Teaming, learning and coordination efficiency of human-robotic networks

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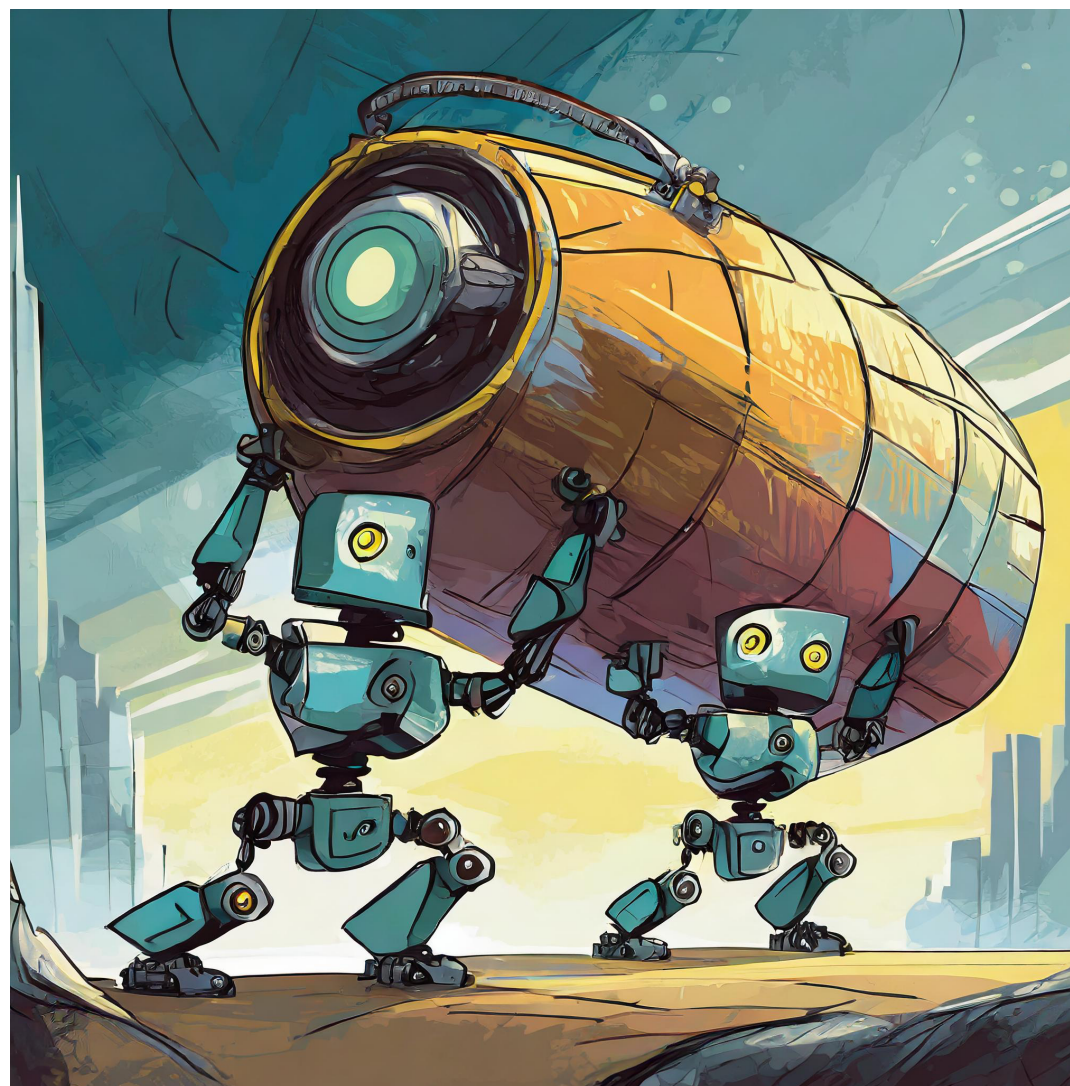
