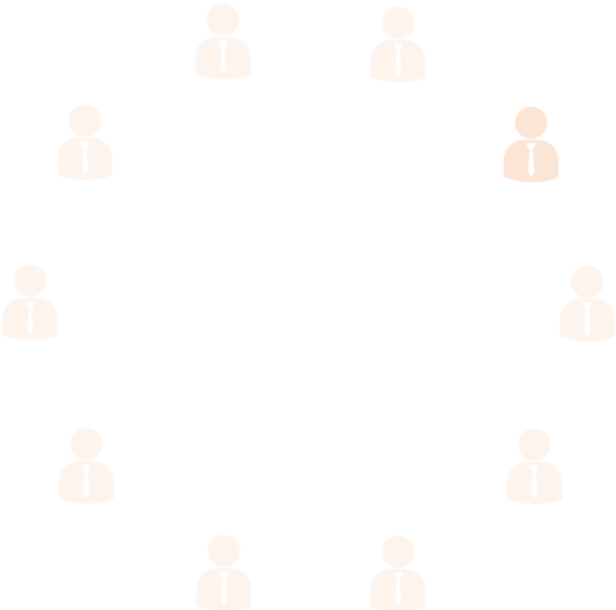
Multiple Optimal Groups

Group hiring generates **bias**

Social Learning



Group hiring improves **efficiency**

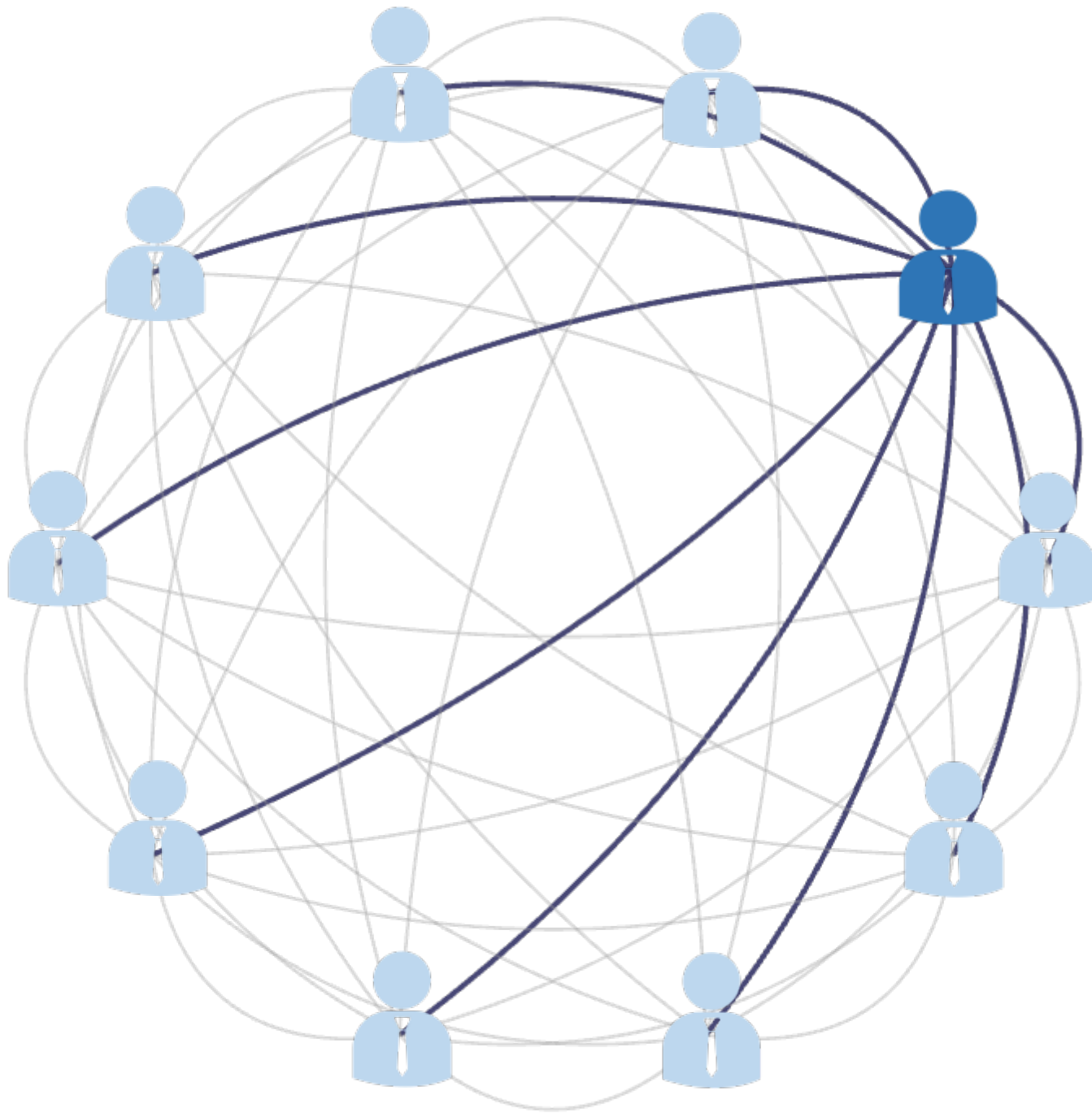


One Optimal Group

Results: Across 4 types of agents

I. Bayesian Rational Learners

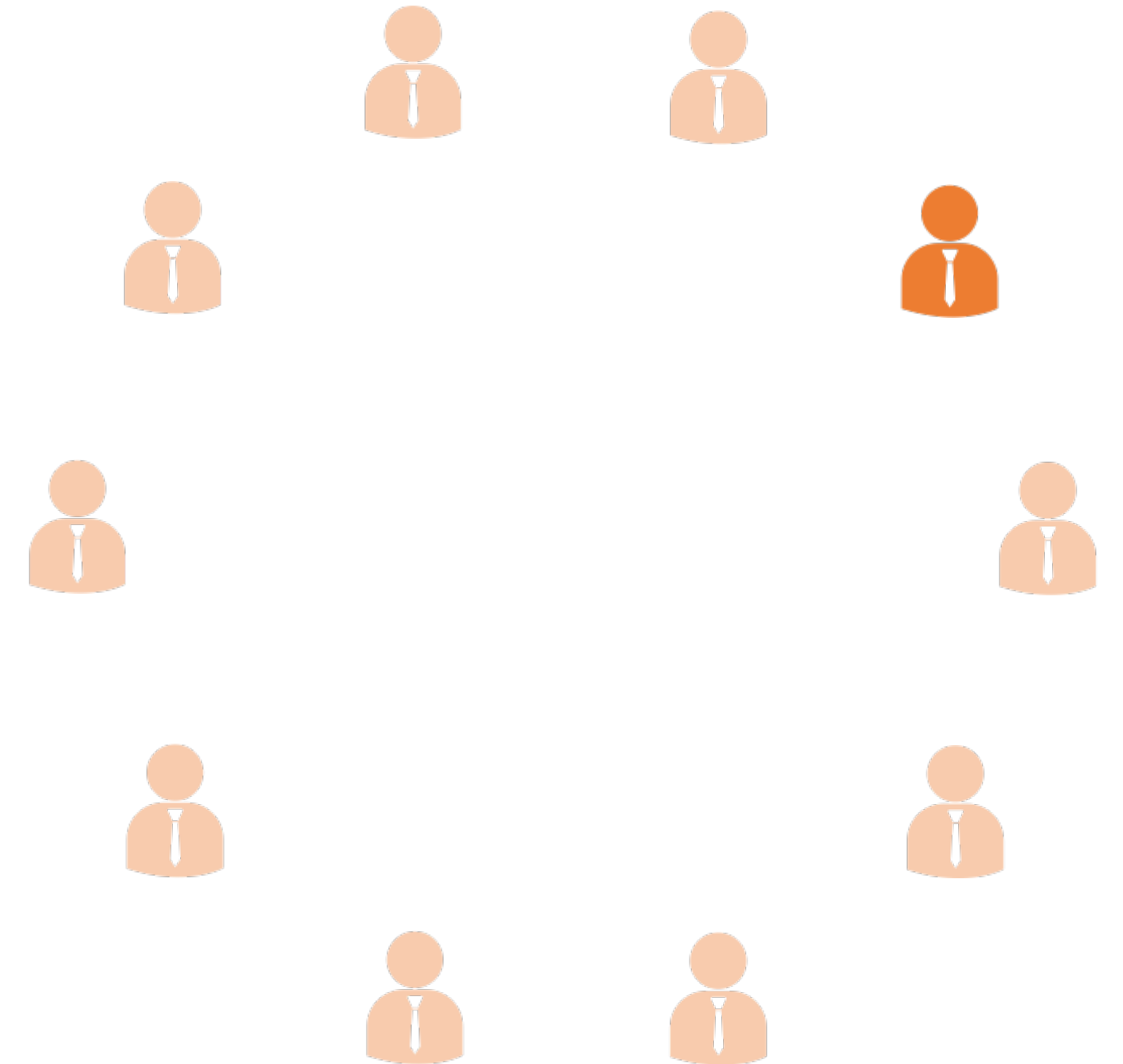
A



Social Learning

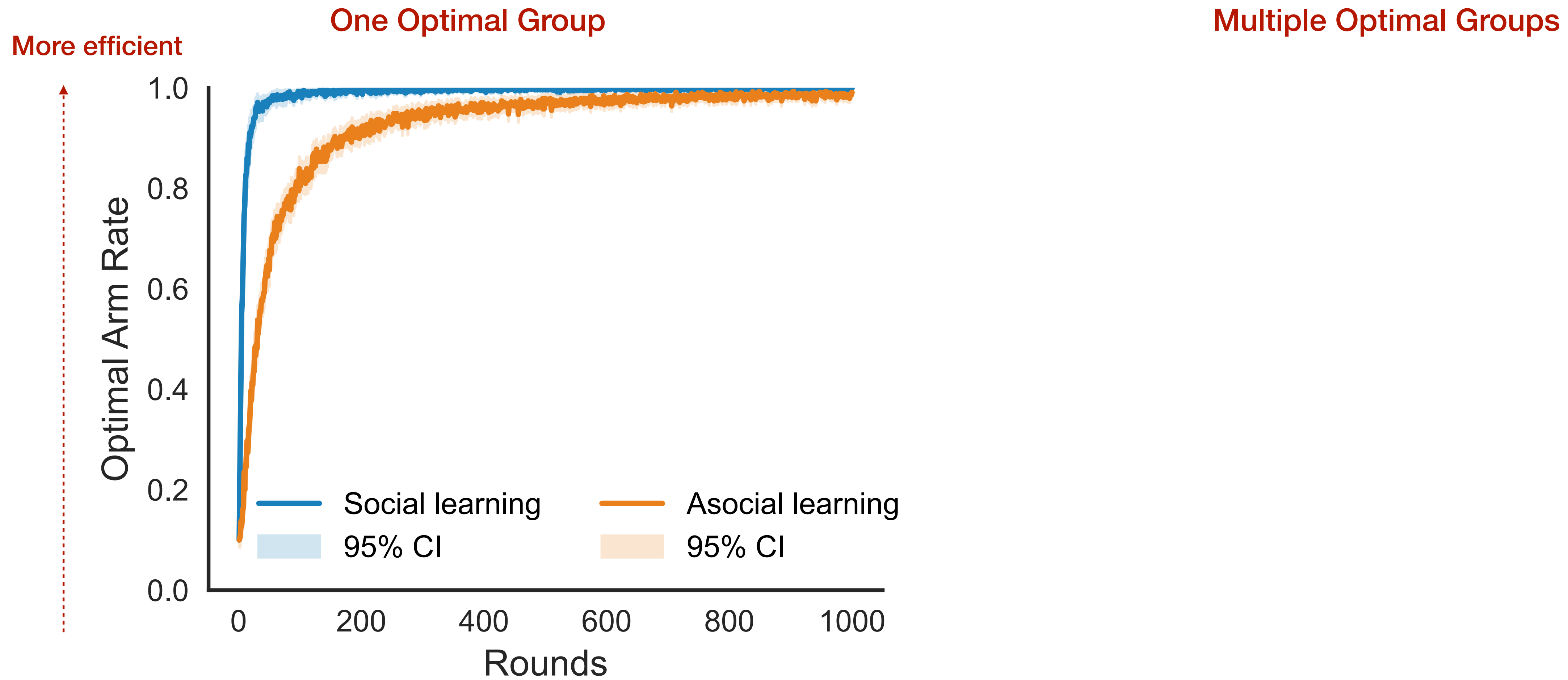
$$P(A | B) = \frac{P(B | A)P(A)}{P(B)}$$

