CS/INFO 4154:
Analytics-driven Game Design

Class 9:

Learning Pathways

Mon	Wed	Fri
	9/13 Learning Pathways	9/15 Throwaway Testing 1
9/18 Throwaway Testing 2		
	9/27 Alpha Testing 1	9/29 Alpha Testing 2

Assignment 5: Throwaway Prototype

- Friday and Monday
- **No pressure**
- Doesn’t need to be playable or integrated
- Pick *some pieces* of your game and build them
  - Avatar moves/jumps on flat land
  - Grid with nothing on it
  - Background artwork
- Submit picture through CMS by *end of class* on Friday 8/15

Outline

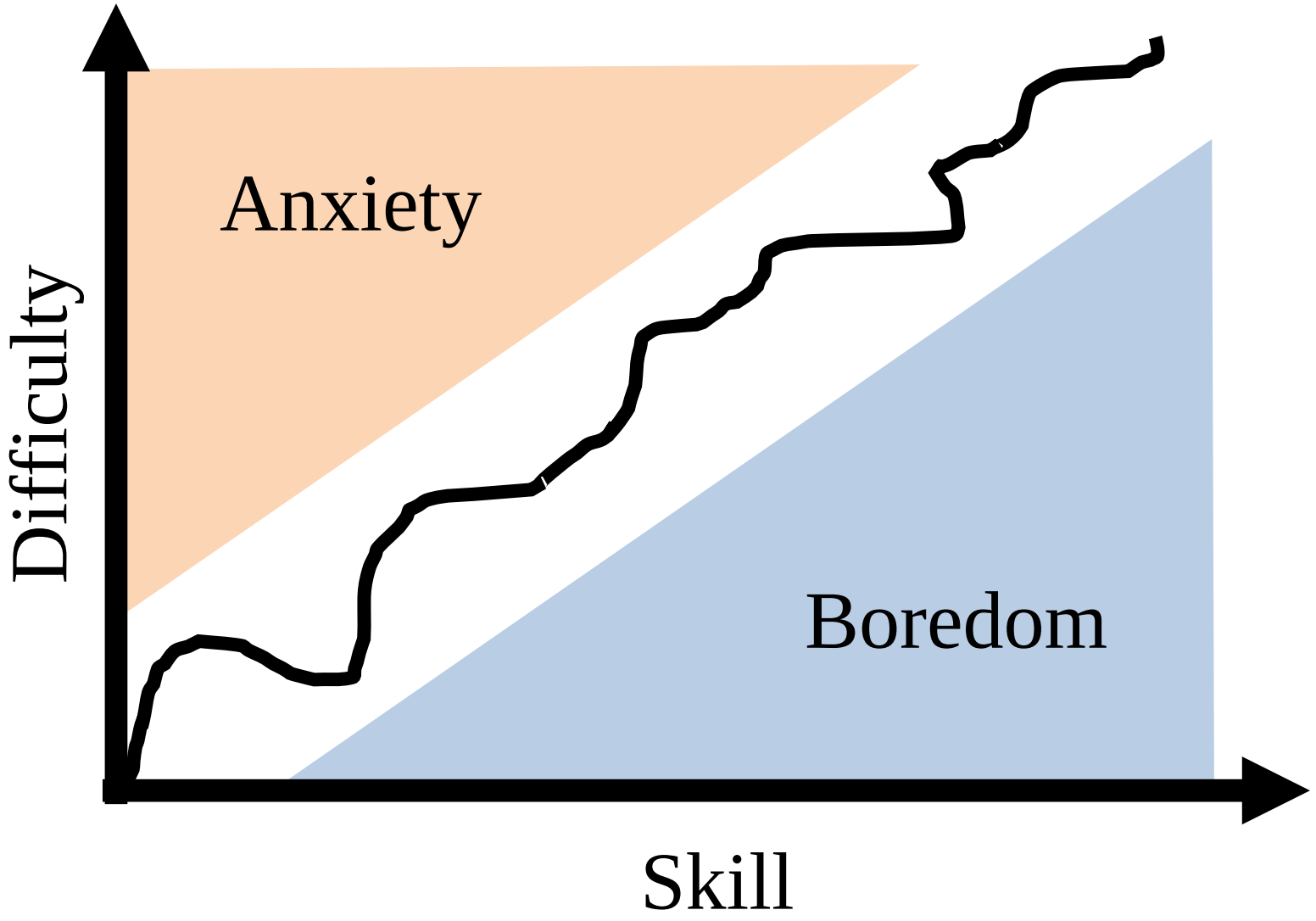
1. More thoughts on difficulty
2. Learning pathways
3. Group activity: *progression design*

Outline

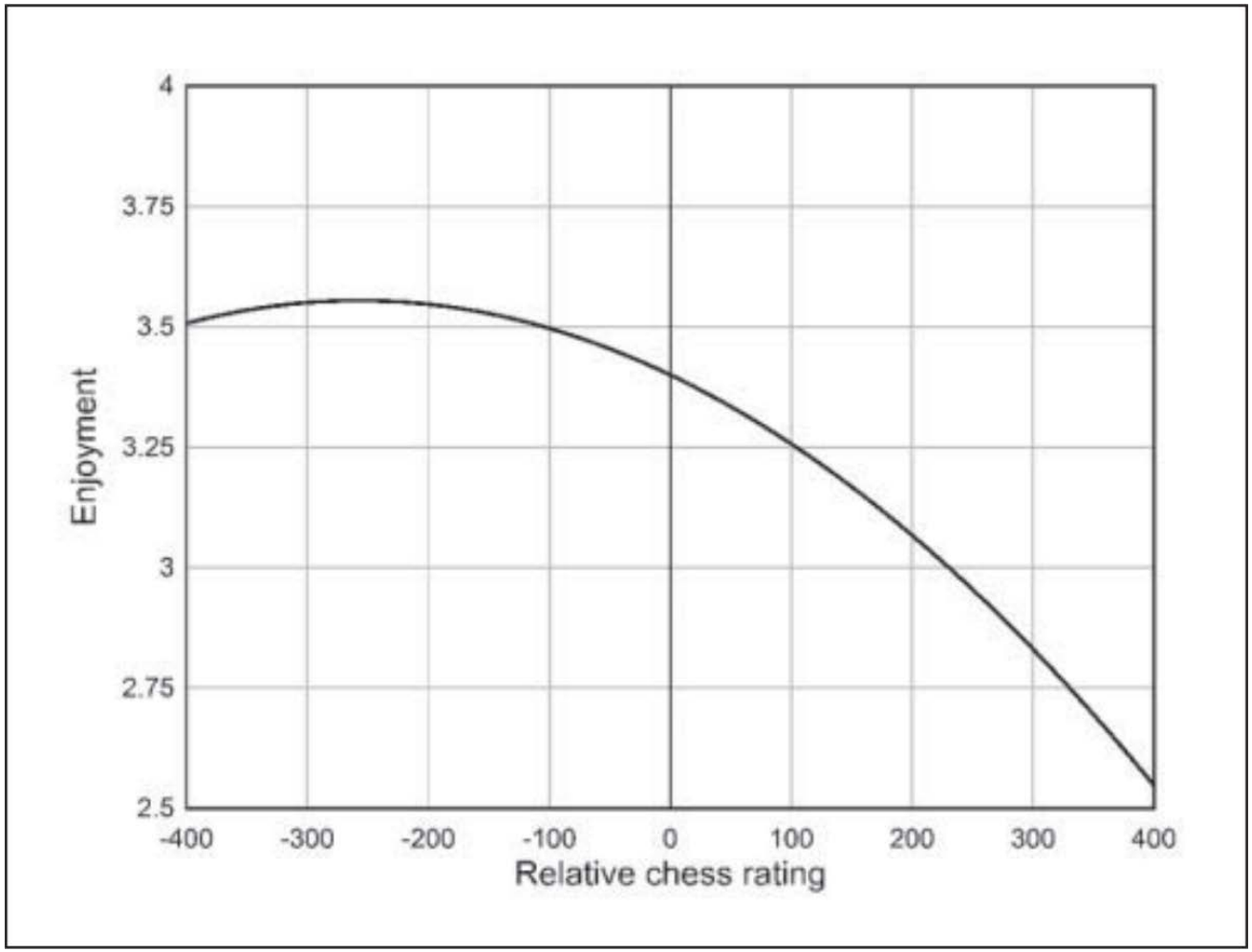
1. More thoughts on difficulty
2. Learning pathways
3. Group activity: *progression design*