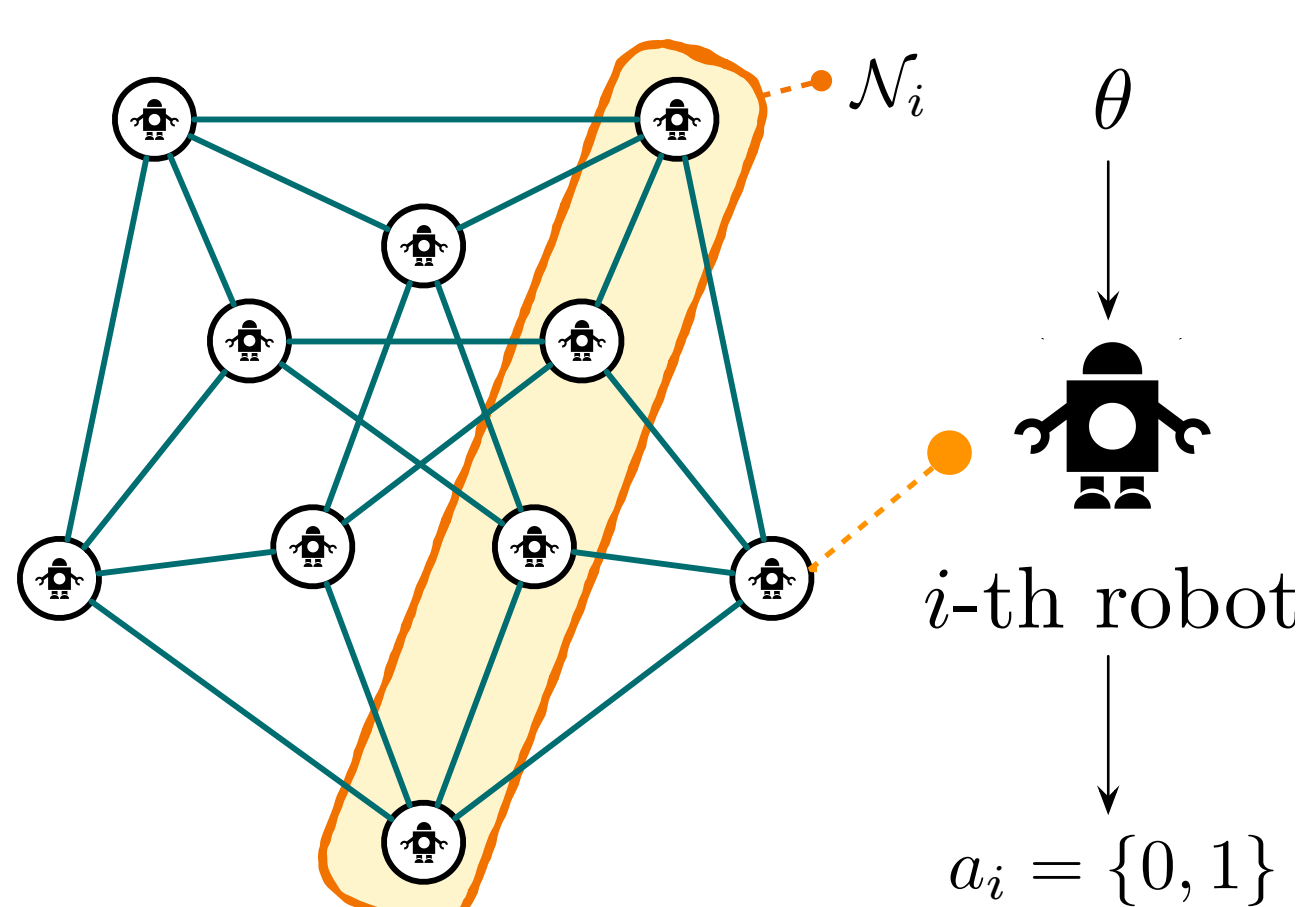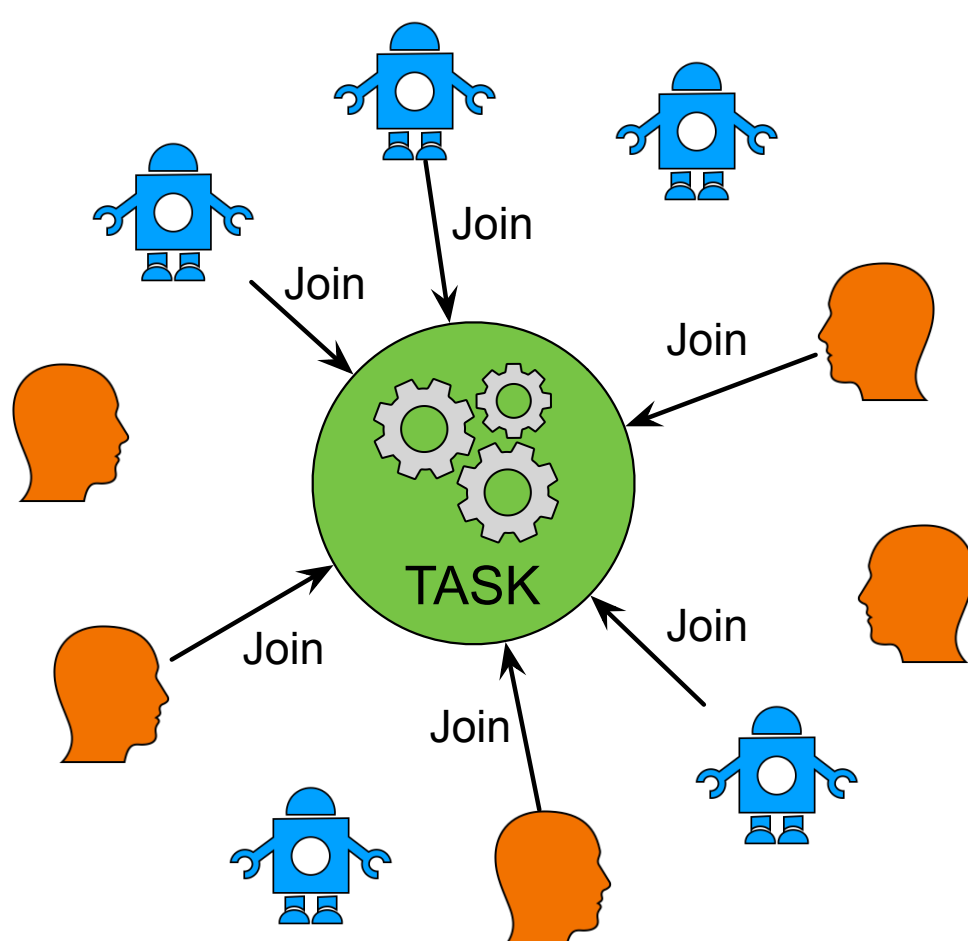marcos@eng.famu.fsu.edu