C

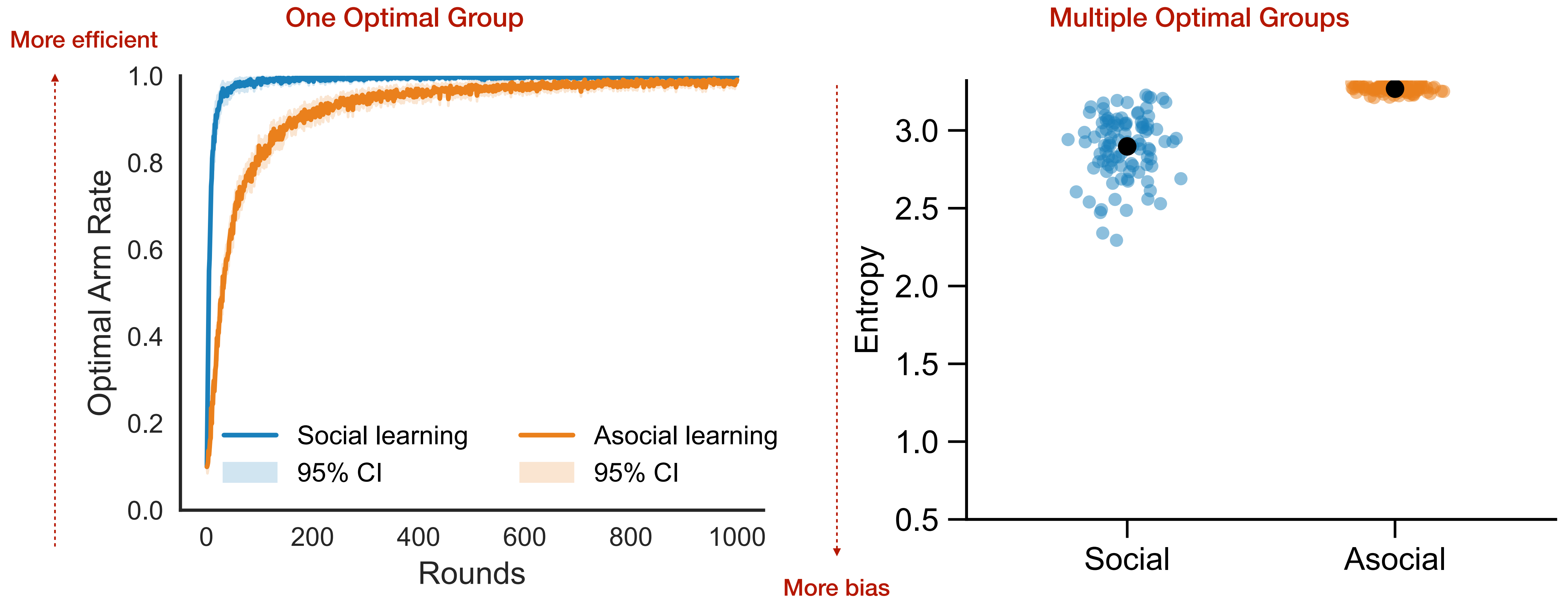


Asocial Learning

I. Bayesian Rational Learners



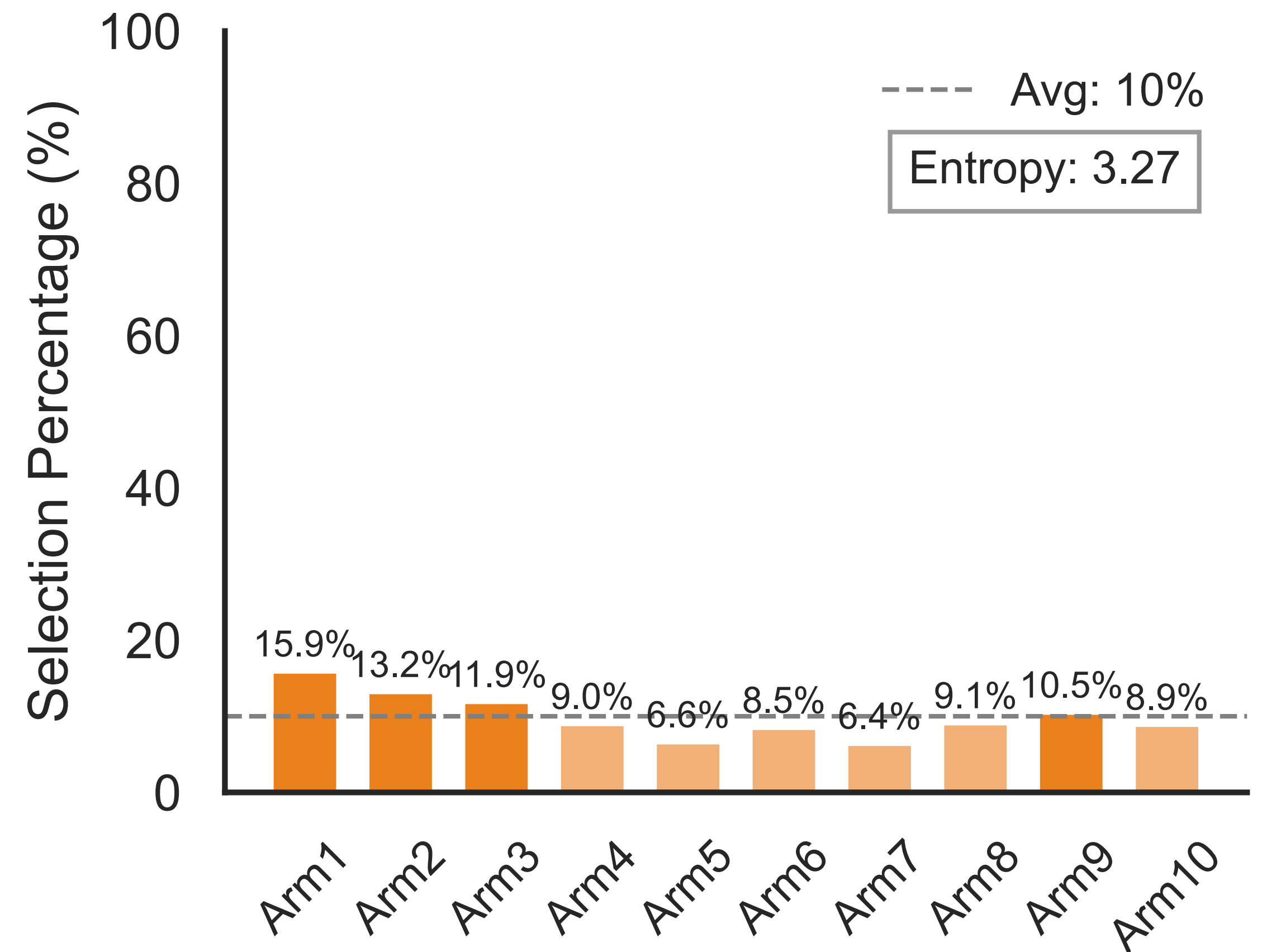
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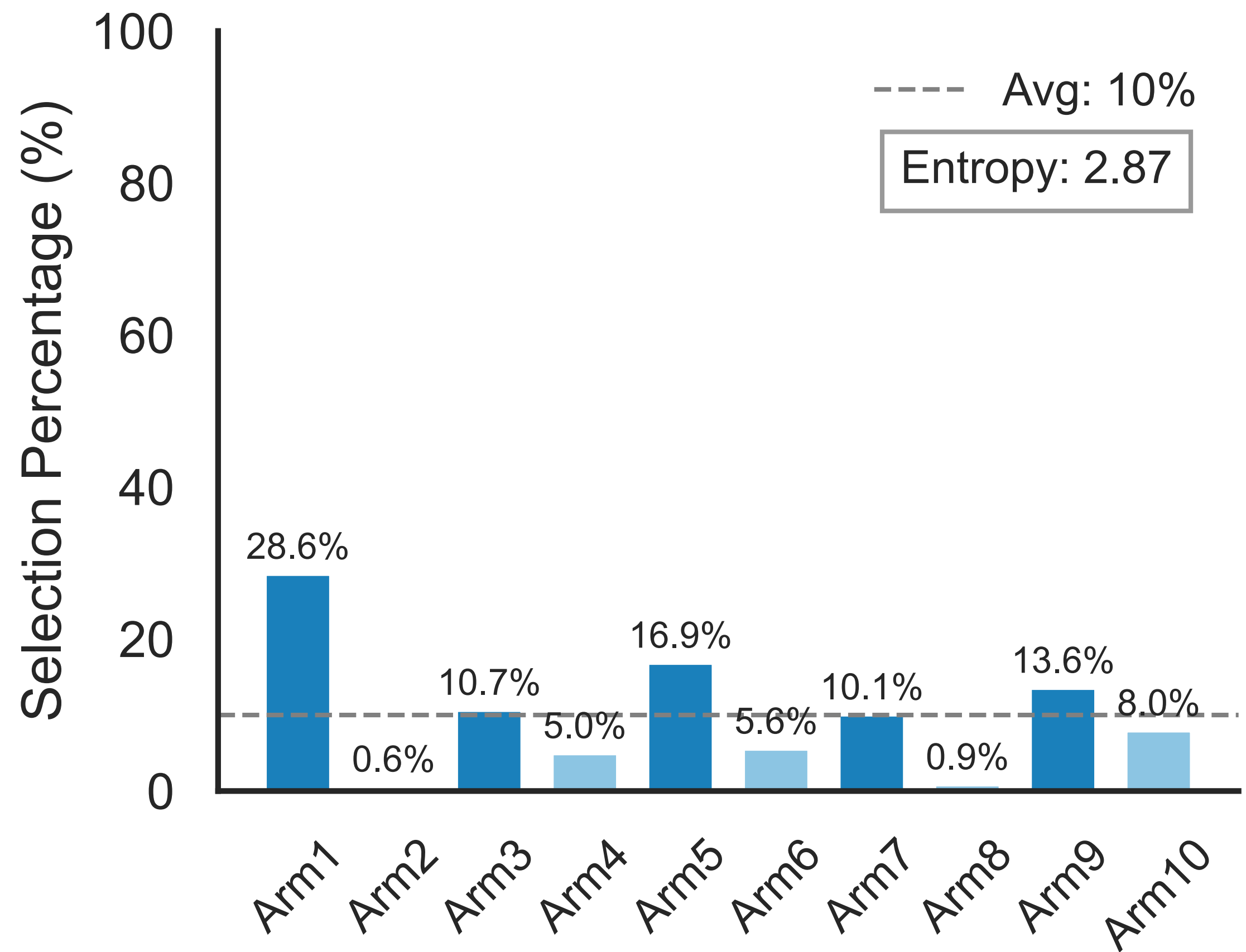
Social Learning