Review: Flow

Flow: Ideal situation

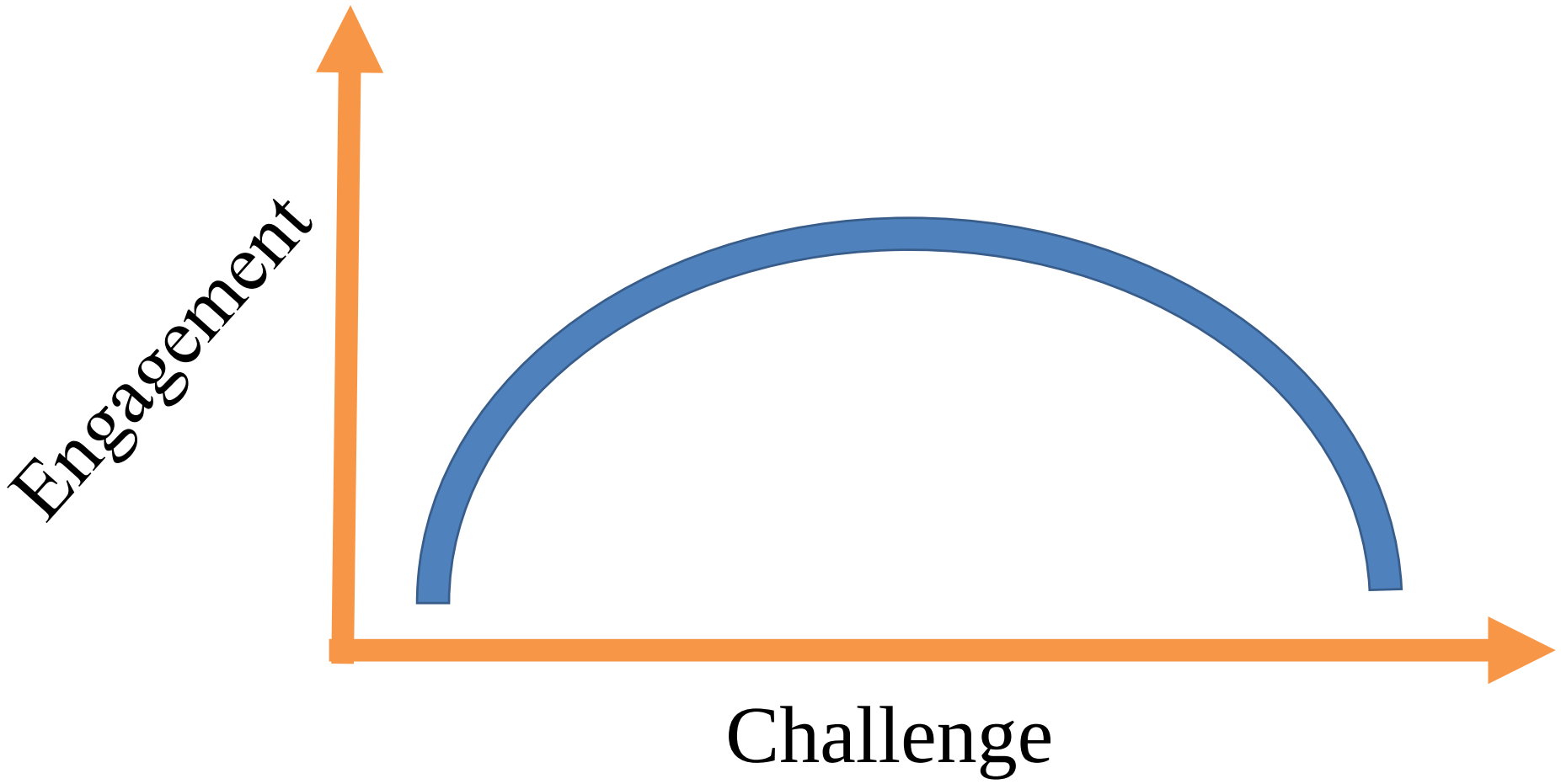


Impact of challenge on engagement

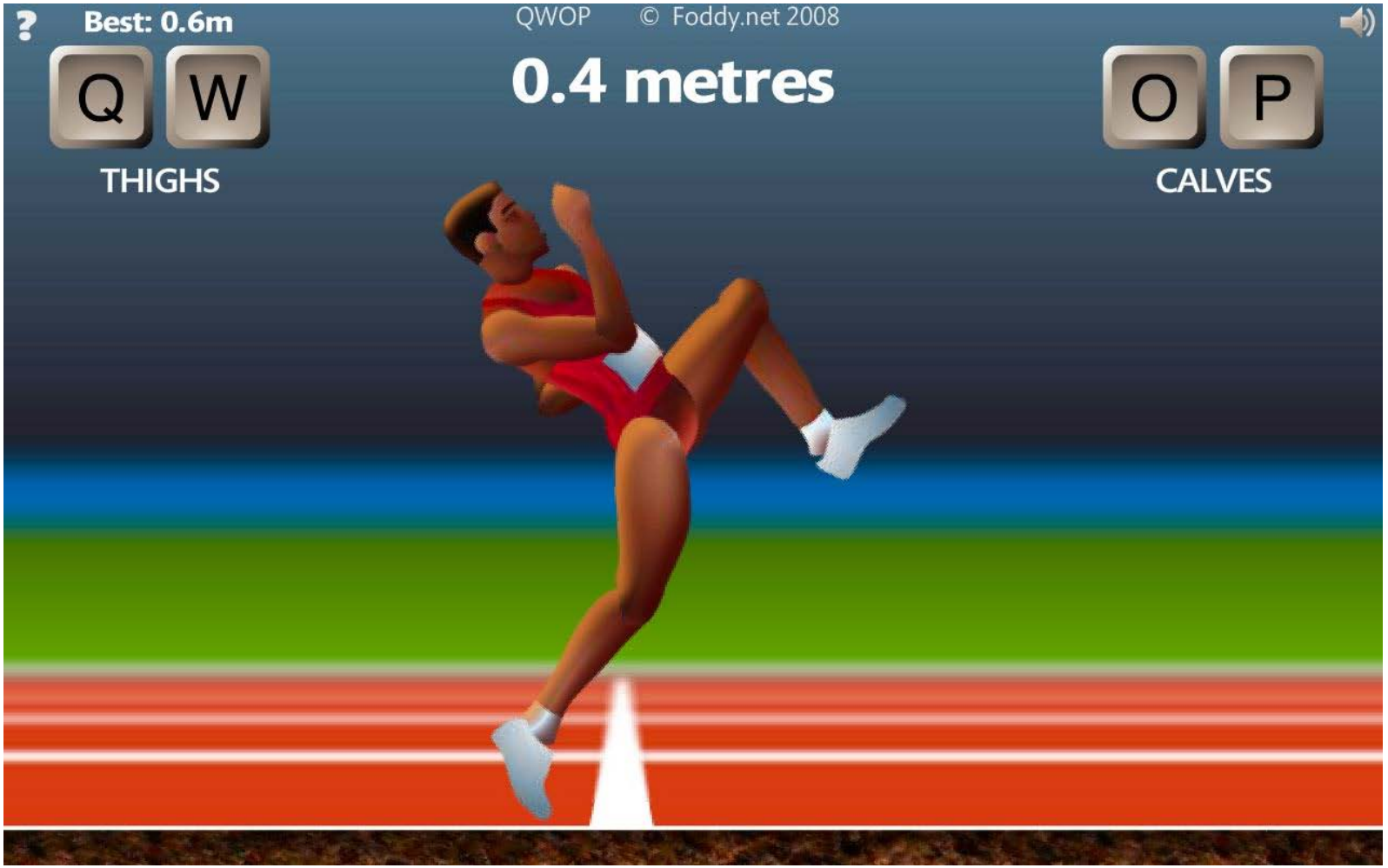


Abuhamdeh and Csikszentmihalyi 2012

Inverted-U hypothesis



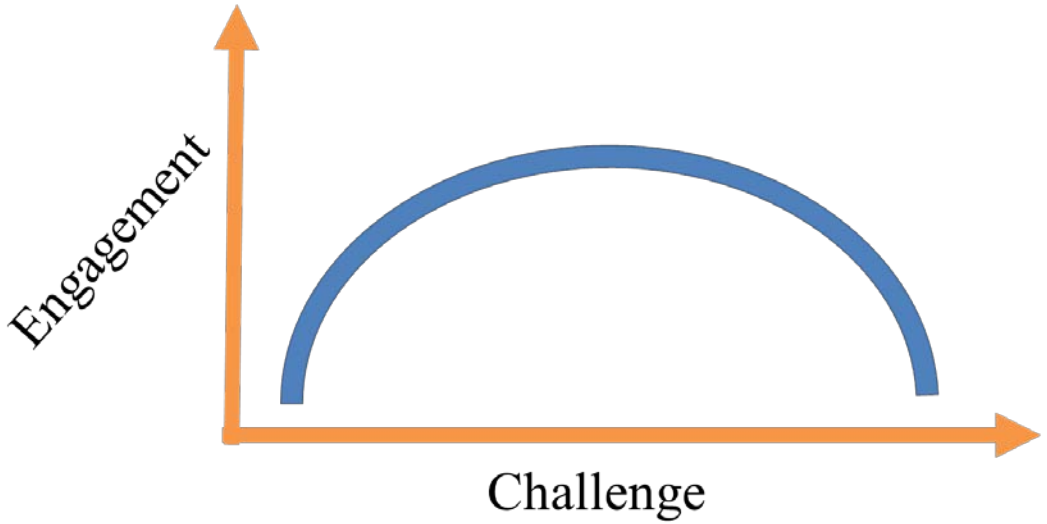
Extreme example: QWOP



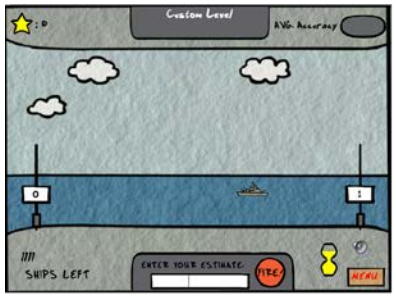
Bennett Foddy

Pair activity: quick discussion

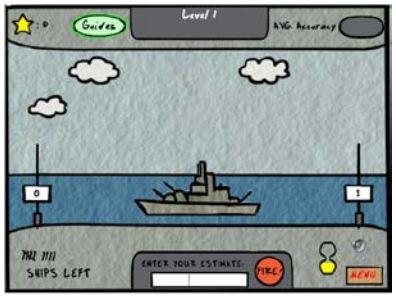
- Pick your favorite game
  - How difficult was *your* experience with this game?
  - Is this game *easier* or *harder* than other games you have played and liked less?
  - Does the inverted-U hypothesis predict *your* engagement?