MINDS

Today
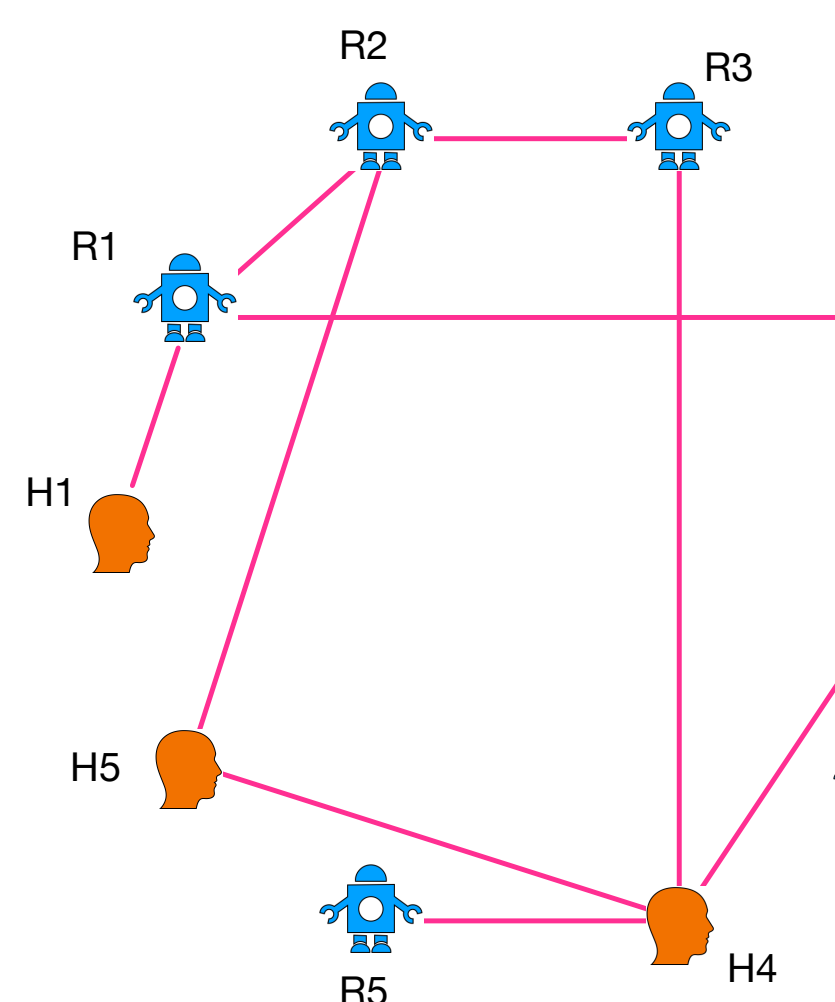

In a (not too) distant future

Can robots and humans coordinate to work together?