Asocial Learning

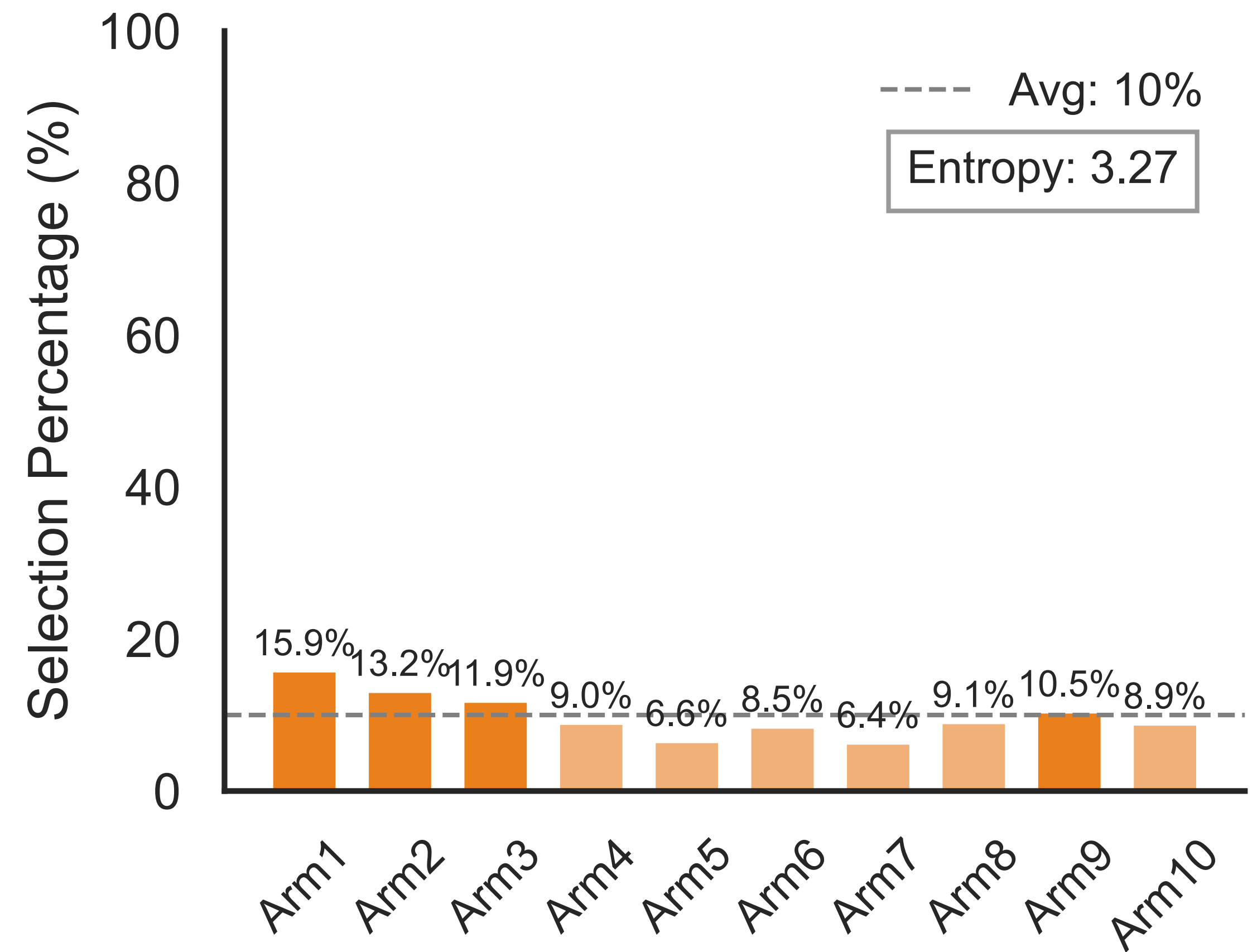


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Social Learning

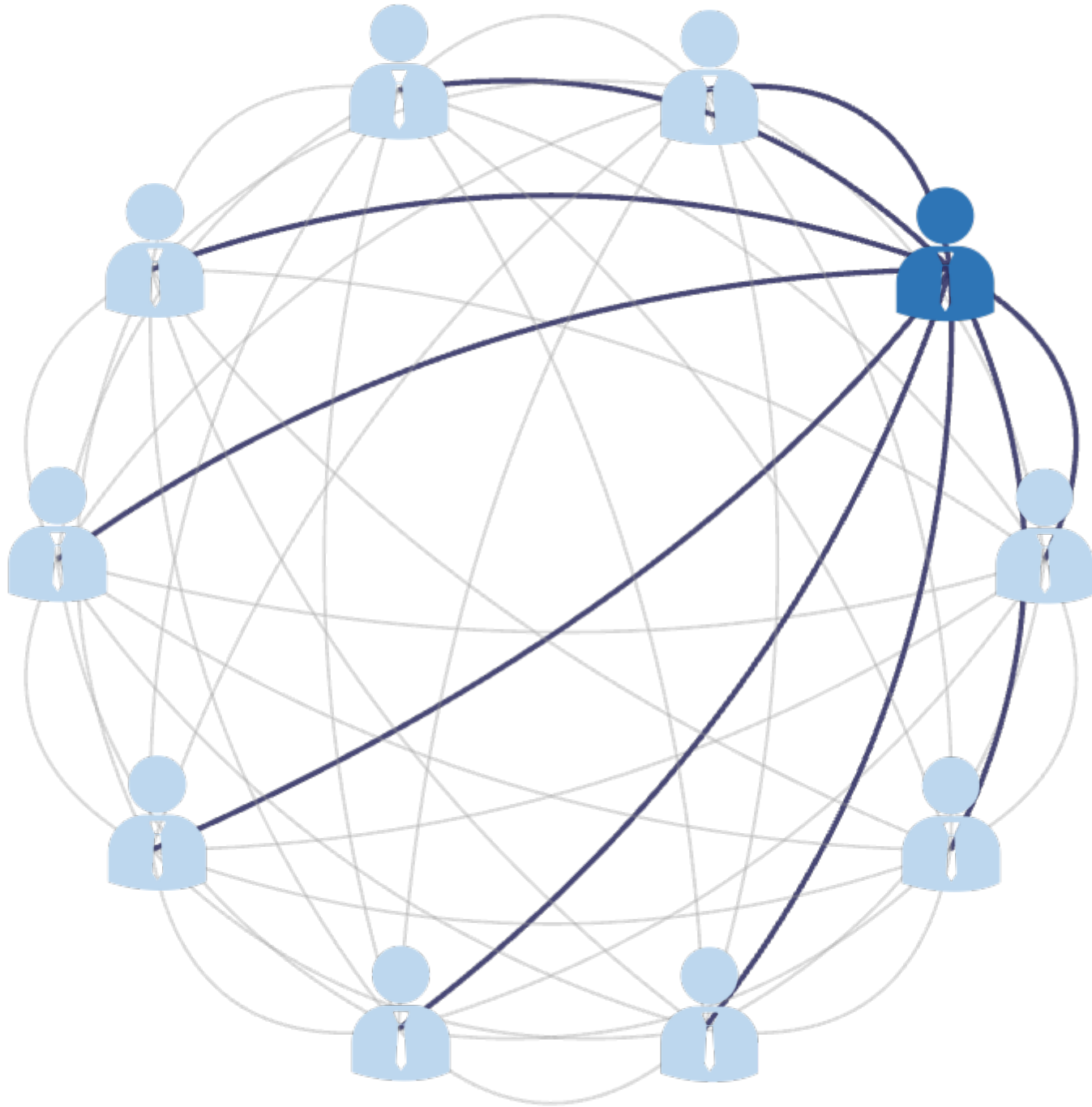


Asocial Learning



II. **LLM** (GPT-4o) Agents

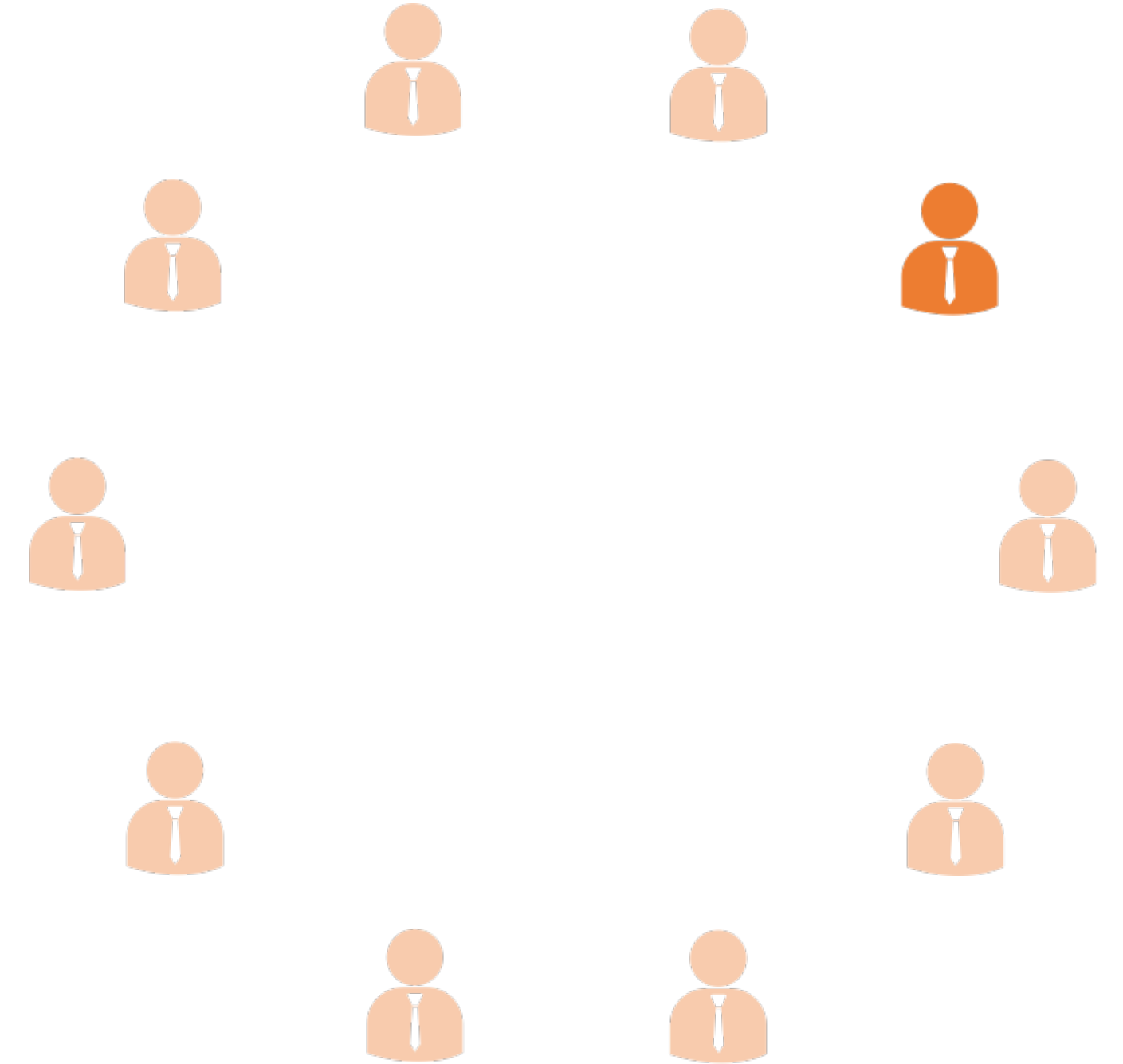
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Social Learning