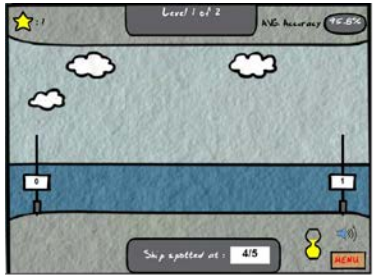
Large-scale experiment



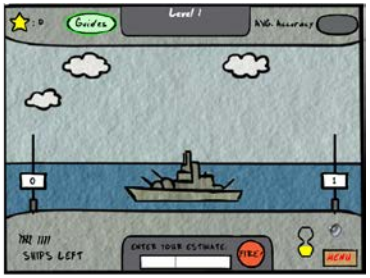
Smaller ship



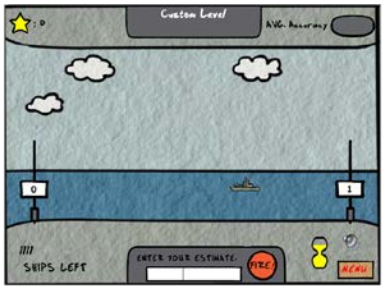
Larger ship



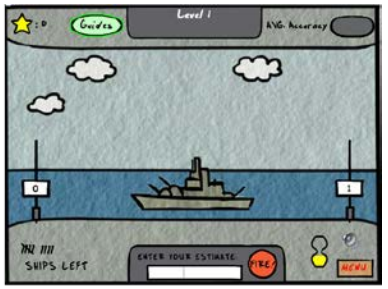
Click on fraction



Type fraction



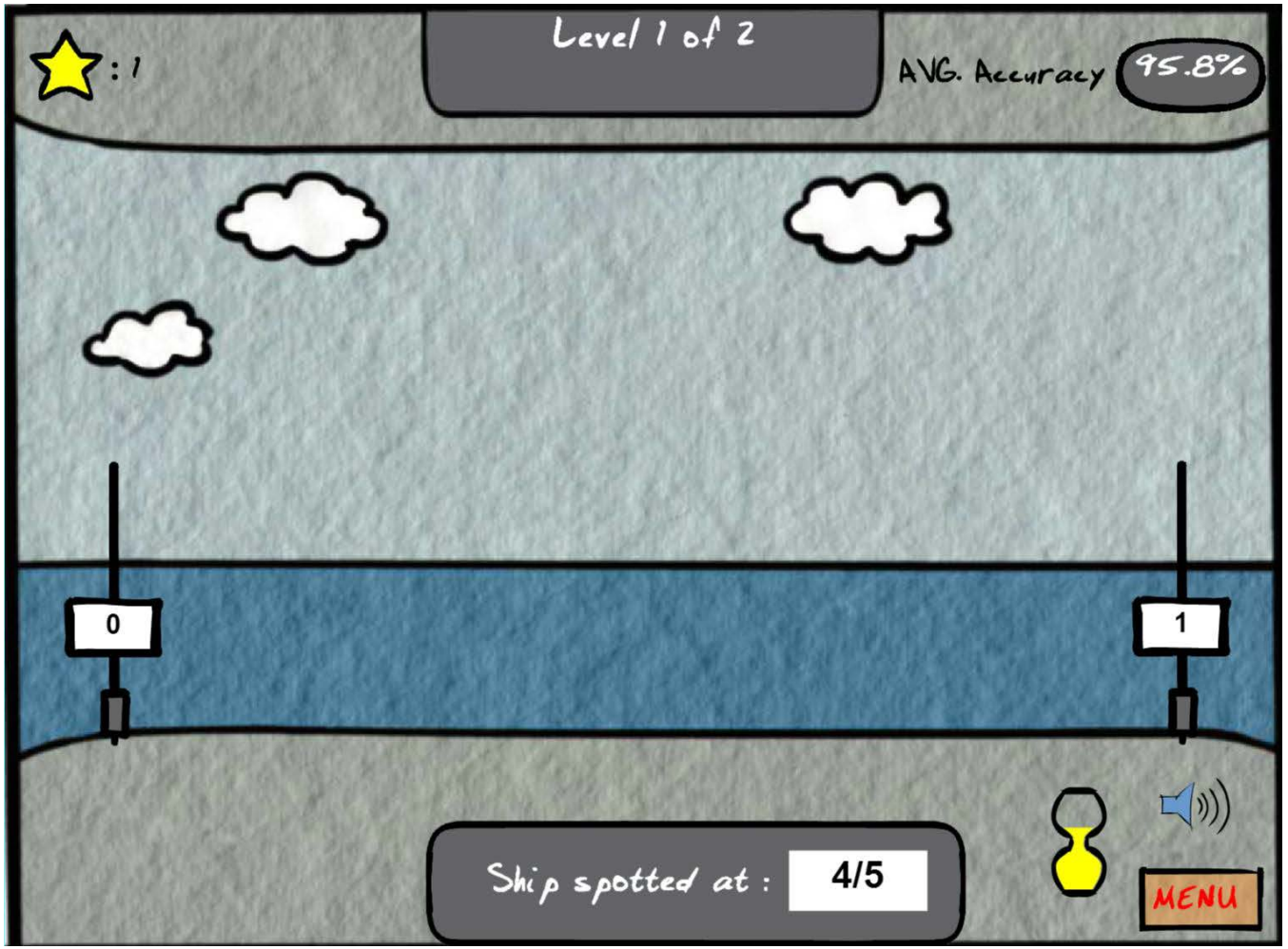
Less time



More time

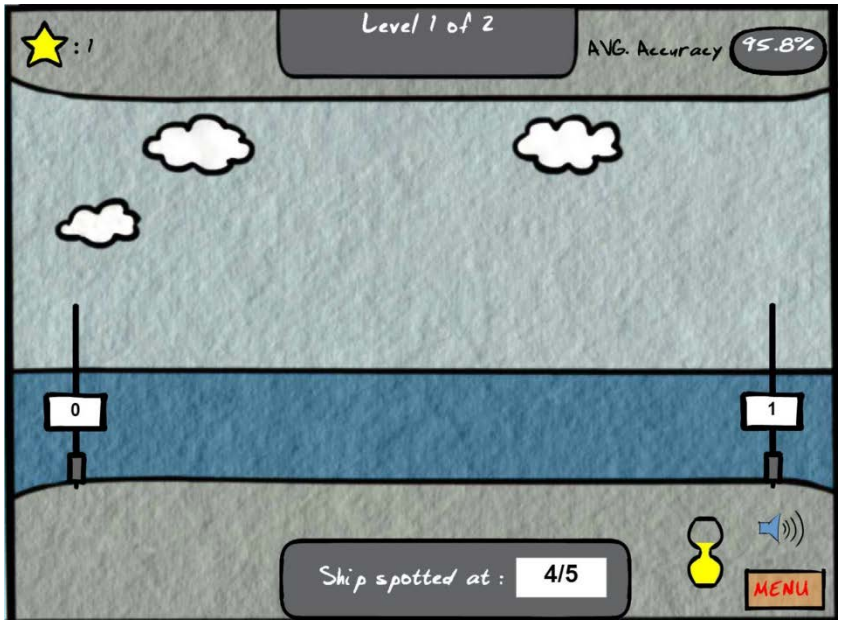
Lomas et al. CHI 2013

Battleship Numberline

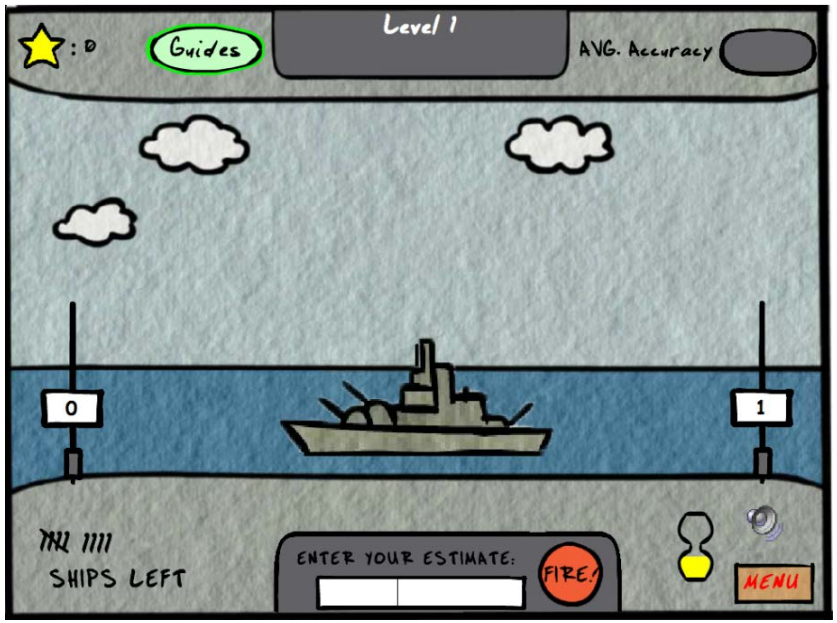


Lomas et al. CHI 2013

Impact of input type



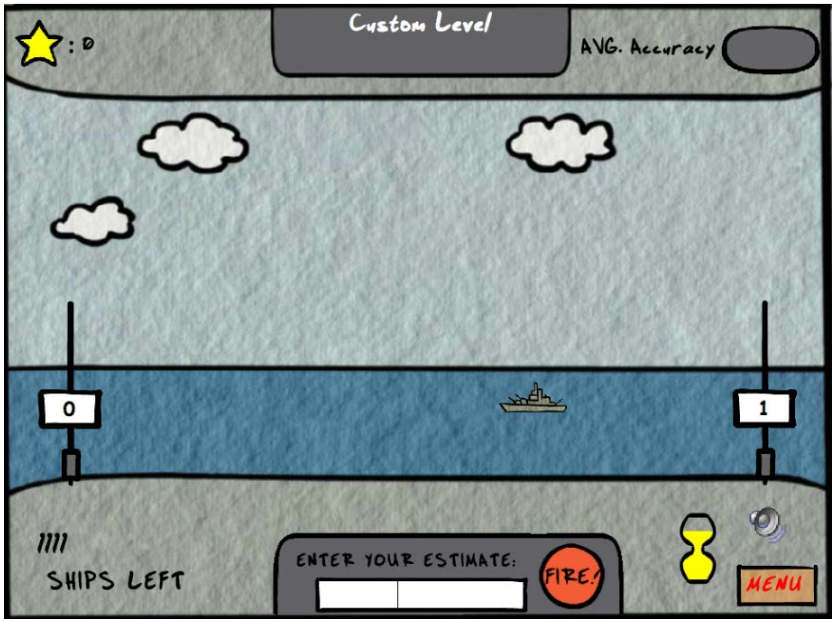
Click on fraction



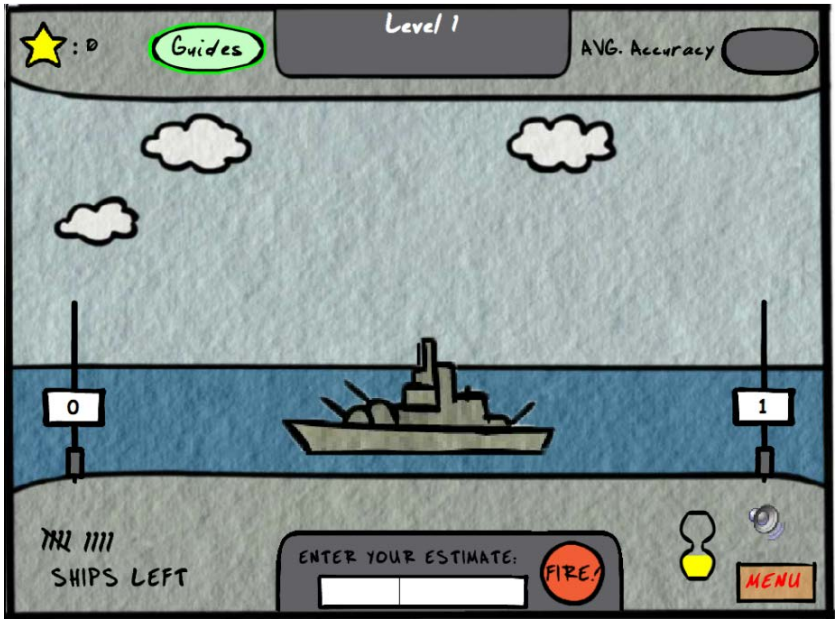
Type fraction

Lomas et al. CHI 2013

Impact of target size



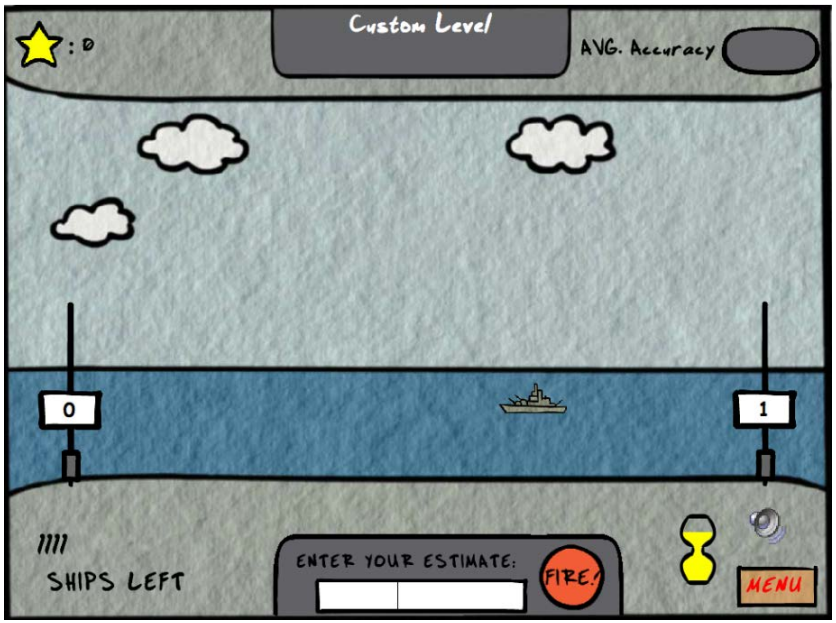
