Using Phone Games to Test ACT-R

Robert L West, Emily Grieve, Elisabeth Wood
Institute of Cognitive Science
Carleton University, Ottawa, Canada

Gamers as Experts

- Expert video game players excel at finding optimal solutions

- Expert video game players excel at compiling productions

- Expert video game players have very fast, consistent perceptual/motor skills

- Expert video game players will work for the glory of achieving the top score

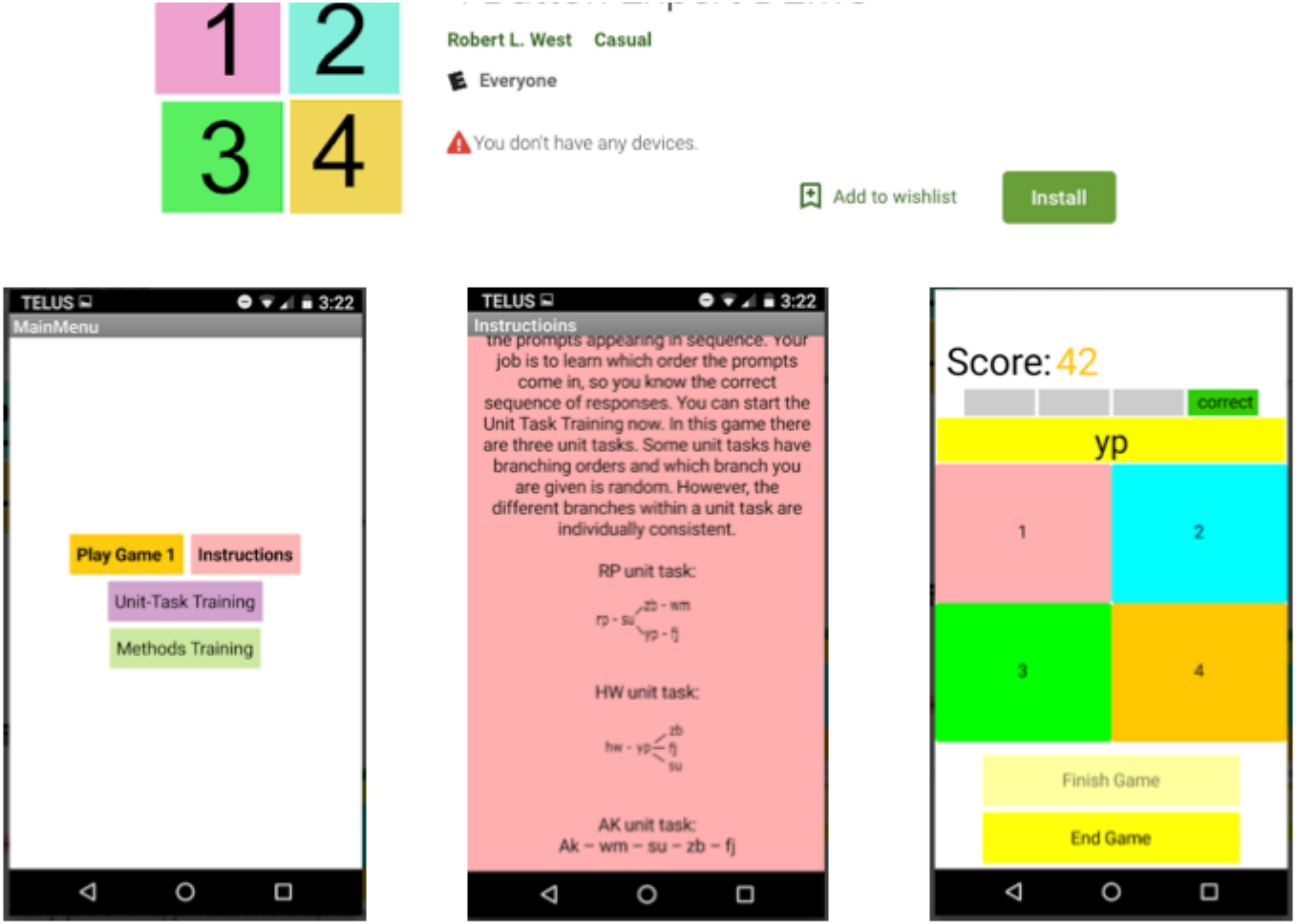
Macro Architectures

- There is often more than one way to get ACT-R to perform a task
- Macro architectures are code templates that organize ACT-R in specific ways for reoccurring task types
- Organized in advance of experience
- Designed for real world

SGOMS

- GOMS Is a Macro architecture for routine expertise
- Default system for coding real world expertise
- Instantiated as a set of generic productions to manage
    - Operators, methods, unit tasks, planning units
- Serial bottleneck - generic productions add time over task specific productions

4 Button Expert DEMO



Robert L. West Casual

Everyone

You don't have any devices.