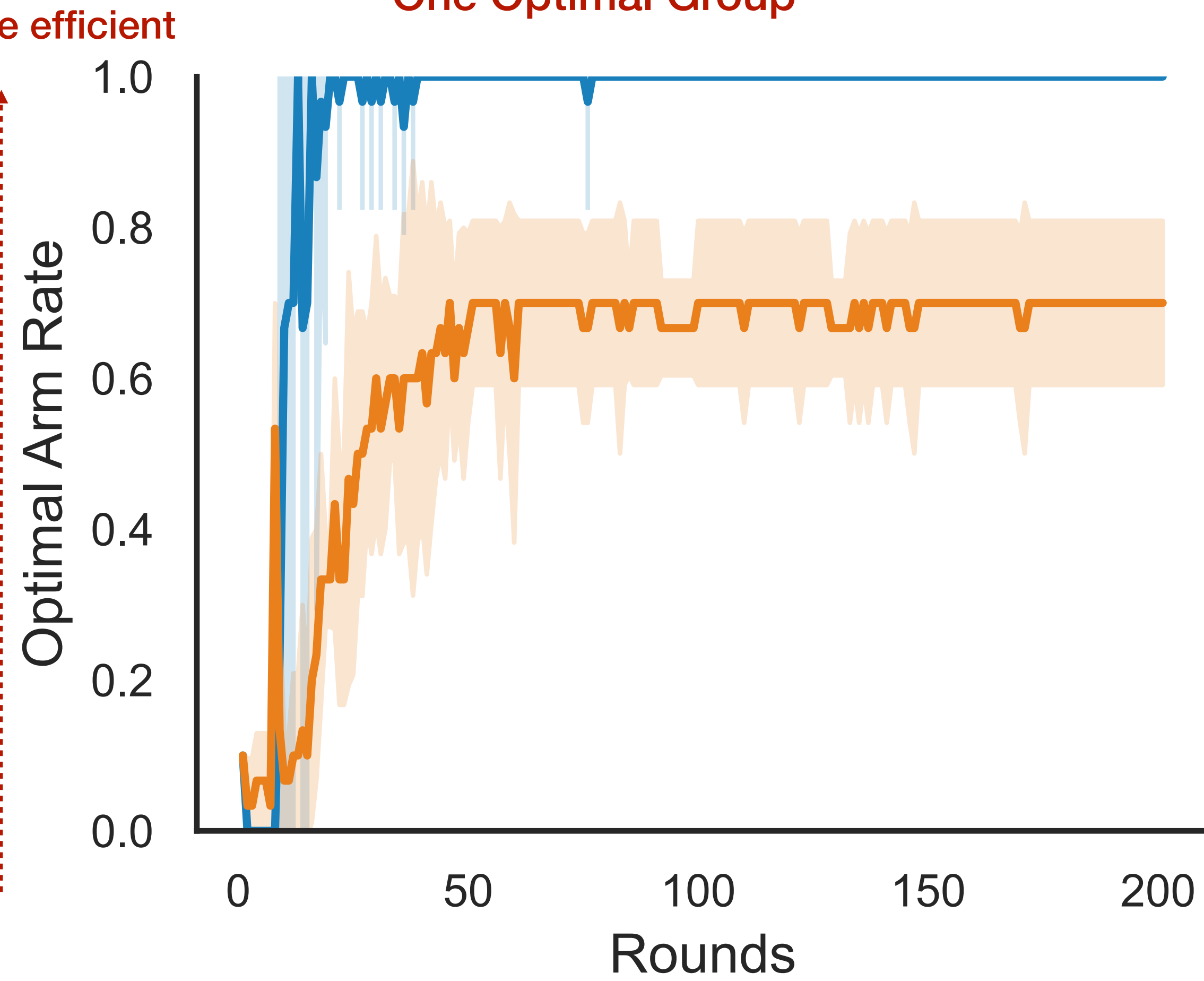
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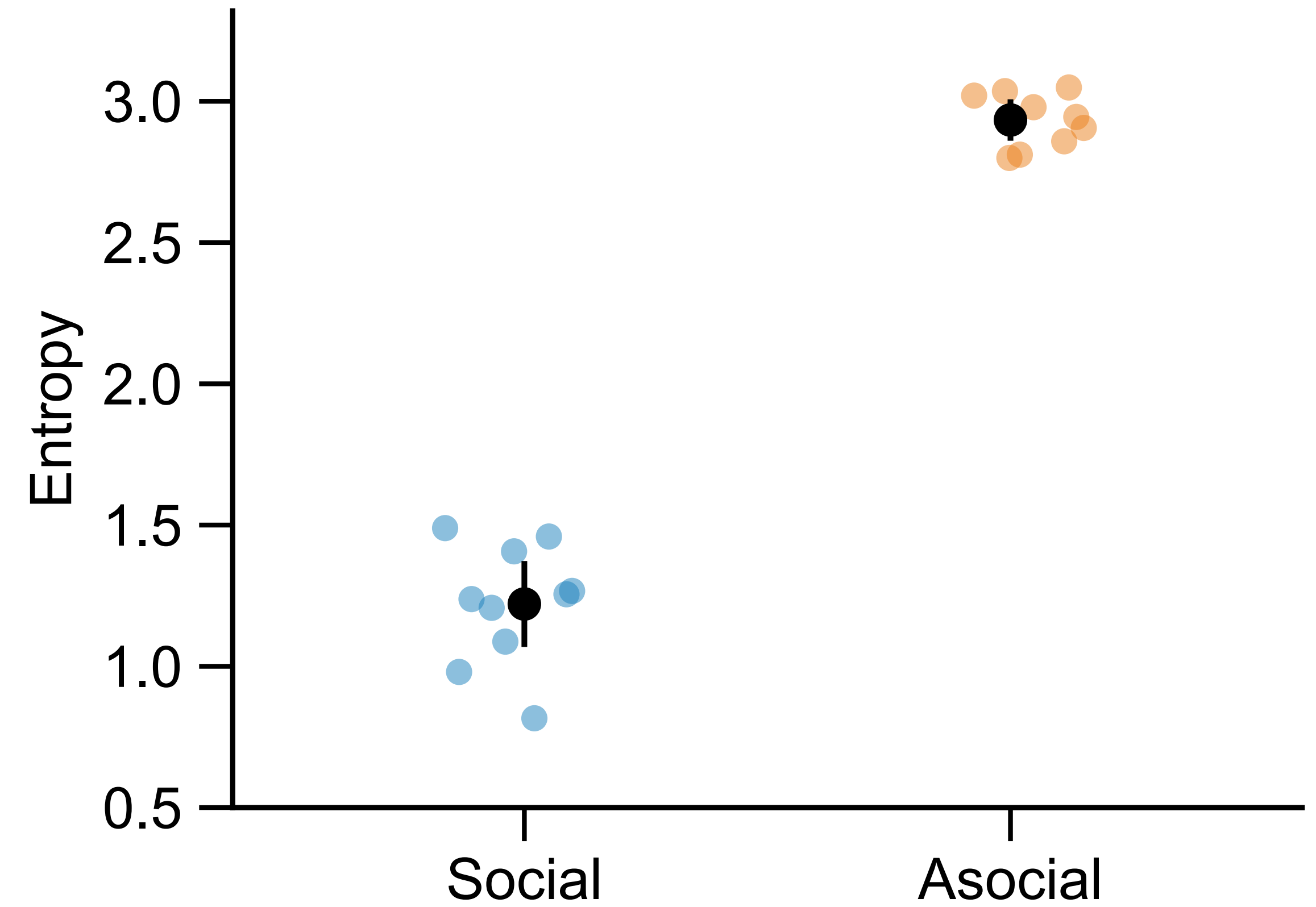
Asocial Learning