Smaller ship



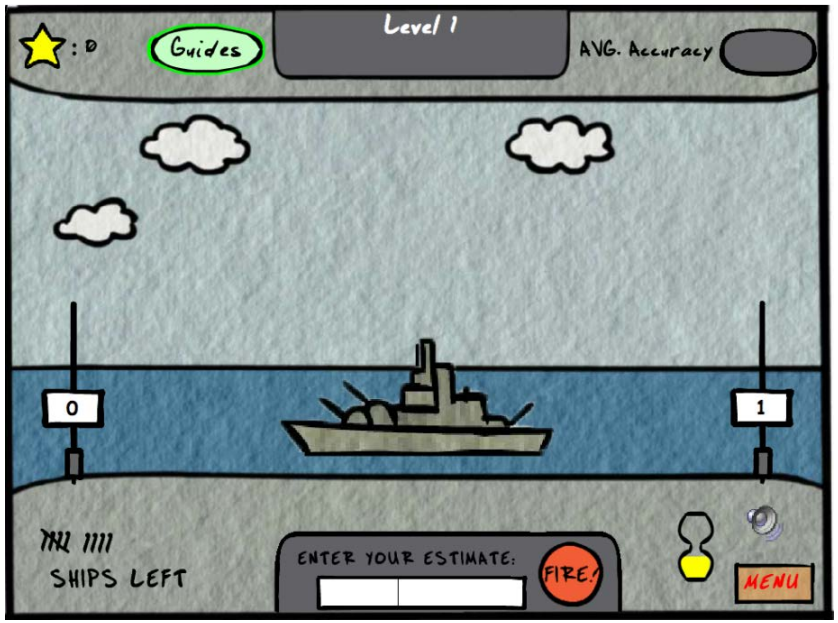
Larger ship

Lomas et al. CHI 2013

Impact of time limit



Less time



More time

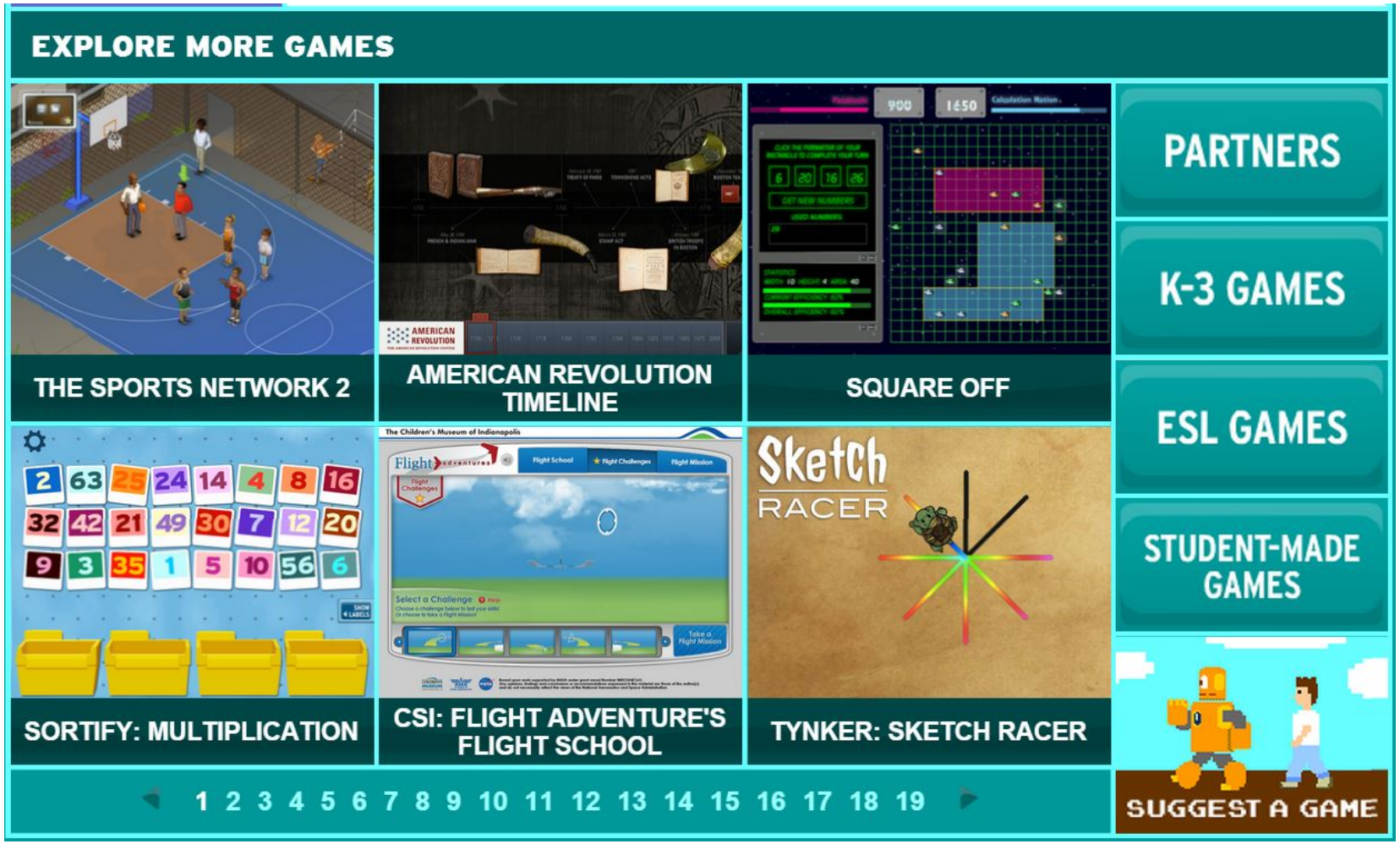
Lomas et al. CHI 2013

Experiment: 28,800 conditions!

- Input types: *click on number line* vs. *type fraction*
- Ship sizes: 4, 6, 8, 10, 16, 20, 24, 30, 40%
- Time limits: 2, 3, 4, 5, 8, 10, 15, 30 seconds

Lomas et al. CHI 2013

Experiment: 70,000 people



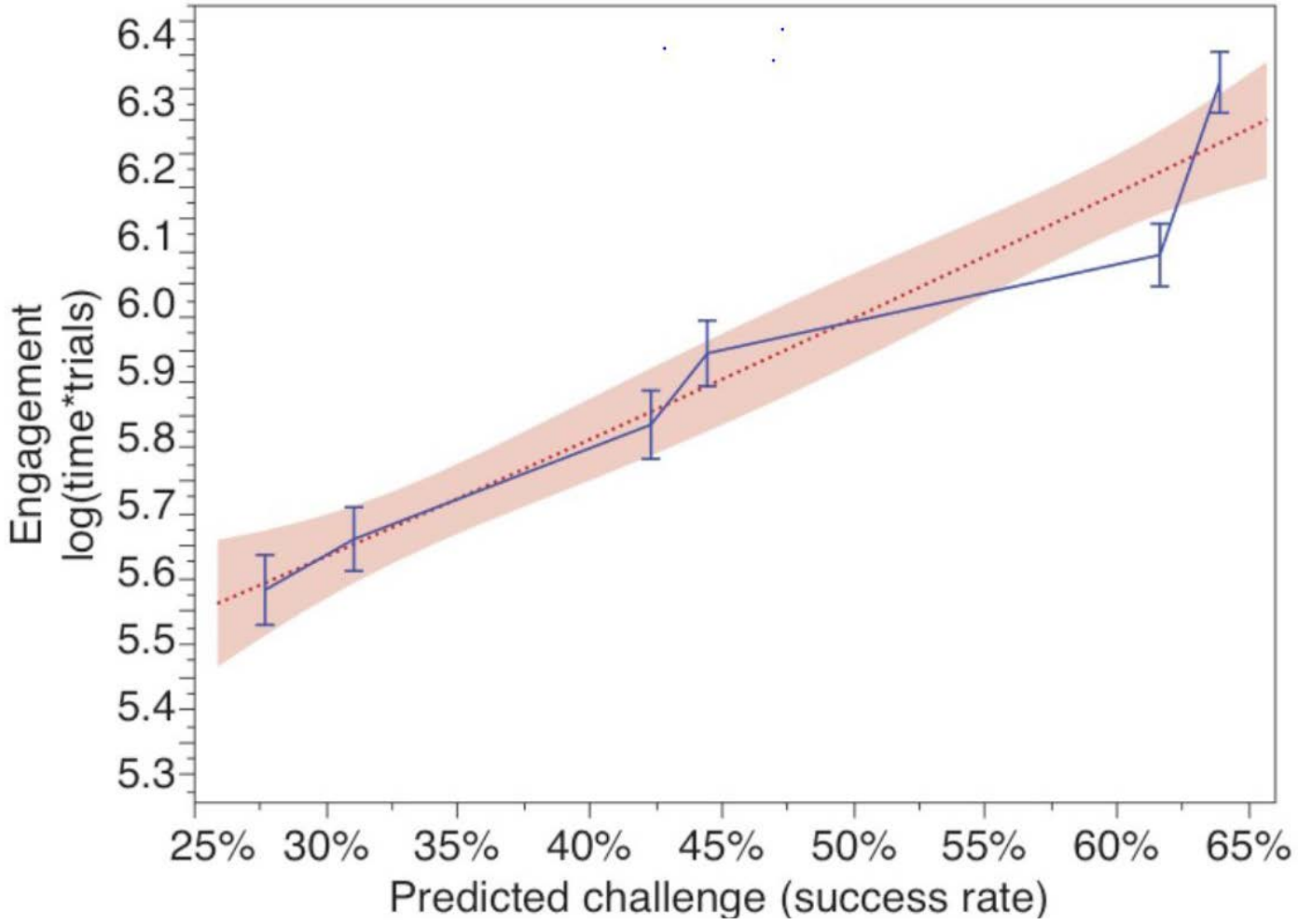
Lomas et al. CHI 2013

Results

- Clicking on target = more time played
- Bigger target = more time played
- Longer time limit = more time played

Lomas et al. CHI 2013

Inverted U?