Add to wishlist

Install

TELUS 3:22

MainMenu

Play Game 1

Instructions

Unit-Task Training

Methods Training

TELUS 3:22

Instructioins

the prompts appearing in sequence. Your job is to learn which order the prompts come in, so you know the correct sequence of responses. You can start the Unit Task Training now. In this game there are three unit tasks. Some unit tasks have branching orders and which branch you are given is random. However, the different branches within a unit task are individually consistent.

RP unit task:

rp - su - zb - wm / yp - fj

HW unit task:

hw - yp - zb / fj / su

AK unit task:
Ak – wm – su – zb – fj

Score: 42

correct

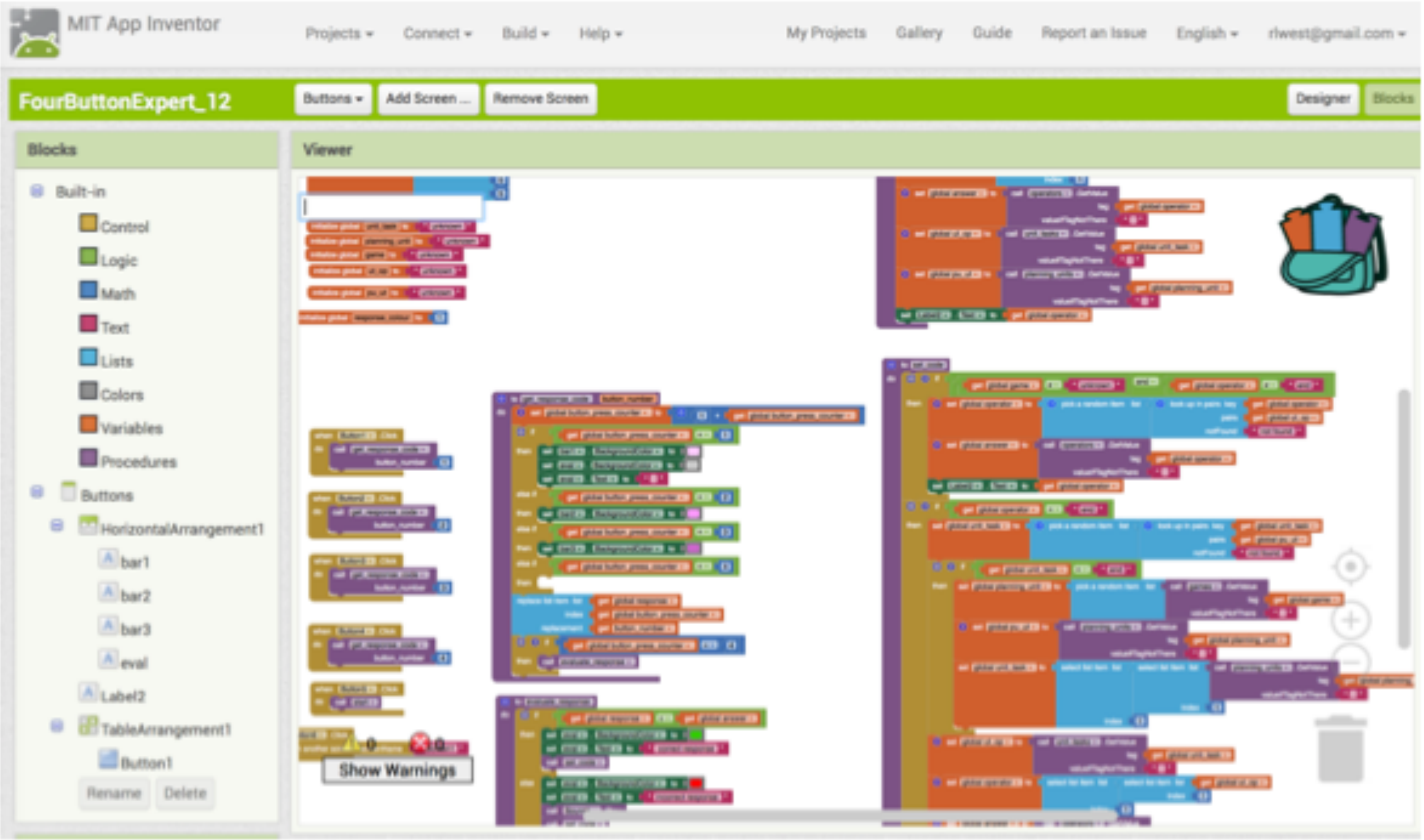
yp

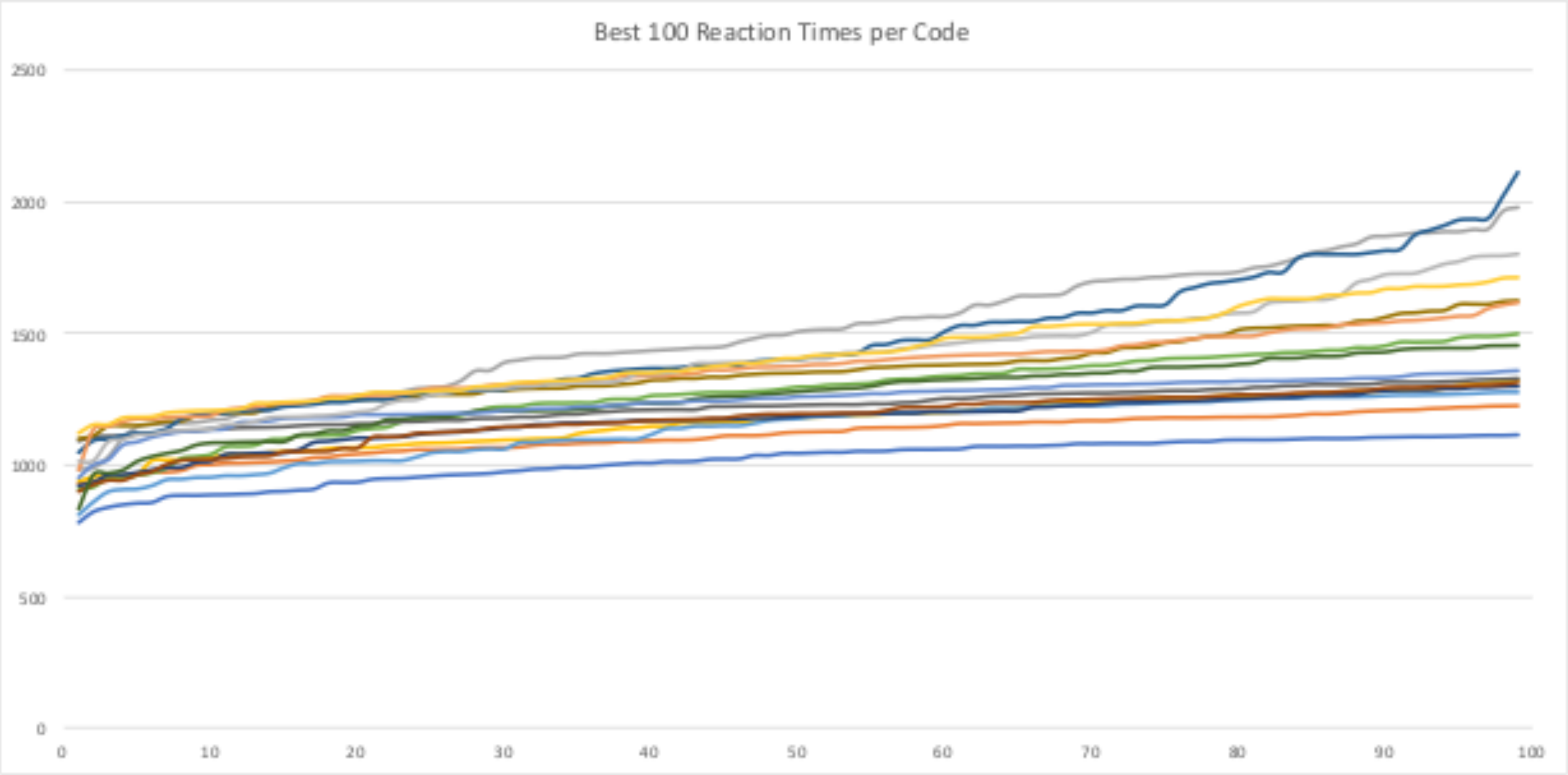
1	2
3	4

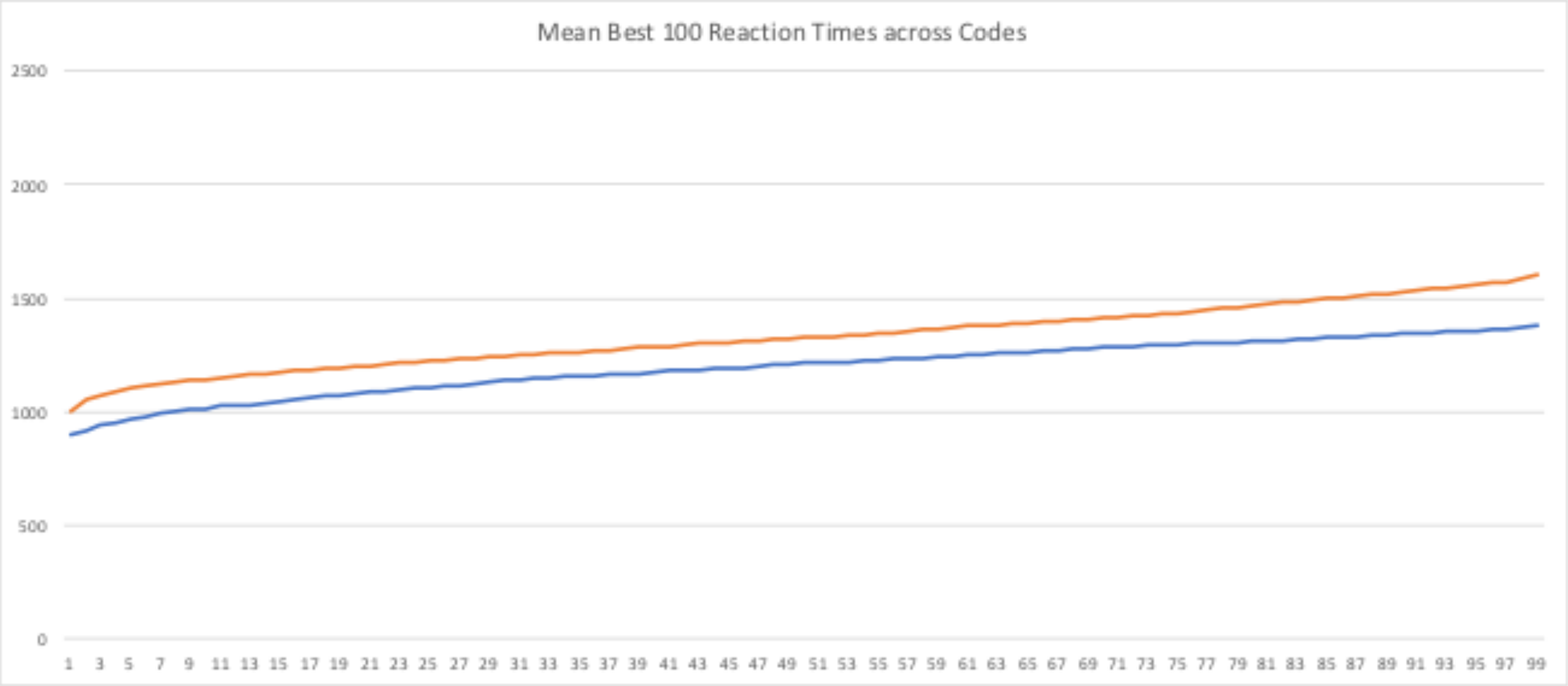
Finish Game

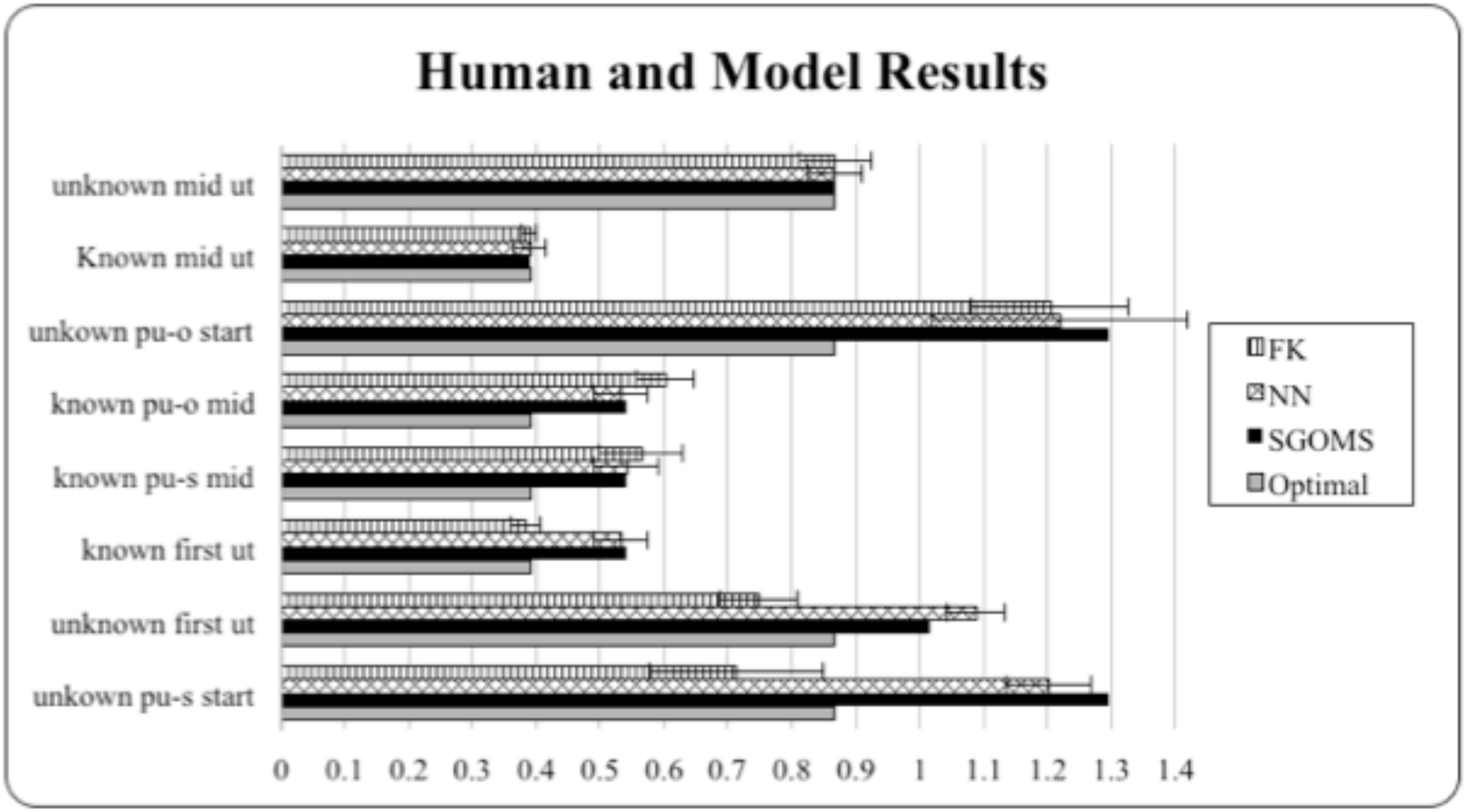
End Game