II. LLM (GPT-4o) Agents

One Optimal Group

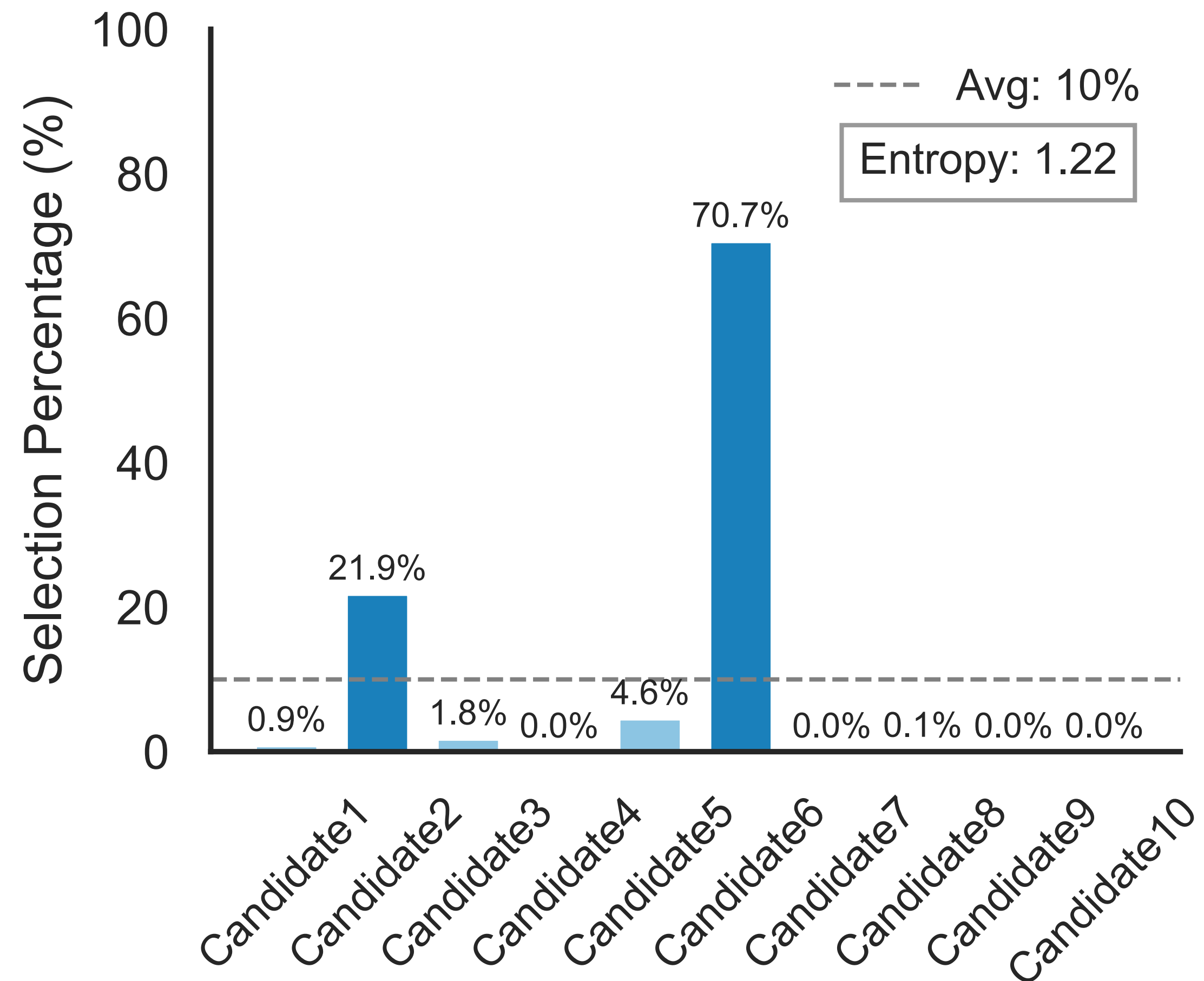


Multiple Optimal Groups

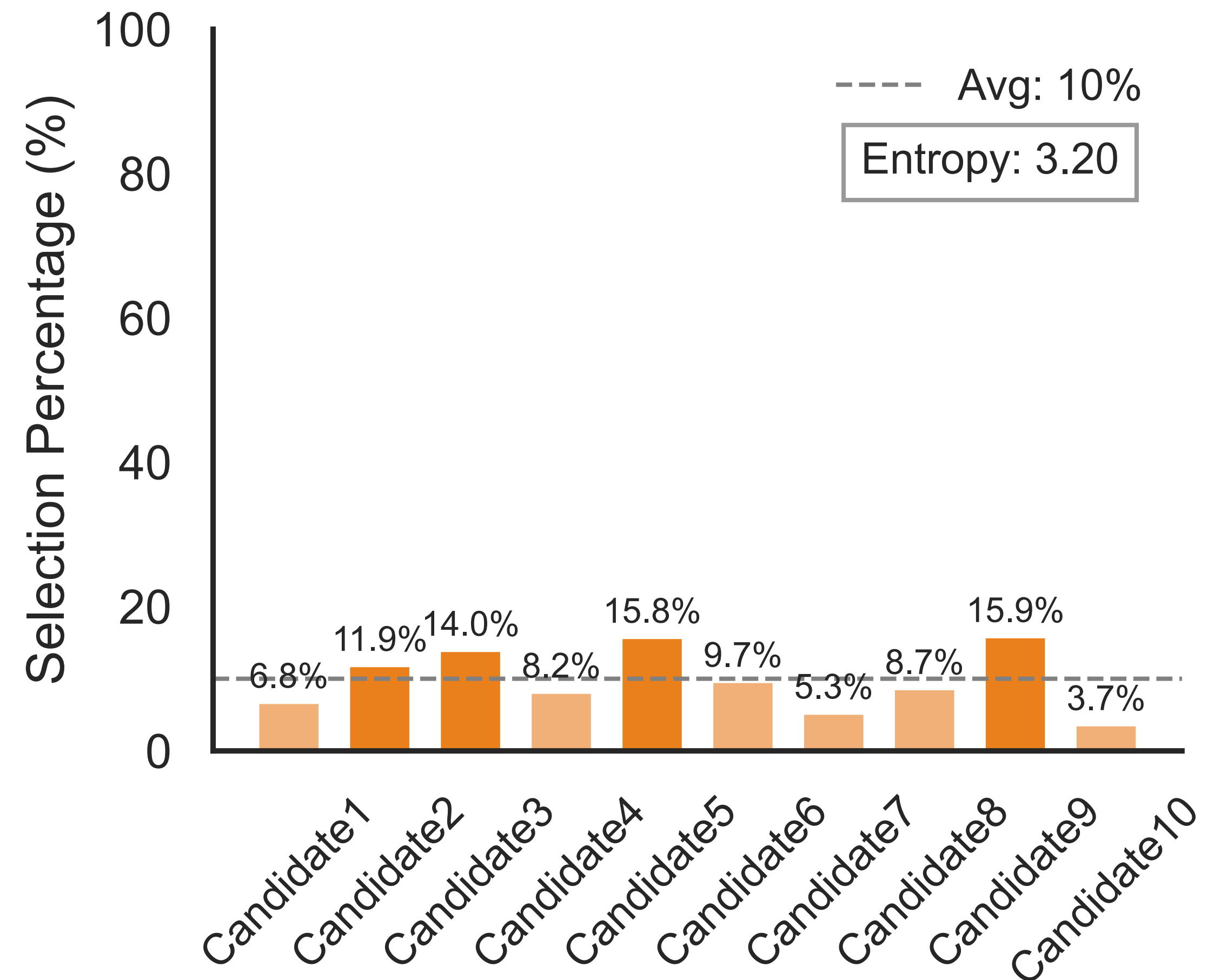


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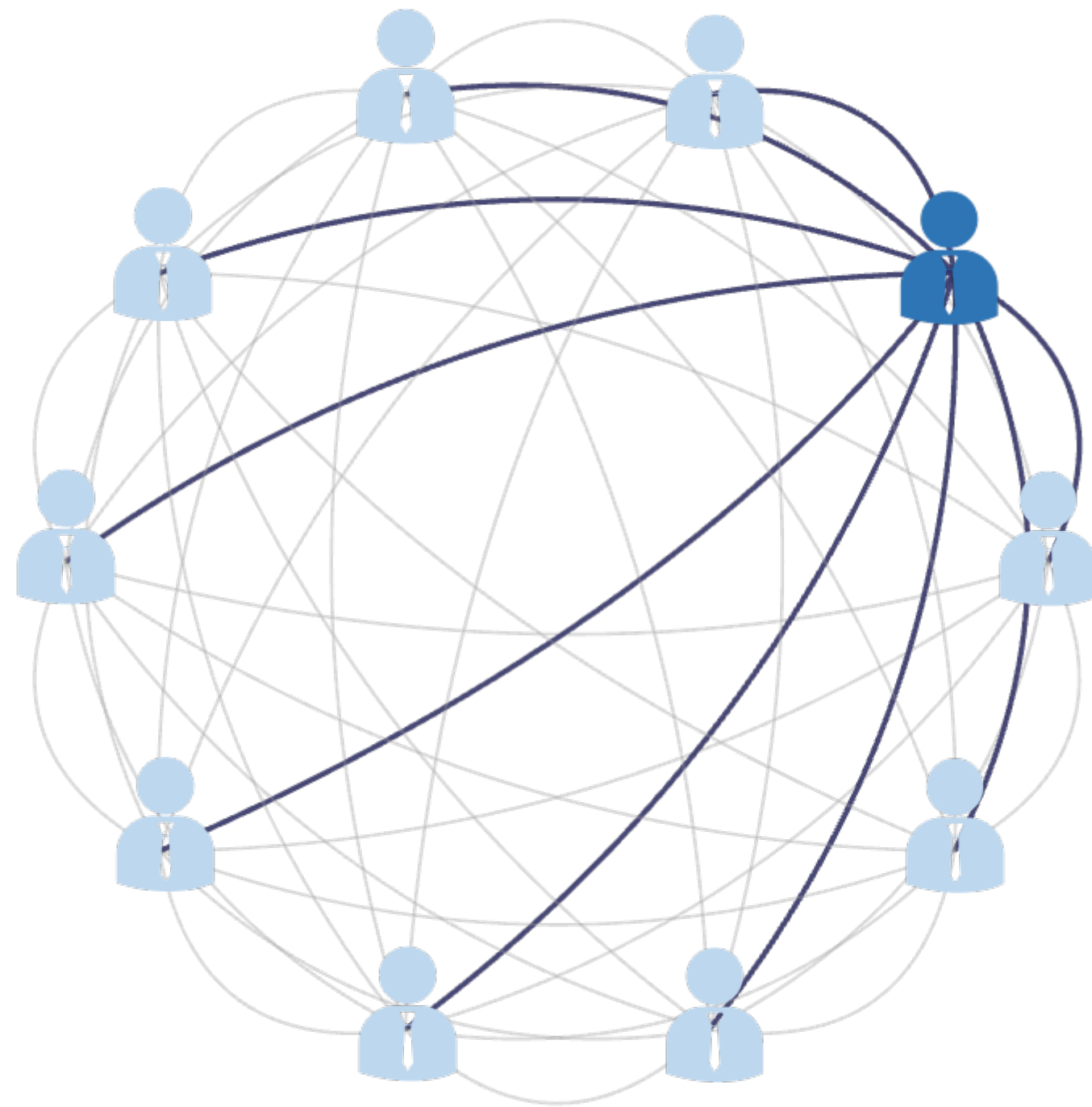