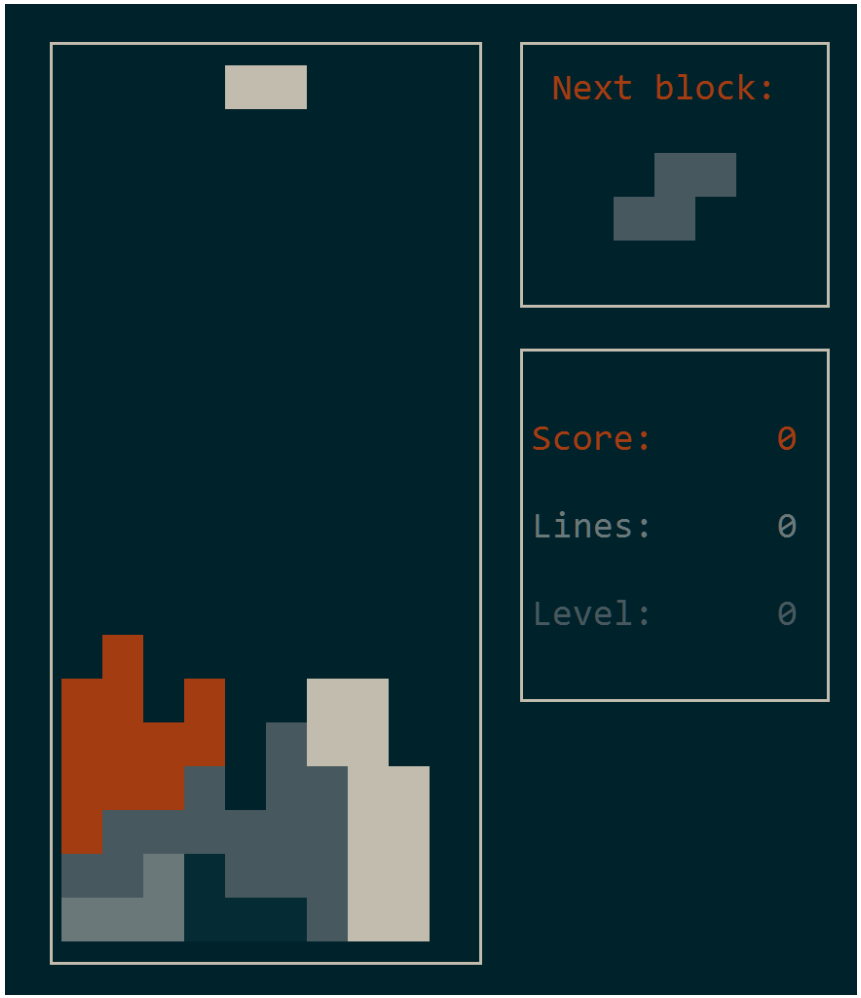
Lomas et al. CHI 2013

Findings

"In contrast to the Inverted-U hypothesis, which predicts that a moderate level of challenge should lead to maximum engagement, we found that the easier the game, the longer people played"

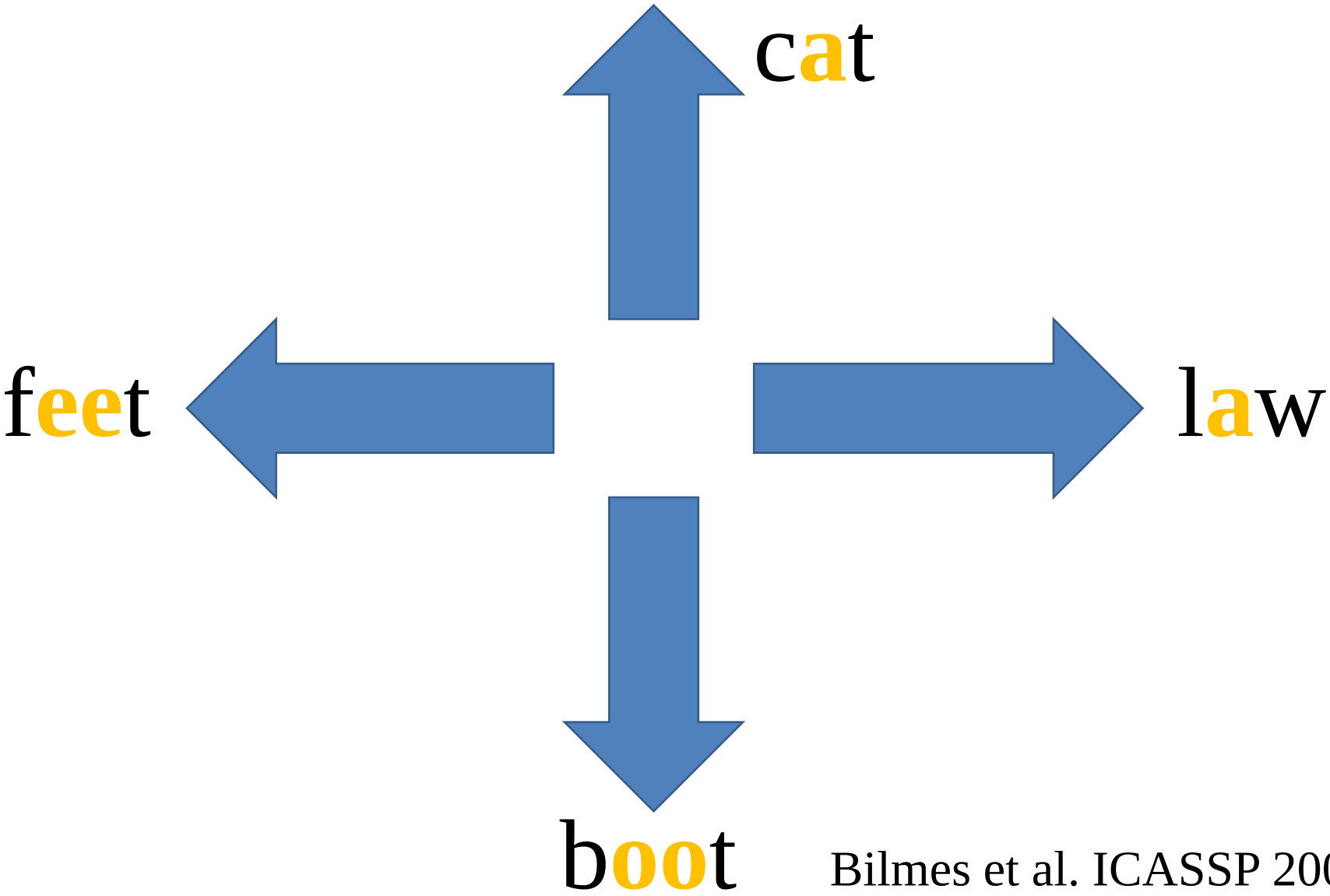
Lomas et al. CHI 2013

Bastet



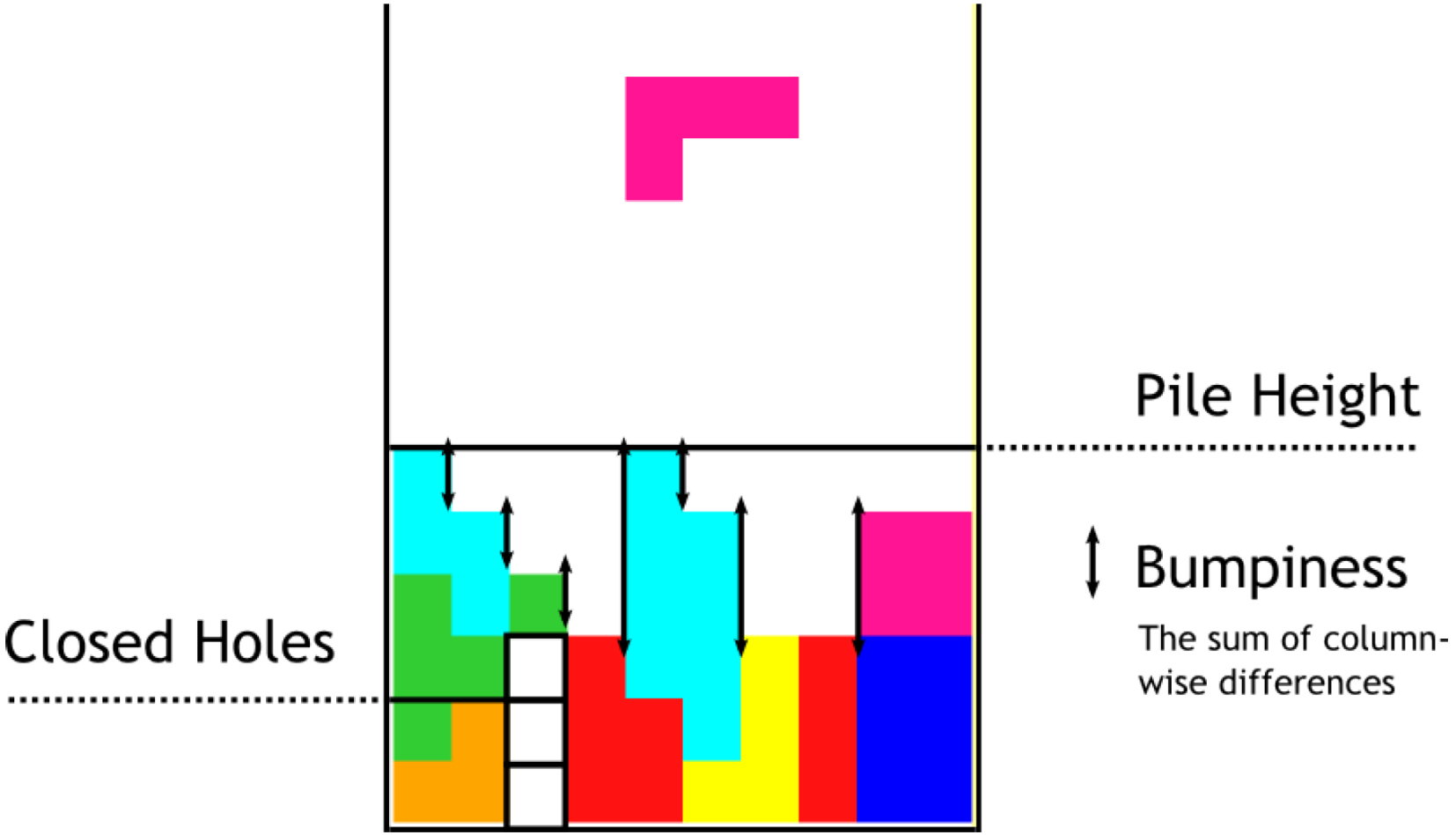
Frederico Poloni

Vocal Joystick



Bilmes et al. ICASSP 2006

Analysis of Tetris



Spiel et al. CHI 2017

Algorithms

- Nicetris
  - Ranks pieces by current goodness-of-fit, chooses best
- Bastet
  - Ranks pieces by current goodness-of-fit, chooses worst
- Grab Bag (original game)
  - Pieces drawn randomly without replacement
- True Random
  - Pieces chosen randomly at all times
- Skewed Random
  - 50% probability of  or  , otherwise random