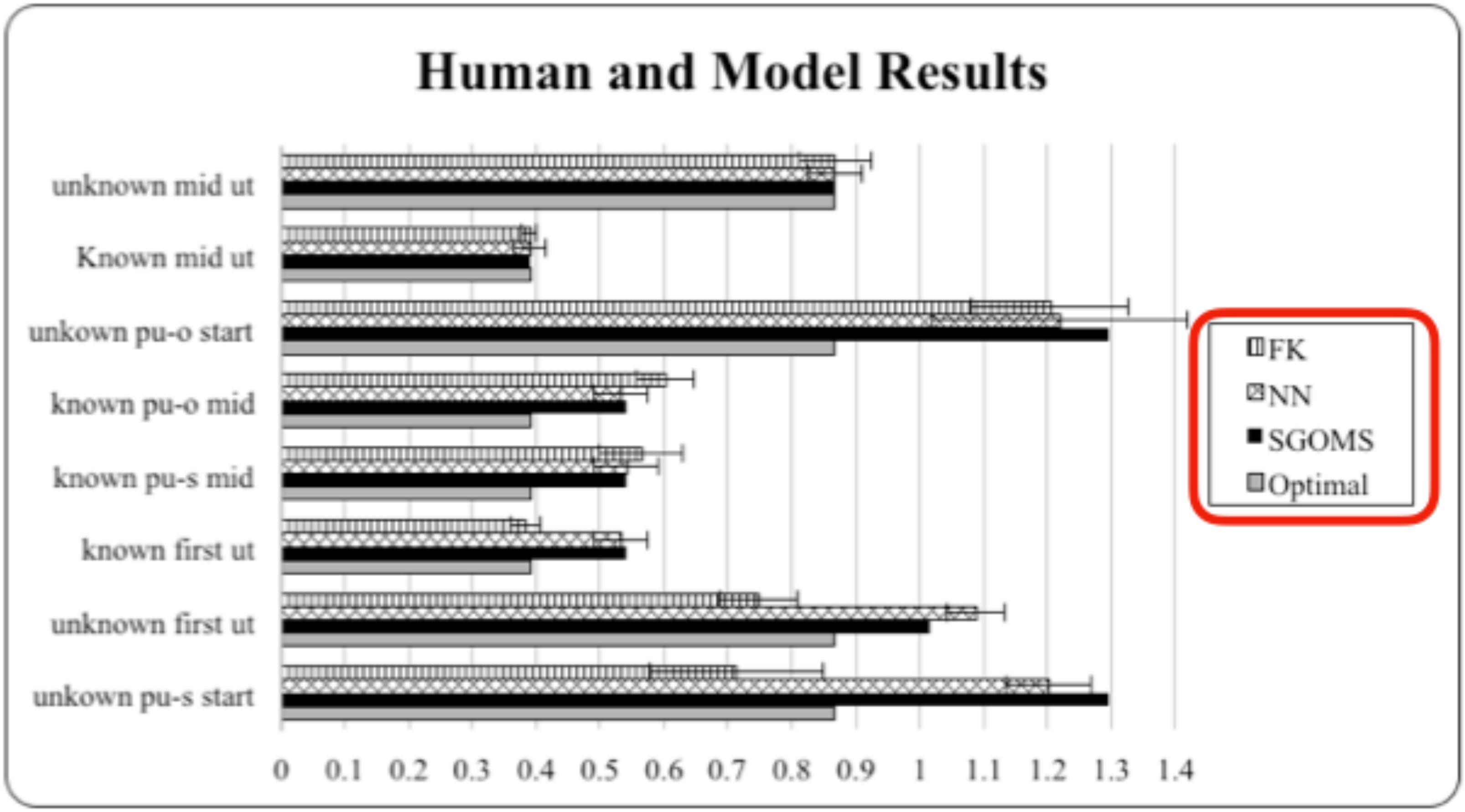
MIT AI2


MIT App Inventor
Projects ▾
Connect ▾
Build ▾
Help ▾
My Projects
Gallery
Guide
Report an Issue
English ▾
rlwest@gmail.com ▾
FourButtonExpert_12
Buttons ▾
Add Screen ...
Remove Screen
Designer
Blocks
Blocks
Viewer
Built-in
Control
Logic
Math
Text