Asocial Learning



III. Online **Human** Participants

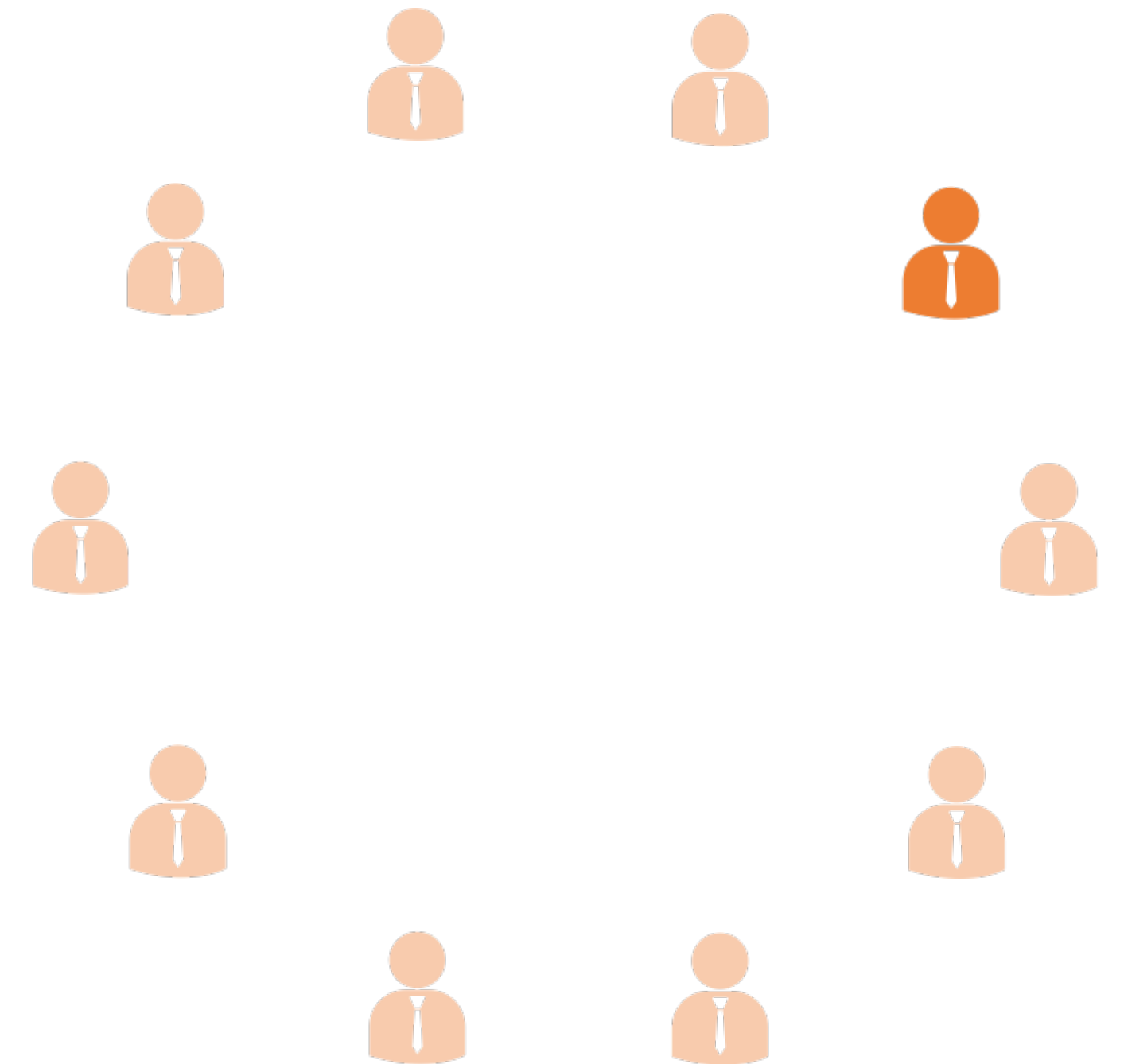
A



Social Learning

$N = 2000$

C



Asocial Learning

(IV. replicated with $N=400$ hiring professionals, using realistic university interns)

Welcome to the Together Hire!

Congratulations! You've been appointed as a key member of the **hiring committee**. Your task is to evaluate and select candidates from **10 different groups**.

Every decision you make will provide valuable insights into the **productivity** of each group. Your goal is to identify the **most capable groups of workers** and maximize your **bonus!** 💰

⚖️ In some rounds, you will see others' choices and results for reference. In others, you'll rely solely on your own judgment. Stay observant and strategic to uncover the strengths of each group and make the best decisions. ⭐

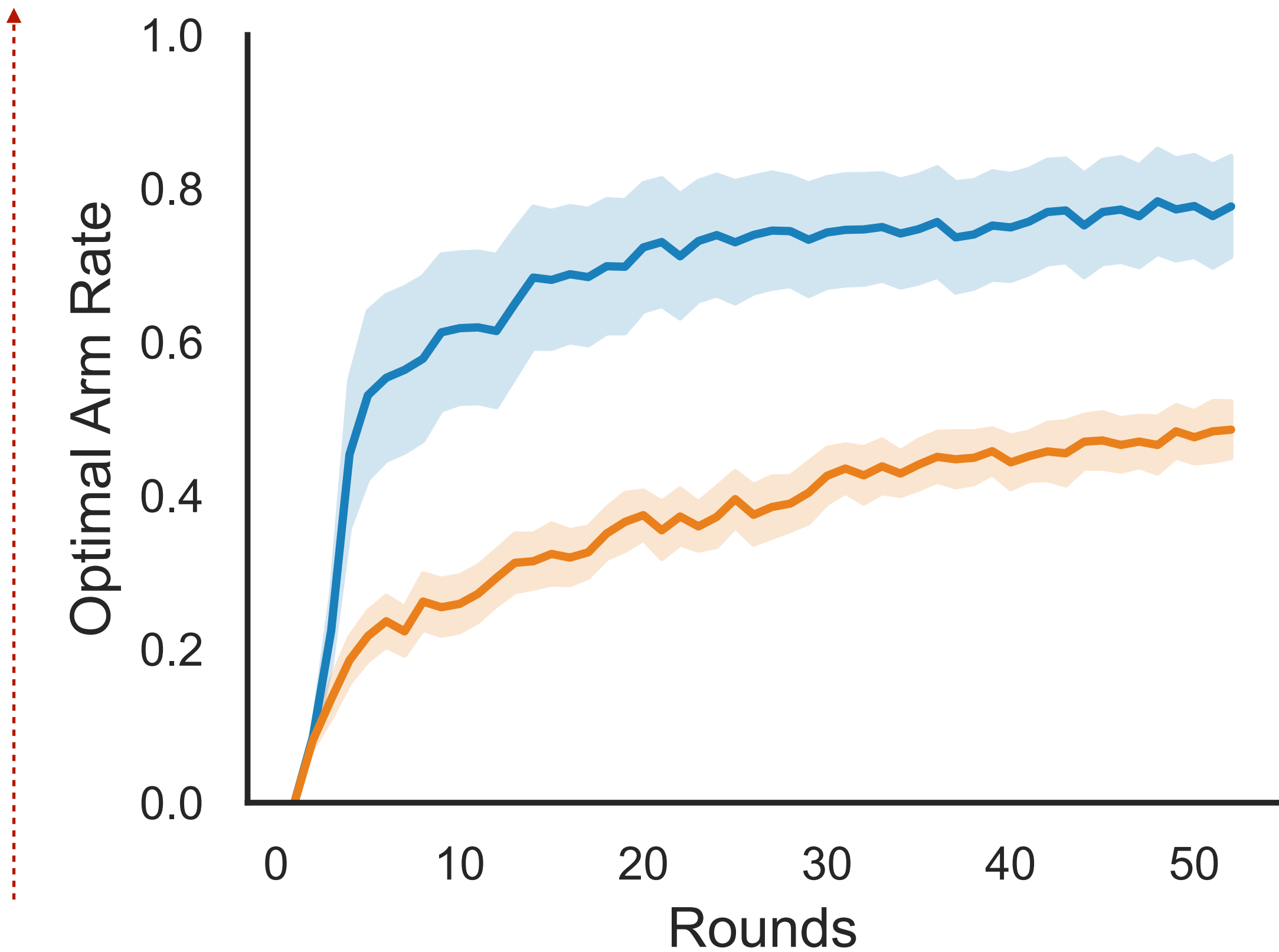
⌚ **The waiting time may be long. Please be patient. Once the game starts, please **DO NOT Exit** as it will affect the entire game for all players.**