Spiel et al. CHI 2017

Pair activity: rank easiest → hardest

- Nicetris
  - Ranks pieces by current goodness-of-fit, chooses best
- Bastet
  - Ranks pieces by current goodness-of-fit, chooses worst
- Grab Bag (original game)
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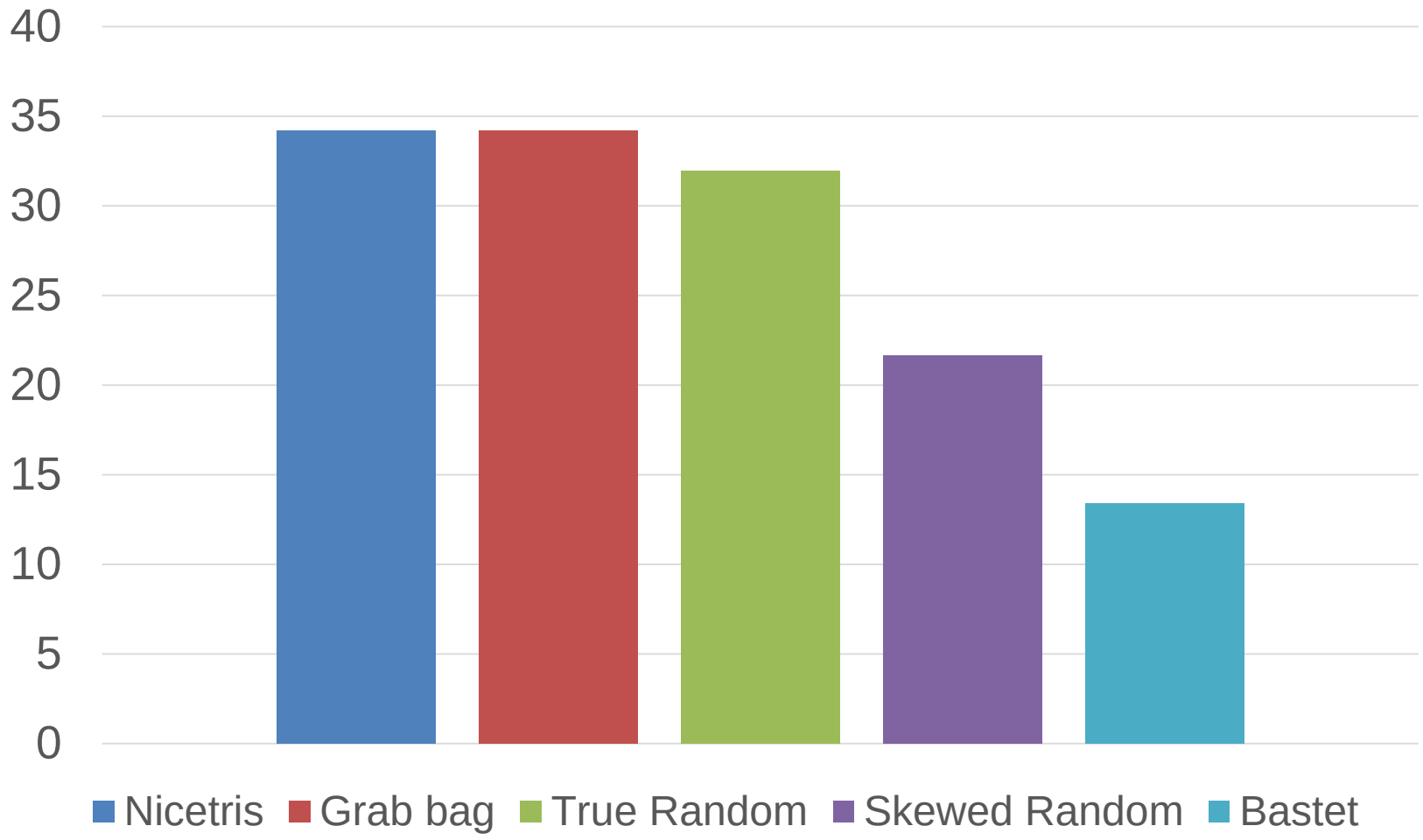
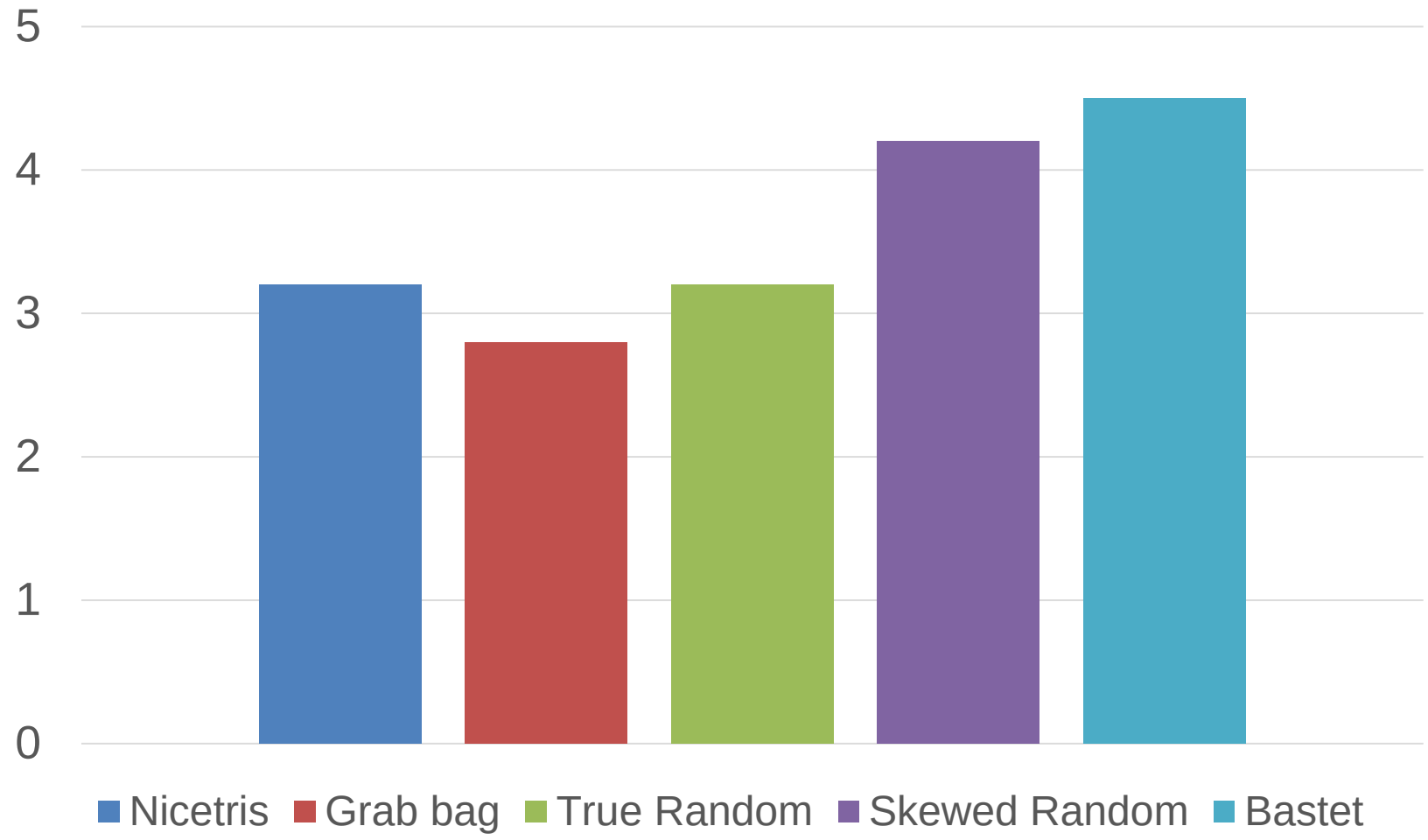
Spiel et al. CHI 2017

Performance: Lines cleared



Spiel et al. CHI 2017

Perceived difficulty



Spiel et al. CHI 2017

Pair activity: rank least fun → most fun

- Nicetris
  - Ranks pieces by current goodness-of-fit, chooses best
- Bastet
  - Ranks pieces by current goodness-of-fit, chooses worst
- Grab Bag (original game)
  - Pieces drawn randomly without replacement
- True Random
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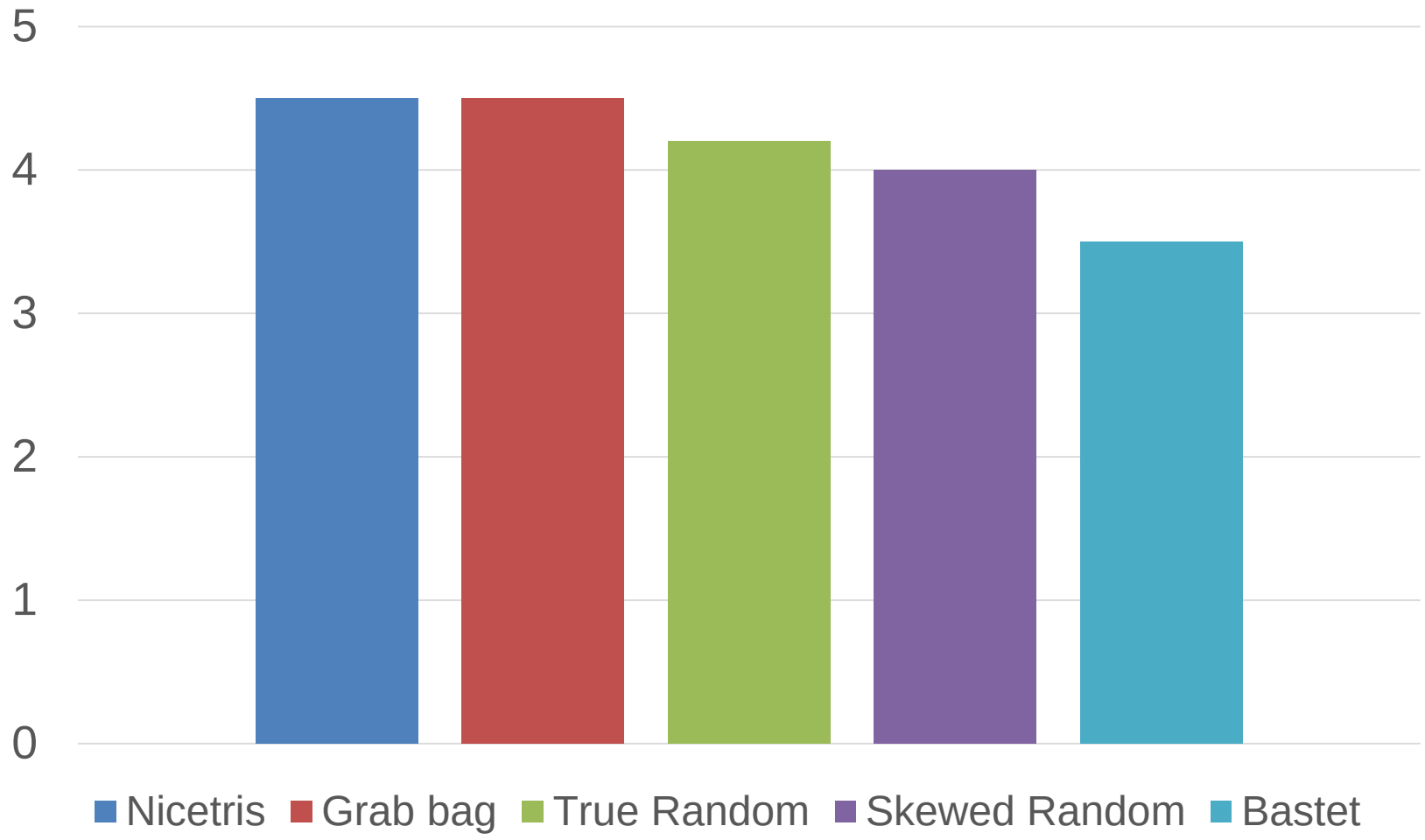
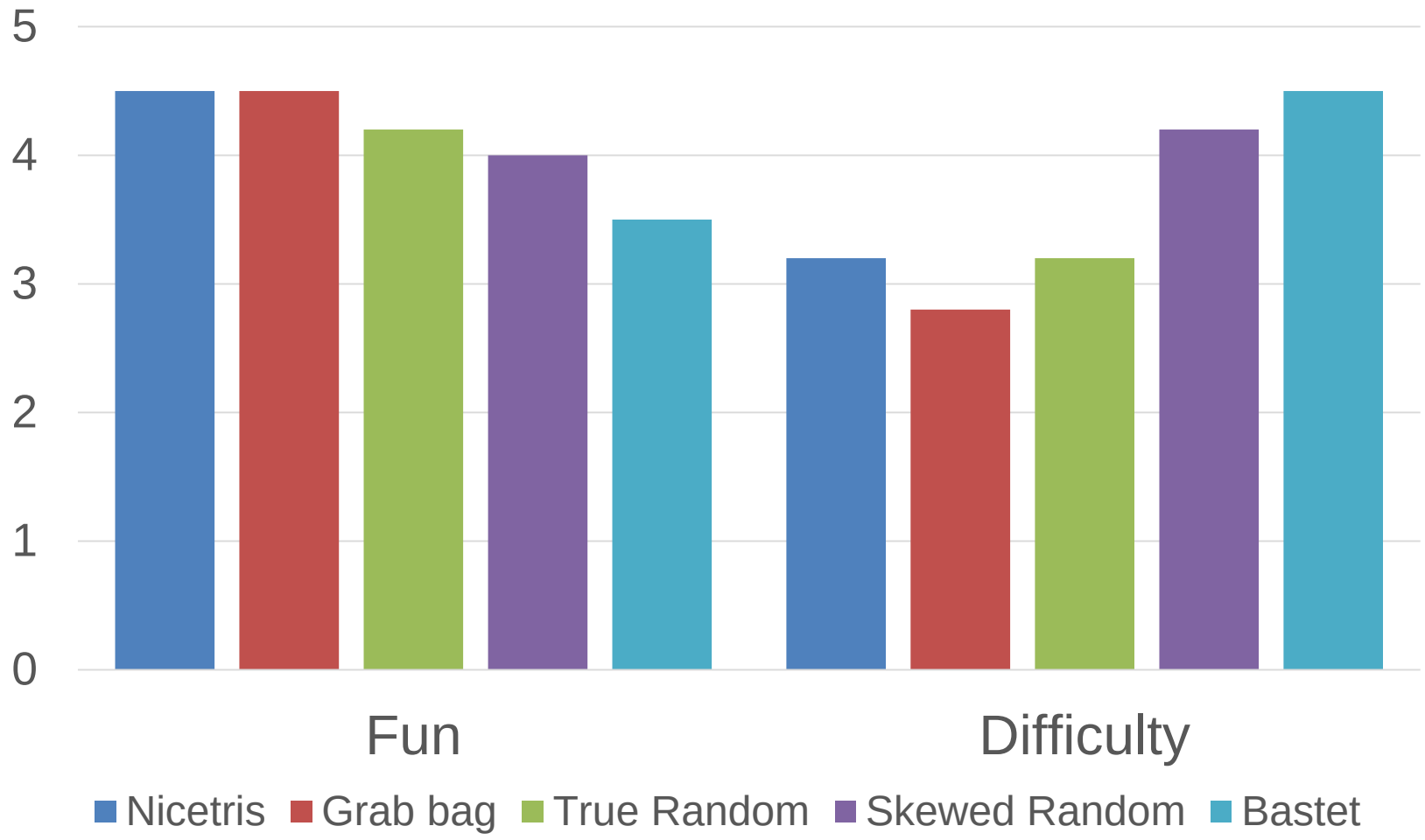
Spiel et al. CHI 2017