Lists
Colors
Variables
Procedures
Buttons
HorizontalArrangement1
bar1
bar2
bar3
eval
Label2
TableArrangement1
Button1
Rename
Delete
0
0
Show Warnings

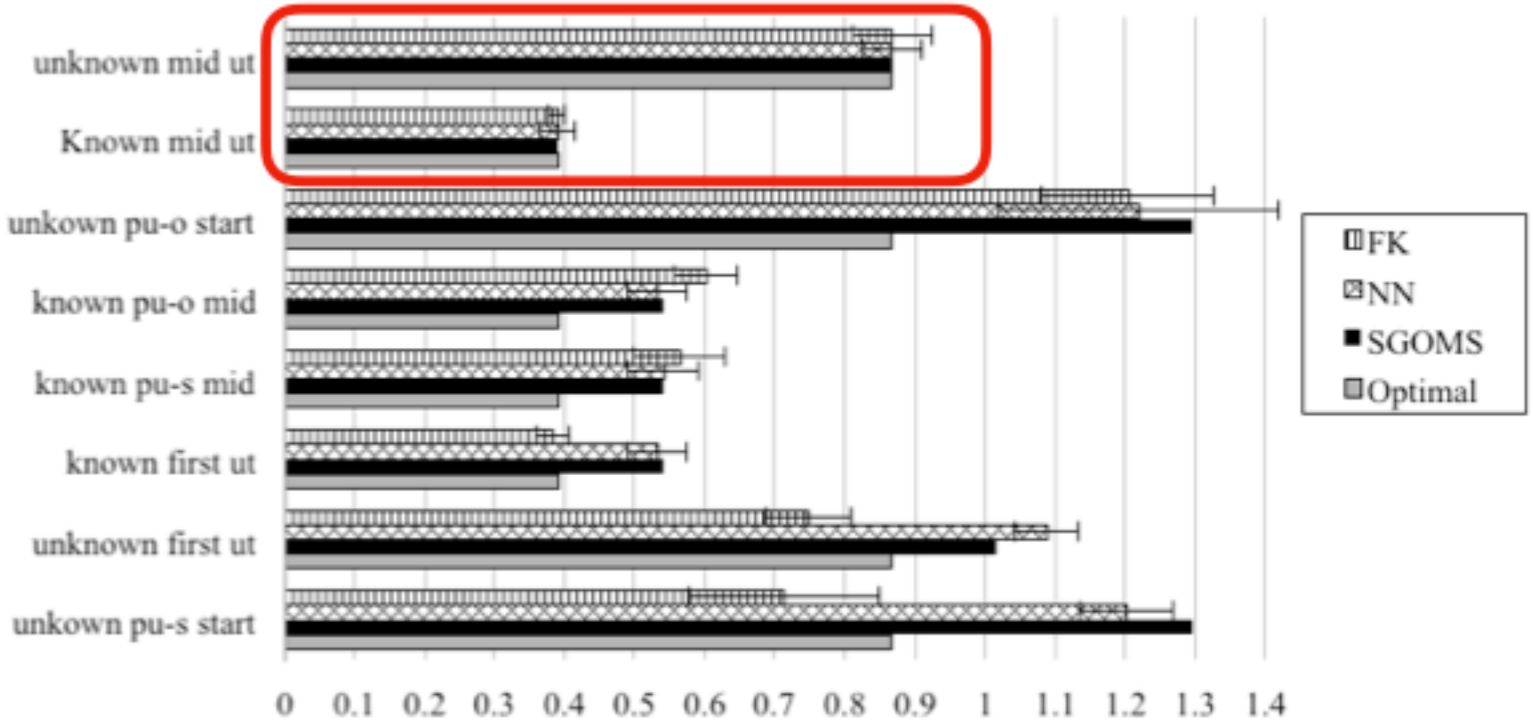

Best 100 Reaction Times per Code
2500
2000
1500
1000
500
0
0
10
20
30
40
50
60
70
80
90
100