 **Begin the Hiring Challenge** 

III. Online **Human** Participants

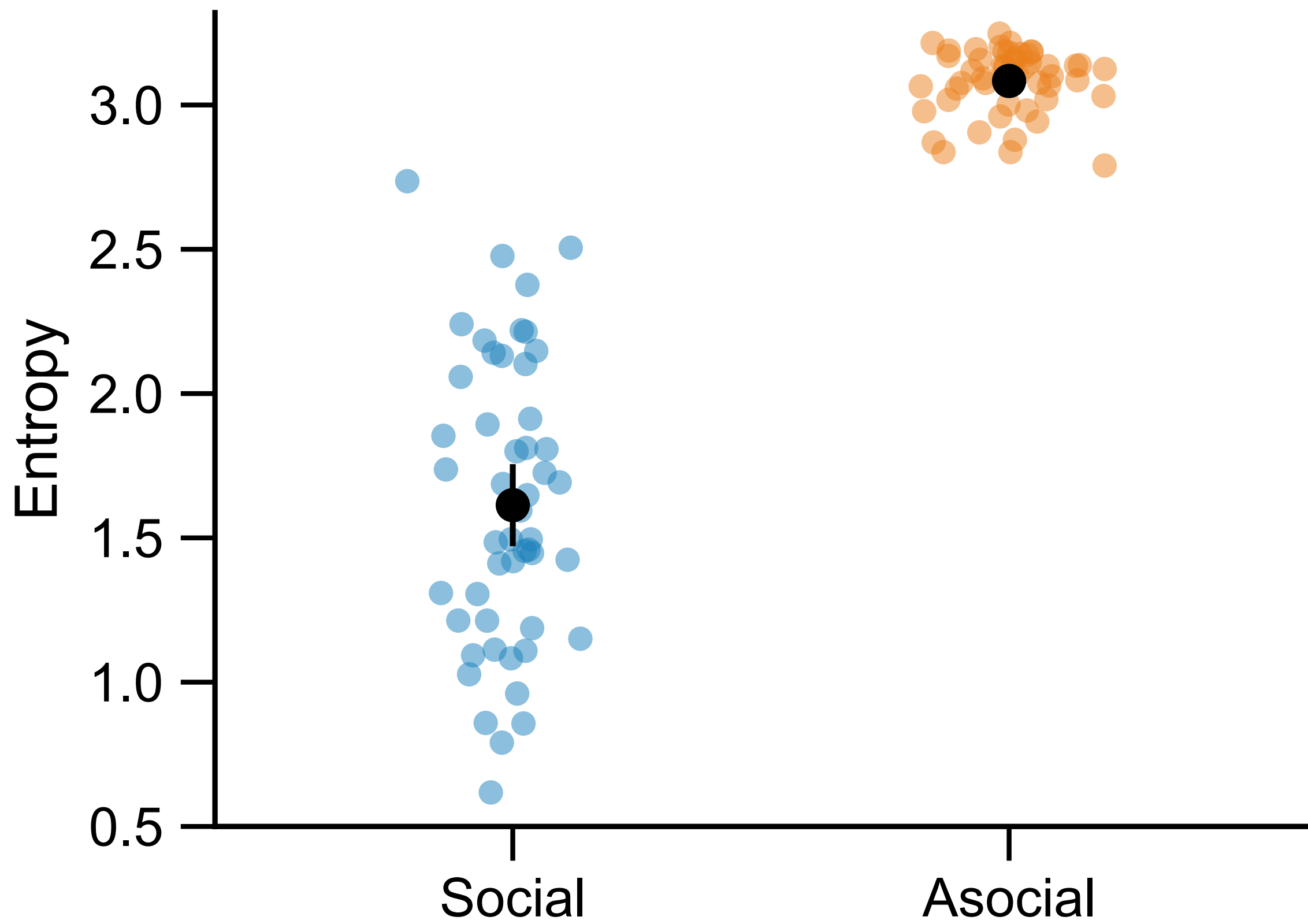
One Optimal Group

More efficient



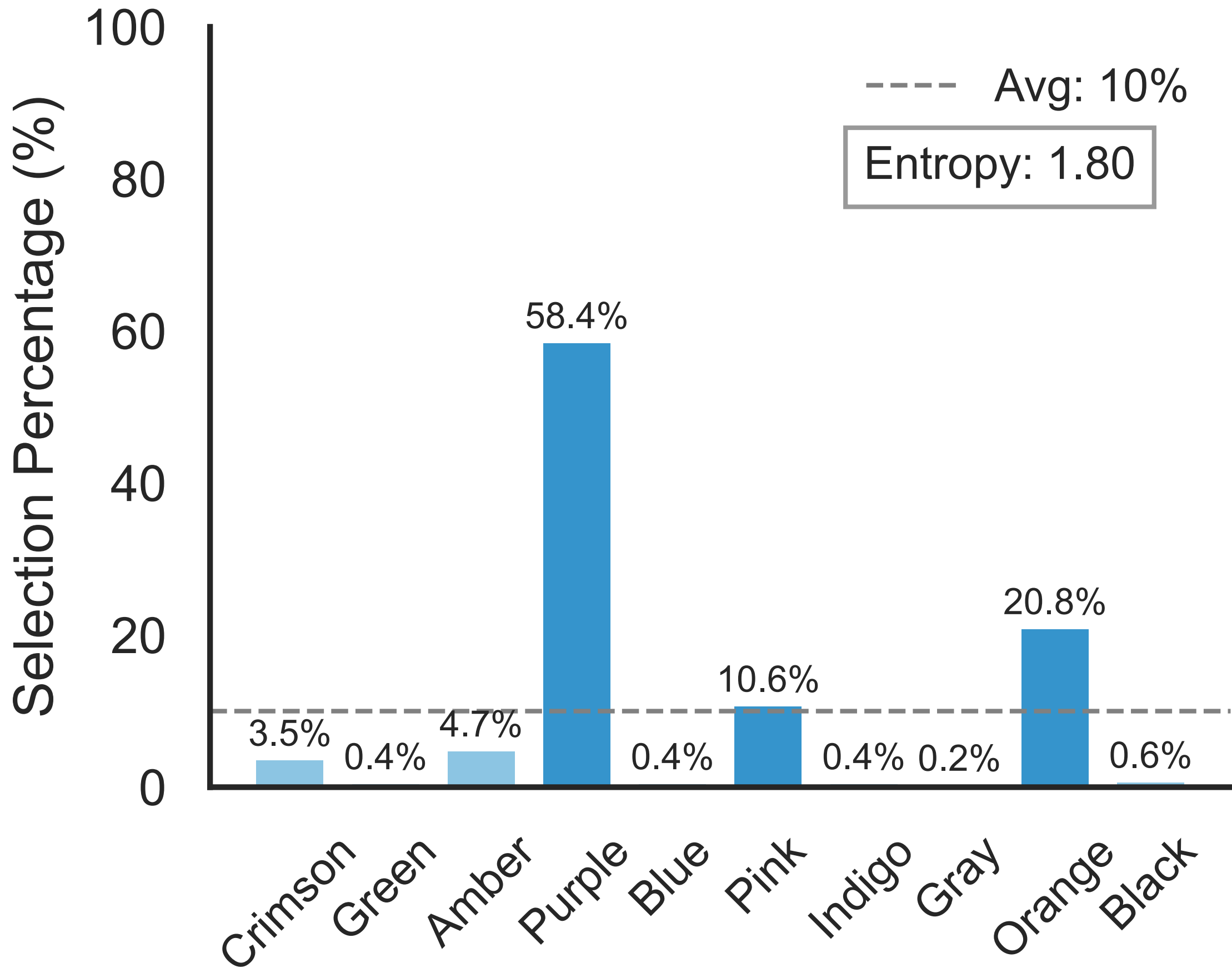
Multiple Optimal Groups

More bias

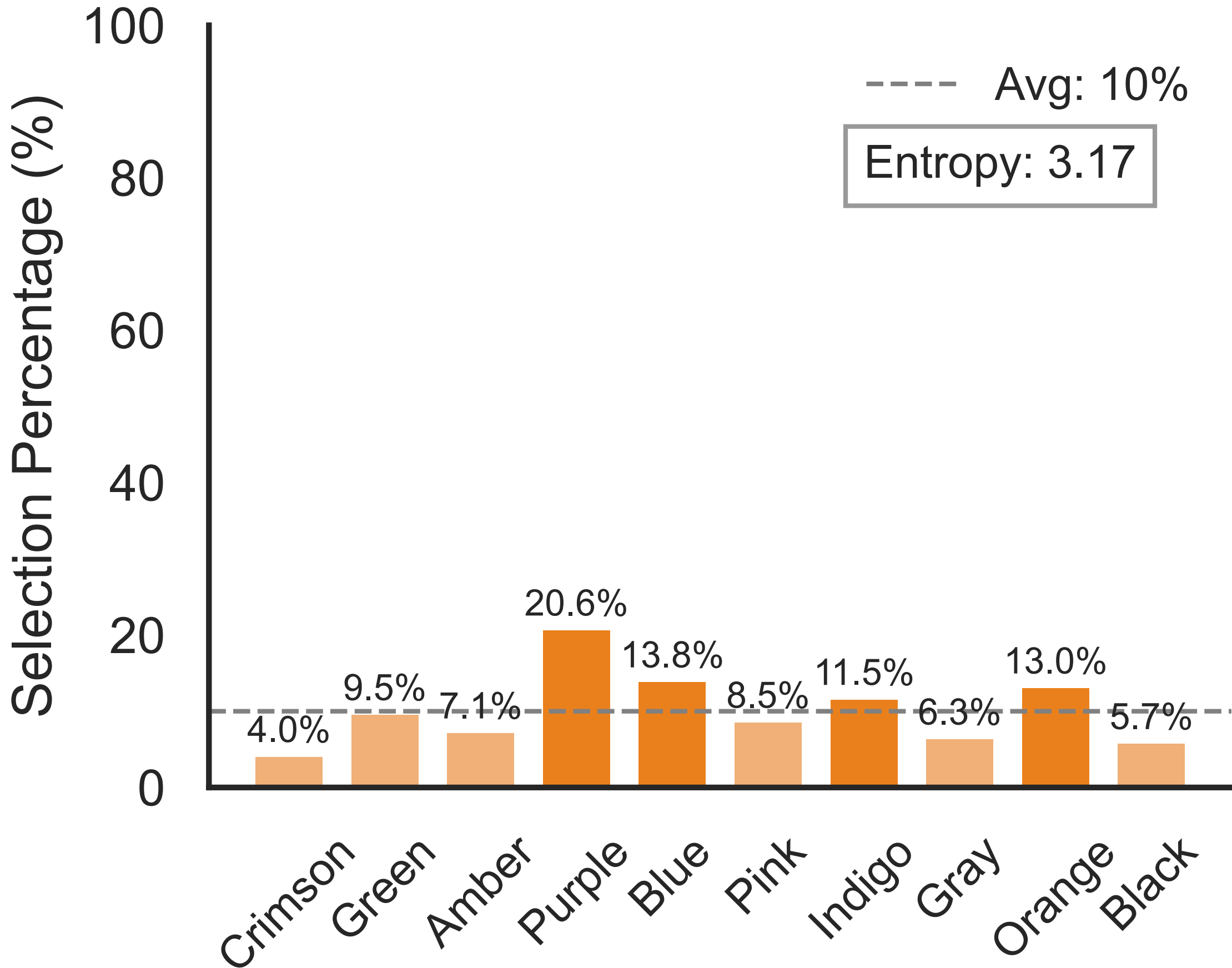


III. Online **Human** Participants

Social Learning



Asocial Learning



Implications: How to better arrange *many individuals in a network*?

Implications: **Many individuals in a network**

To balance *efficiency* and *fairness* in social systems (e.g., hiring), *exploration* is critical:

Implications: **Many individuals in a network**

To balance *efficiency* and *fairness* in social systems (e.g., hiring), *exploration* is critical:

- Individual-level interventions:
- Interaction-level interventions:
- Structure-level interventions:

Implications: **Many individuals in a network**

To balance *efficiency* and *fairness* in social systems (e.g., hiring), *exploration* is critical:

- Individual-level interventions: Train decision-makers to be less biased
- Interaction-level interventions:
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Implications: **Many individuals in a network**

To balance *efficiency* and *fairness* in social systems (e.g., hiring), *exploration* is critical:

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- Structure-level interventions:

Implications: **Many individuals in a network**

To balance *efficiency* and *fairness* in social systems (e.g., hiring), *exploration* is critical:

- Individual-level interventions: Train decision-makers to be less biased
- Interaction-level interventions: Ensure information is shared with high fidelity
- Structure-level interventions: Design more adaptive network structures, e.g., sub networks



Bufan Gao



Preprint

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APS, May 28-30, Barcelona, Spain, Symposium on Advances in Computational Social Cognition