Fun



Spiel et al. CHI 2017

Fun vs. Difficulty



Spiel et al. CHI 2017

Findings

“players tended to have more fun in TETRIS the easier they perceived the game to be”

Spiel et al. CHI 2017

Findings

"Interestingly though, individually, **only eleven out of the sixteen** players found the game *more fun* when it was perceived as *less difficult*."

"**The others** attributed *more fun* to algorithms they perceived as *more difficult*, indicating that engagement and enjoyment are linked differently for different types of players."

Spiel et al. CHI 2017

Key Lesson of this Class #3

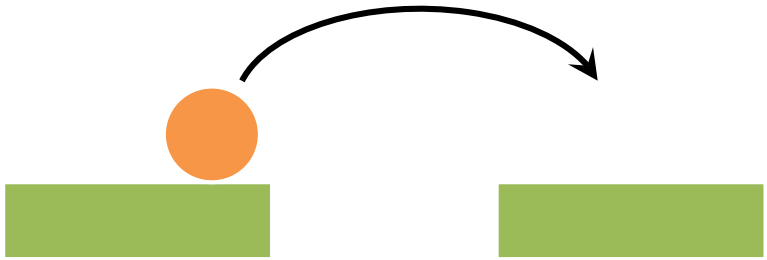
when in doubt, make the game ***easier***

Outline

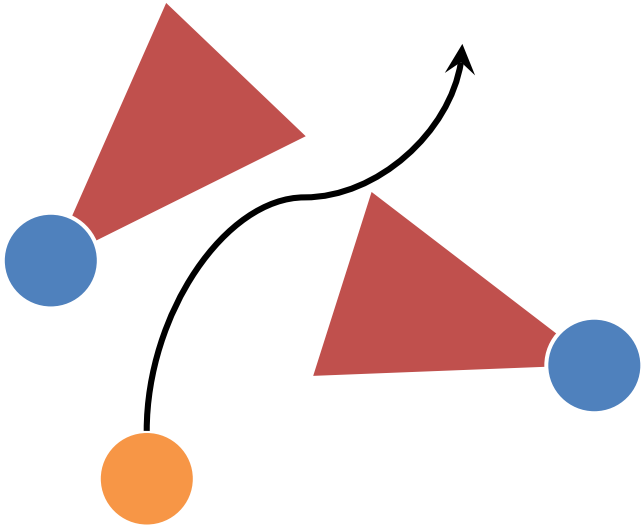
1. More thoughts on difficulty
2. Learning pathways
3. Group activity: *progression design*

Review: Design Patterns

Platformer: Jump



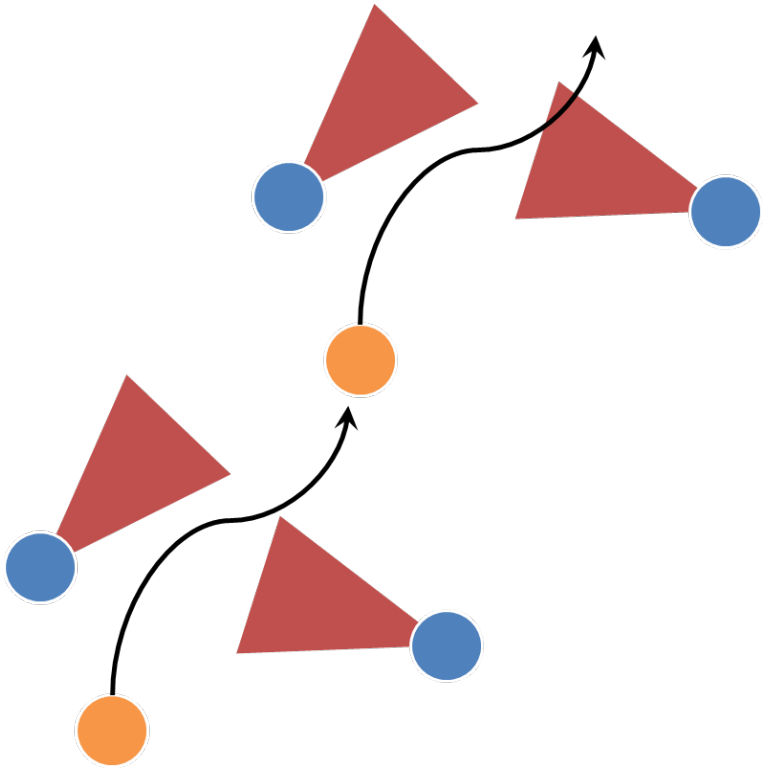
Stealth Game: Avoidance



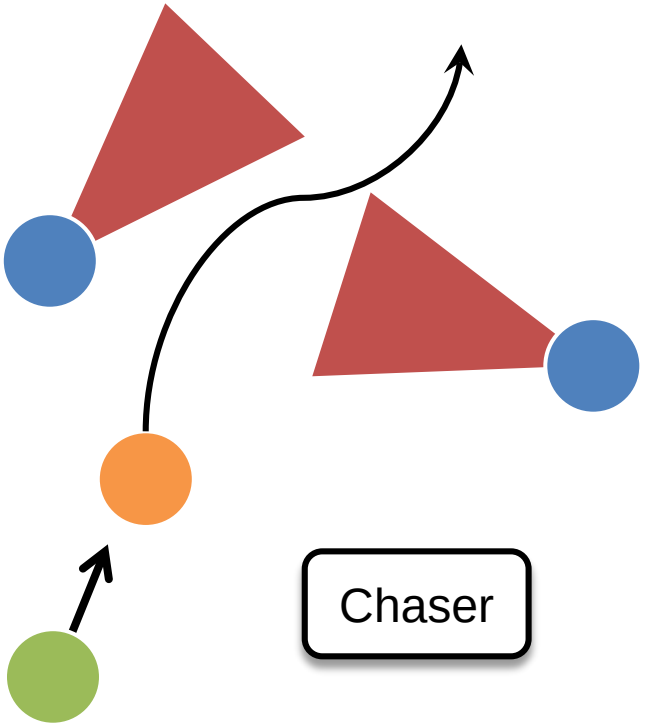
- Help player to *recognize* situations and *apply* learned skills
- Often inspired by game genre
- Ultimately, specific to your game design