Mean Best 100 Reaction Times across Codes
2500
2000
1500
1000
500
0
1
3
5
7
9
11
13
15
17
19
21
23
25
27
29
31
33
35
37
39
41
43
45
47
49
51
53
55
57
59
61
63
65
67
69
71
73
75
77
79
81
83
85
87
89
91
93
95
97
99

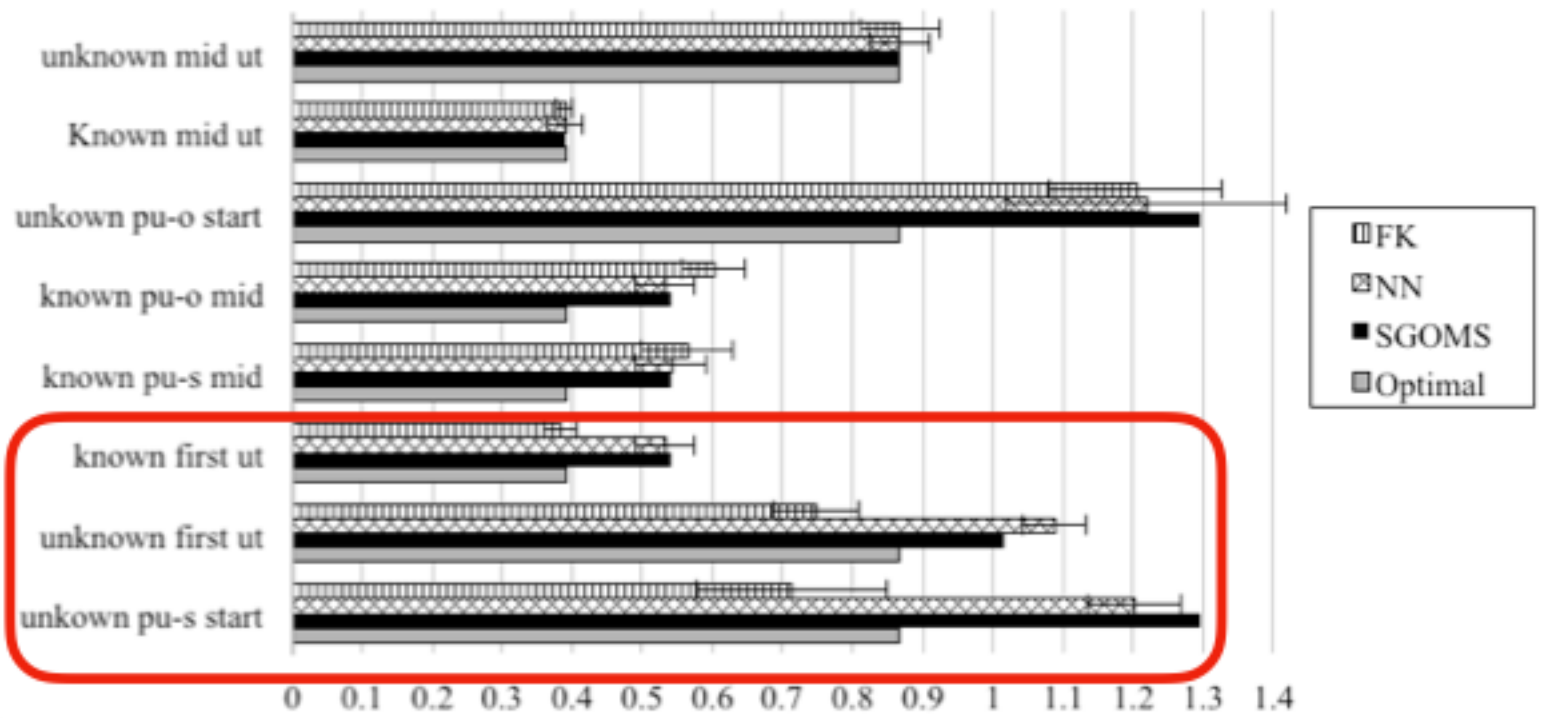

Human and Model Results
unknown mid ut
Known mid ut
unkown pu-o start
known pu-o mid
known pu-s mid
known first ut
unknown first ut
unkown pu-s start
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
FK
NN
SGOMS
Optimal