The goal of this project is to characterize the limits of strategic coordination in task-oriented hybrid teams consisting of humans and robots, and design learning methods to achieve the best possible coordination efficiency and system performance.
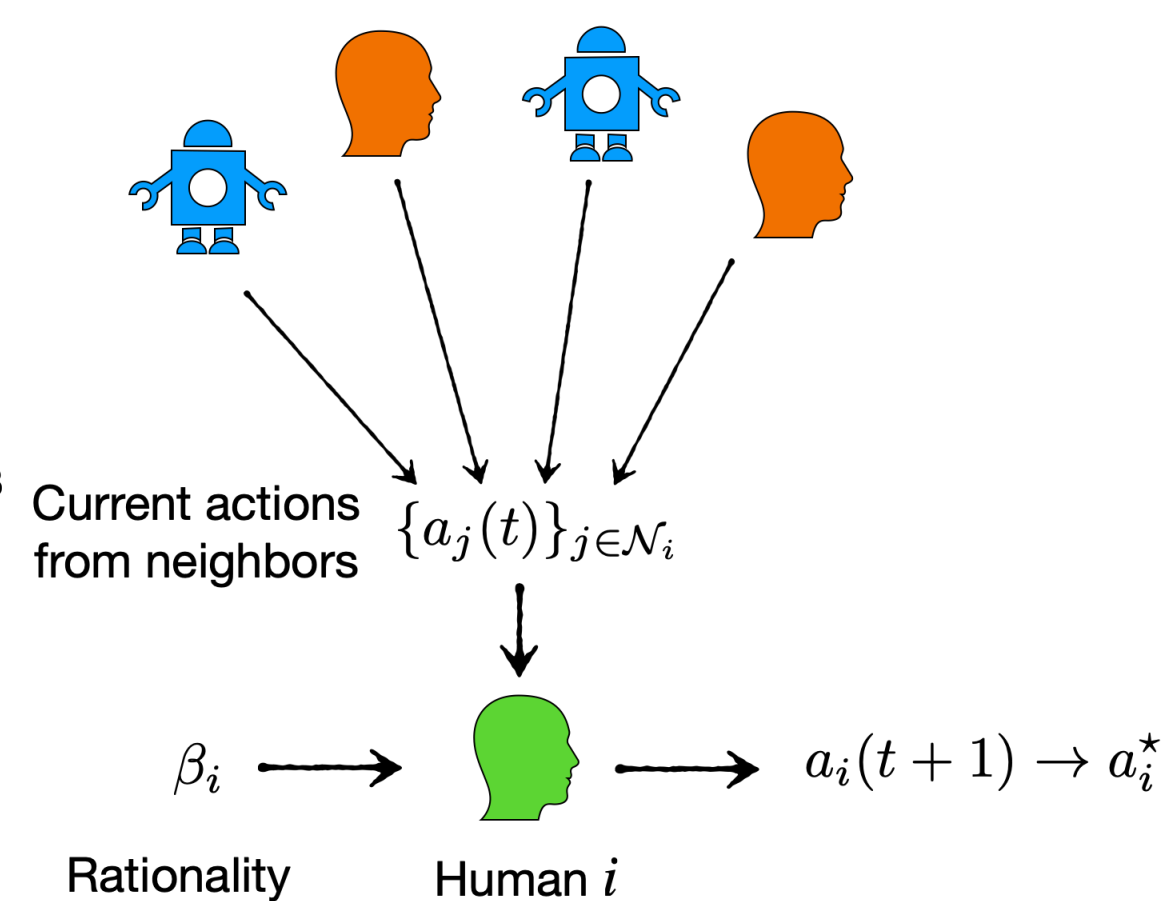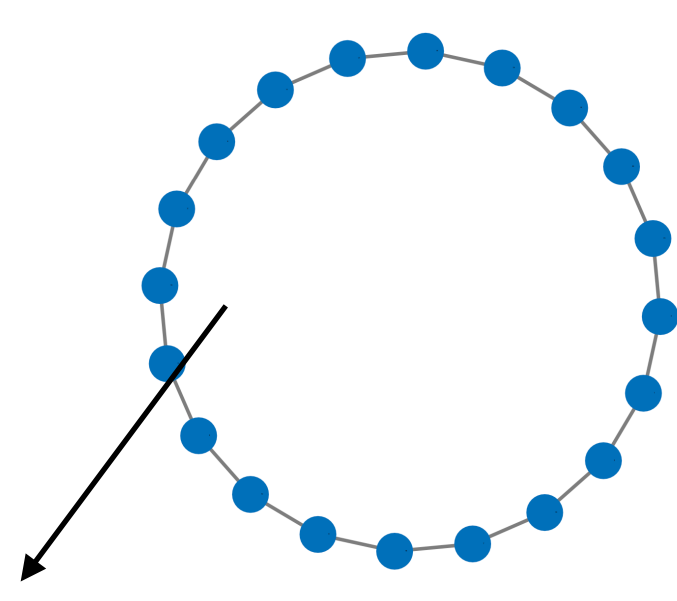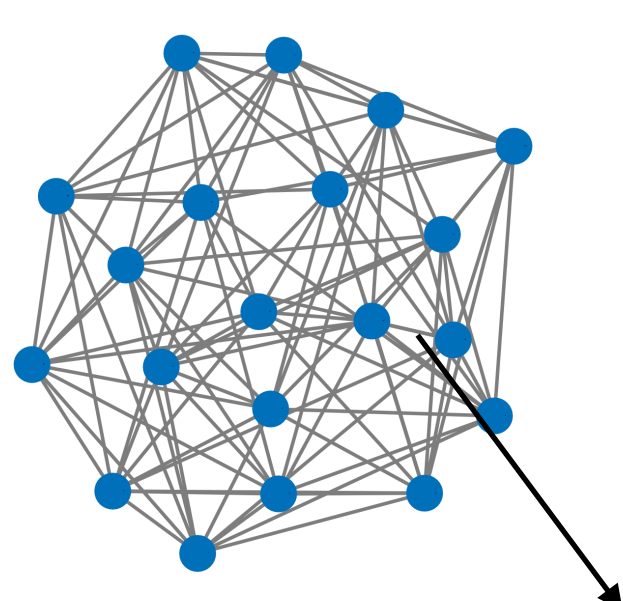
Modeling