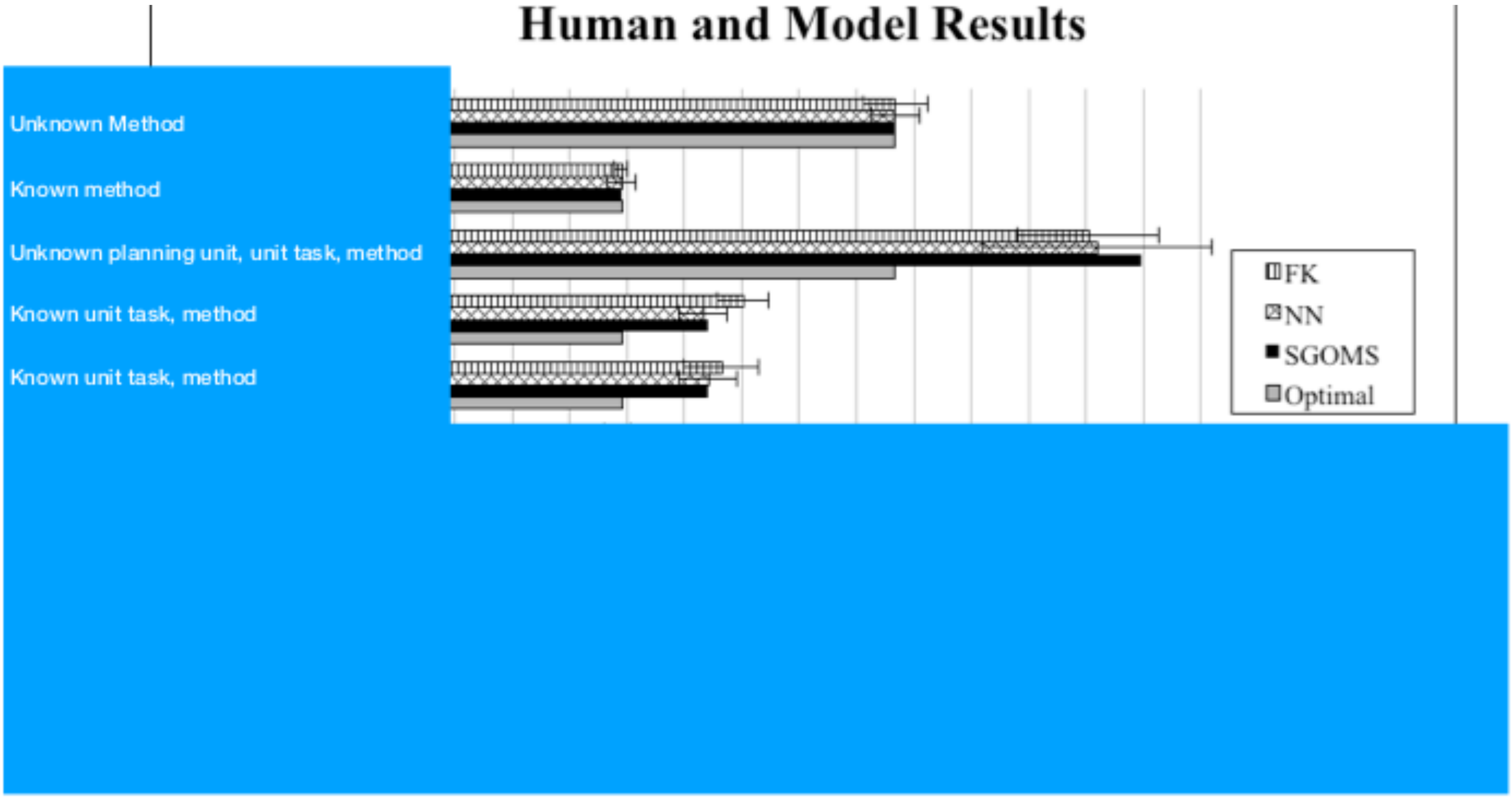

Human and Model Results
unknown mid ut
Known mid ut
unkown pu-o start
known pu-o mid
known pu-s mid
known first ut
unknown first ut
unkown pu-s start
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
1.1
1.2
1.3
1.4
▥FK
▨NN
■SGOMS
▩Optimal

Human and Model Results



Human and Model Results




Human and Model Results
Unknown Method
Known method
Unknown planning unit, unit task, method
Known unit task, method
Known unit task, method
▥ FK
▨ NN
■ SGOMS
▒ Optimal

Future

- Real-time data collection using data (works! ethics!?!)
- Leaderboard (coming soon)
- Research questions
  - Hick's law
  - Buffer capacity
  - Interruptions