task 1   task 2

Θ_1

Θ_1

y

i-th robot

$a_i = \{0, 1\}$

Teaming

$Y_i \in \{1, 2\}$

$A_i \in \{1, 2\}$

(a) Teaming

Learning

Current actions from neighbors $\{a_j(t)\}_{j \in \mathcal{N}_i}$

β_i

Rationality

Human i

$a_i(t+1) \to a_i^\star$

(b) Learning

Our group has discovered a new fundamental principle:

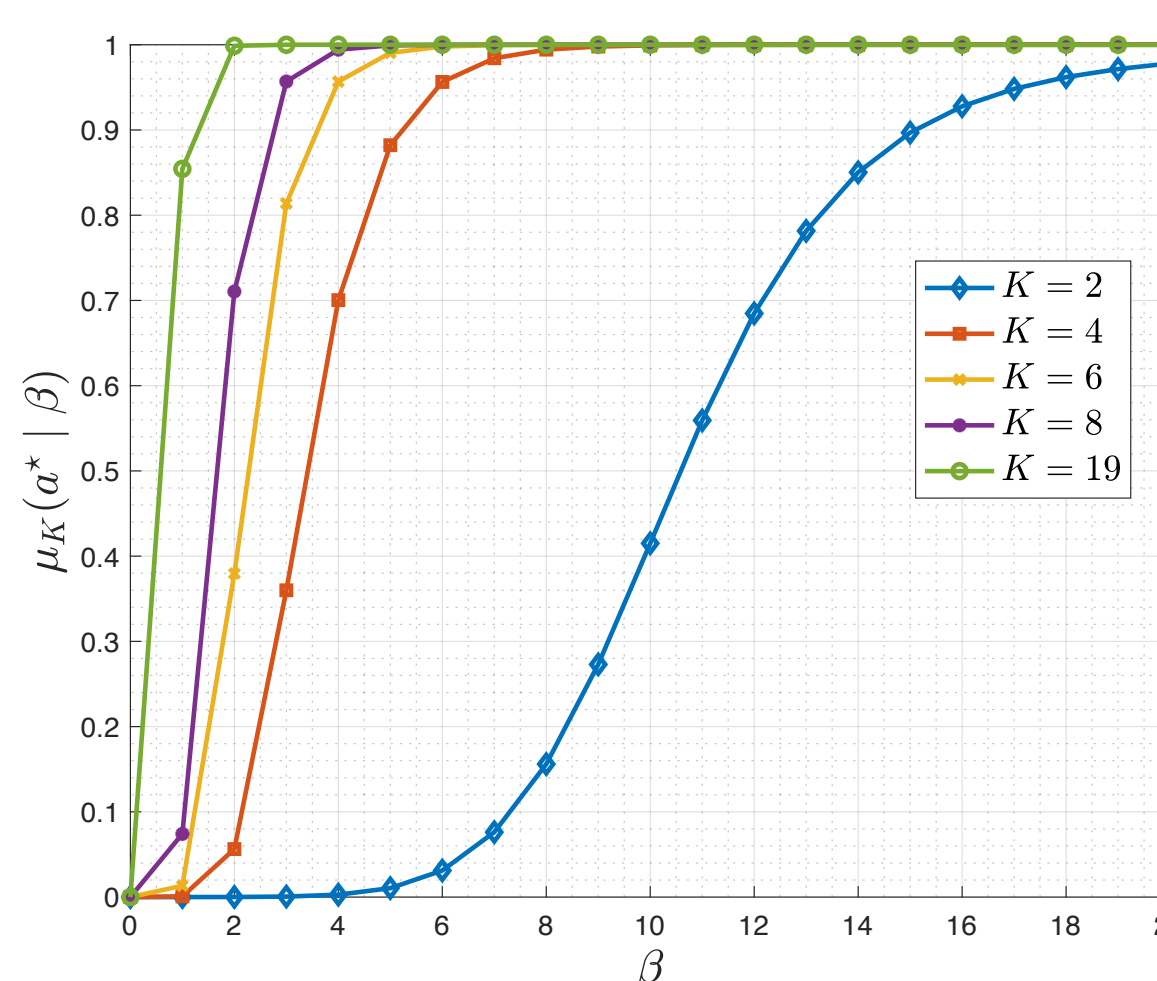## Connectivity can compensate for irrational behavior

What does that mean?

(a) (b)

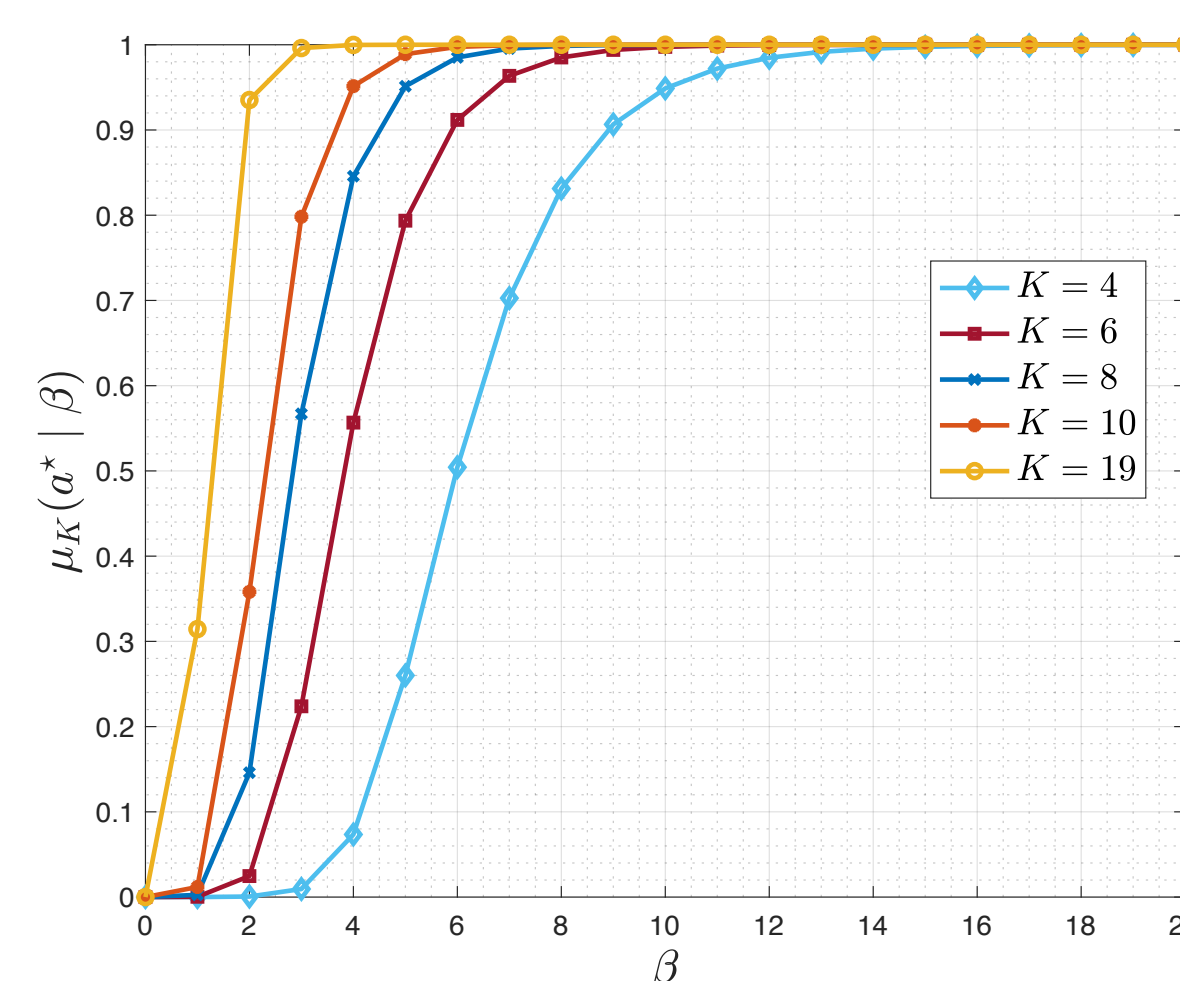**Agents need to be more rational**

Agents can afford to be less rational
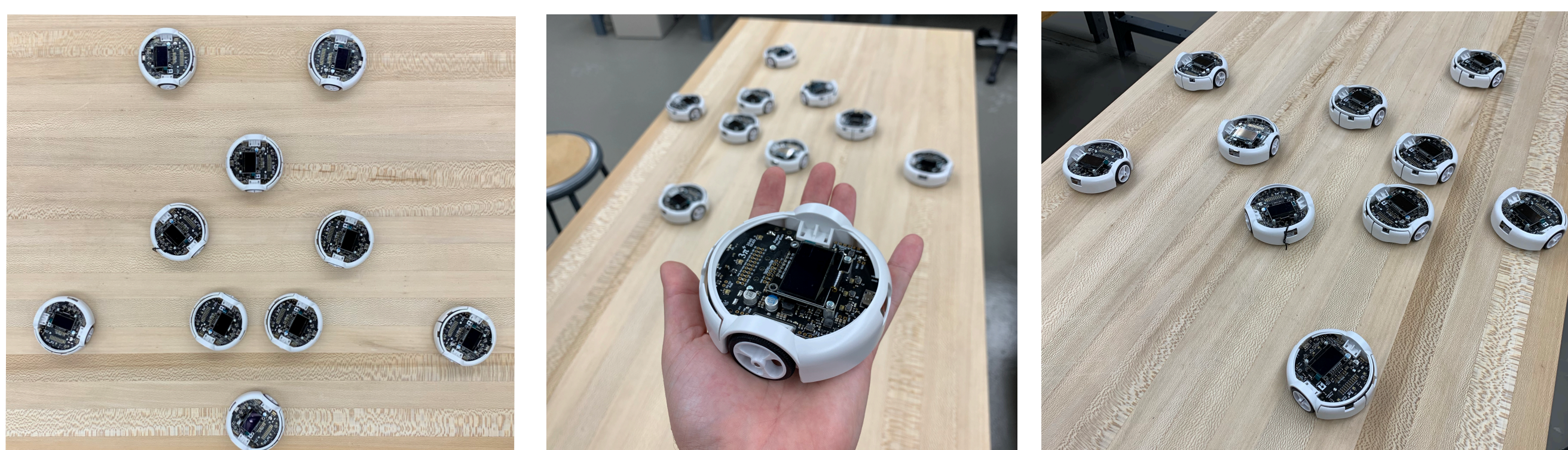
Simulations and Data:

(a) $\theta = 5.1$ (b) $\theta = 3$

Next Steps: Testbed

Results from the FYAP:

A. Published two conference papers
B. One journal paper in preparation
C. NSF CAREER proposal (submitted)
D. Collaboration with the Psychology Department at FSU