Review: Composition

Avoidance + Avoidance



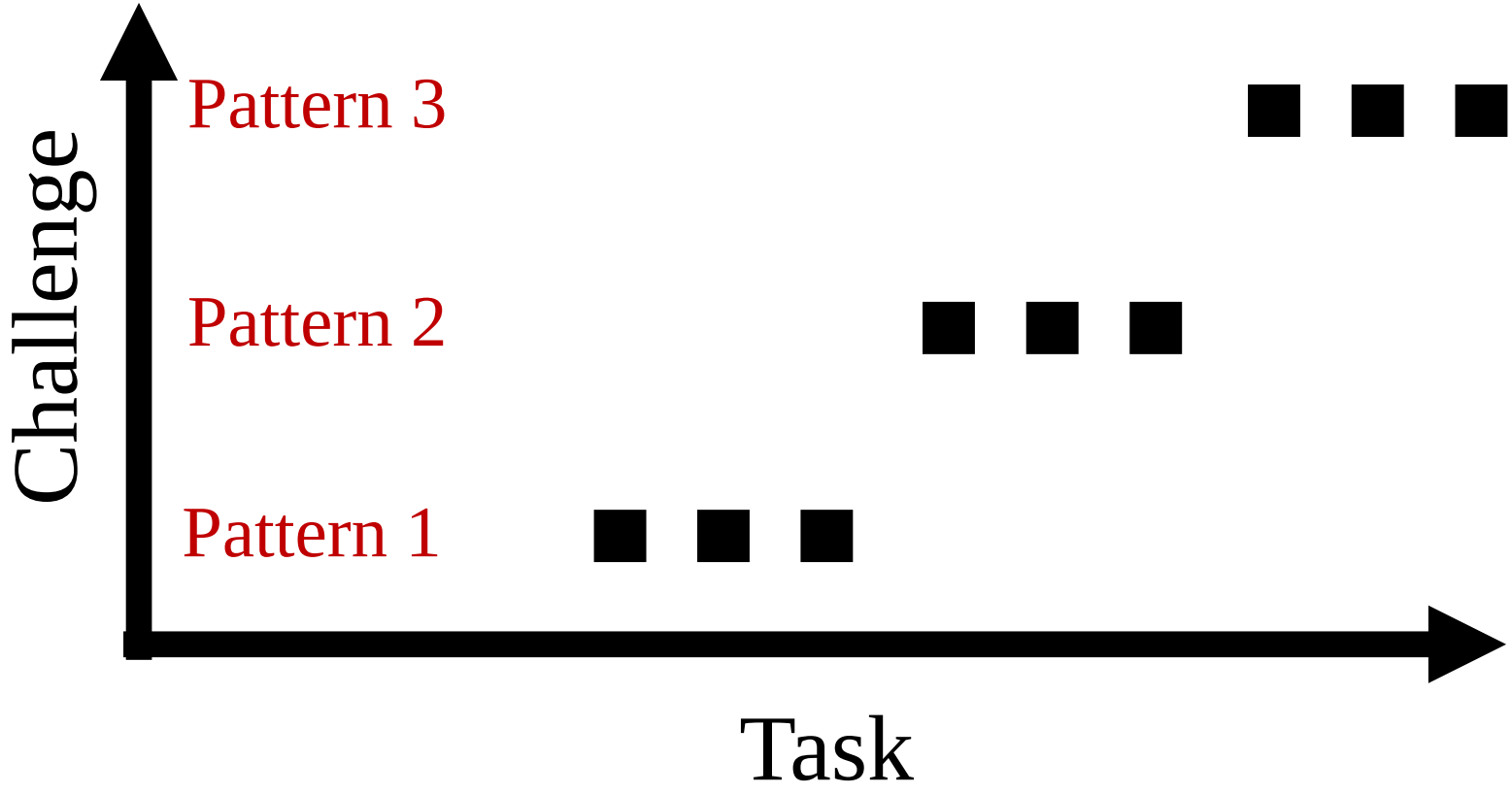
Avoidance + Chasing



Review: *ITCOM* Gantt Chart

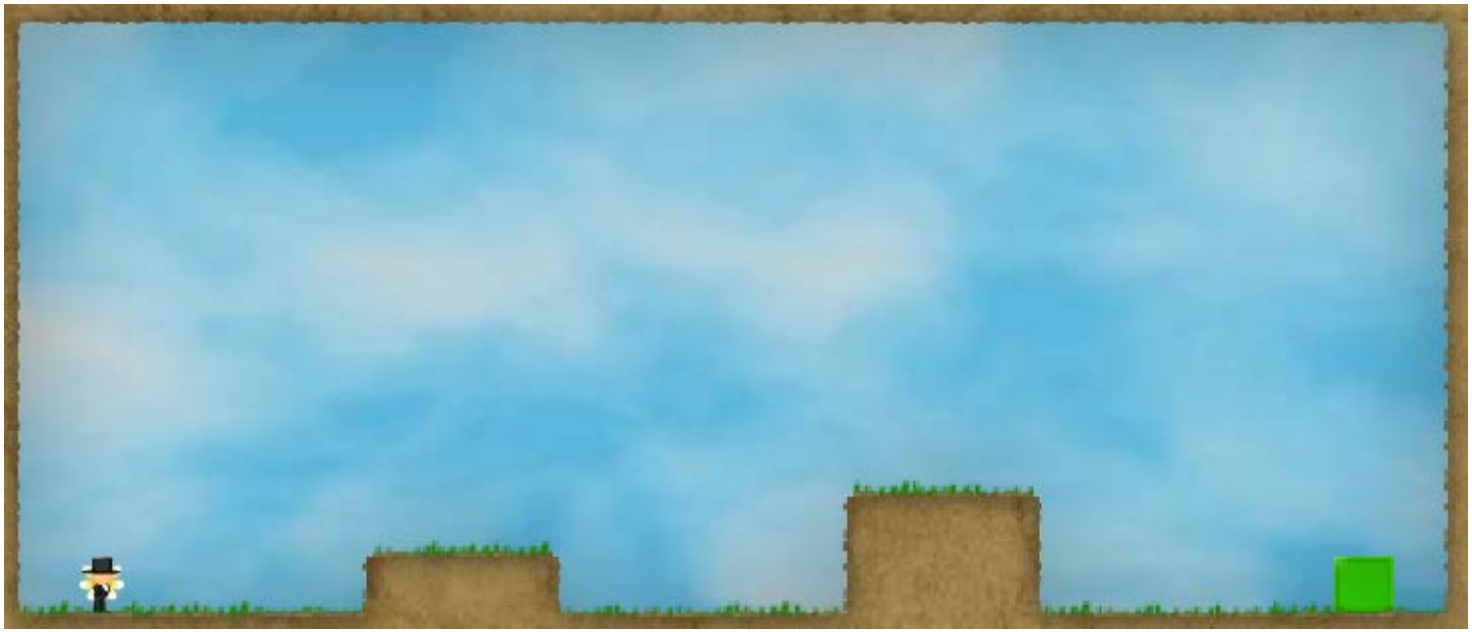
Make a Gantt Chart for *In the Company of Myself*

http://www.kongregate.com/games/2DArray/the-company-of-myself



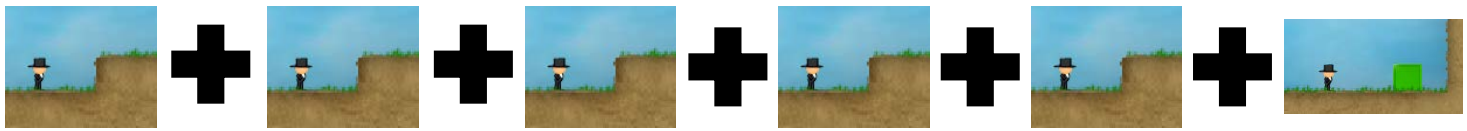
Level 1

Level 2

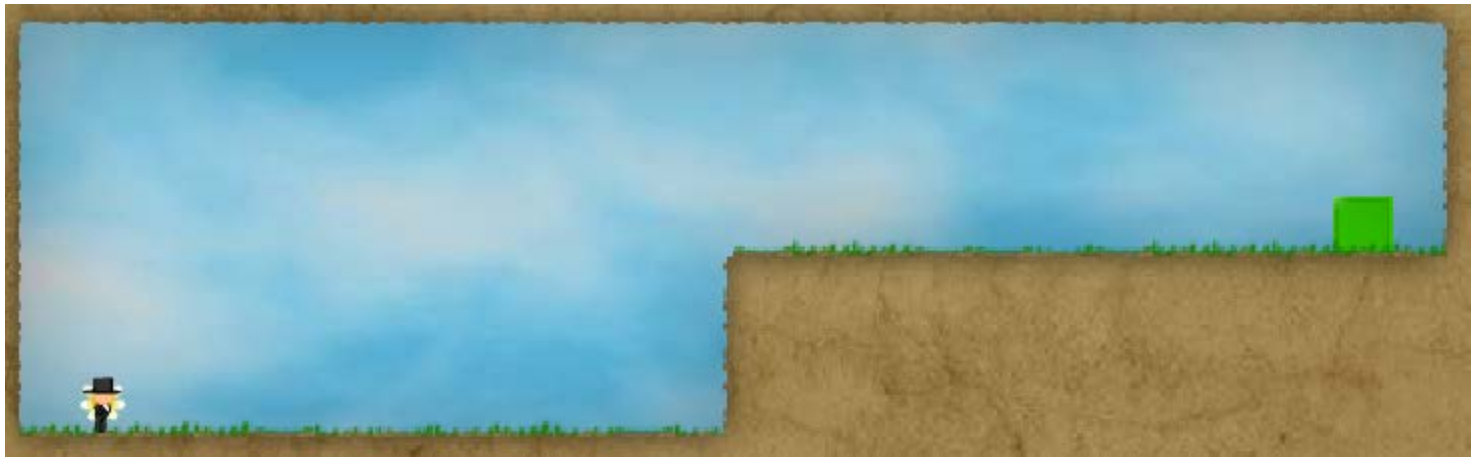


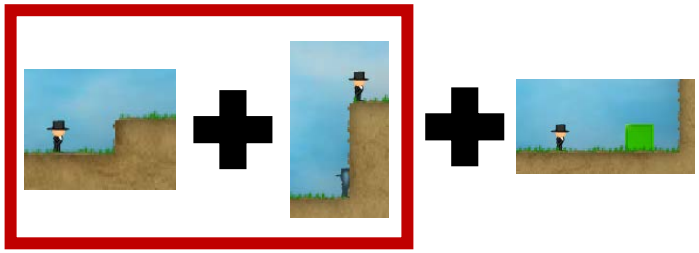
Level 3


Now that risk is involved, jumping on platforms doesn't seem as easy to me.



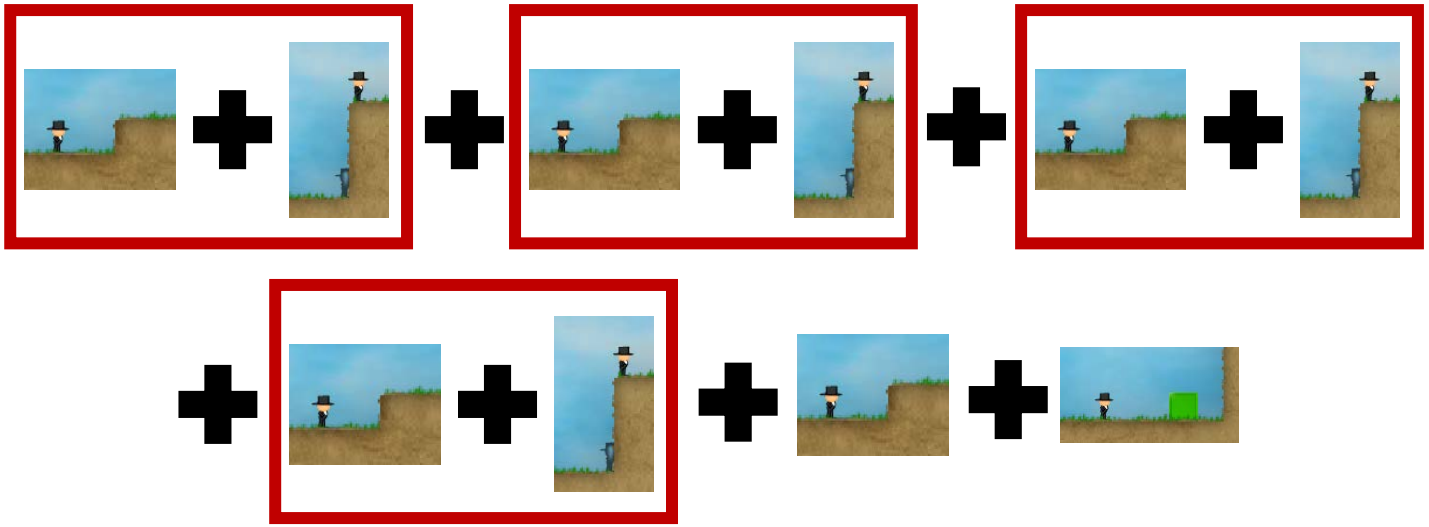
Level 4





Level 5

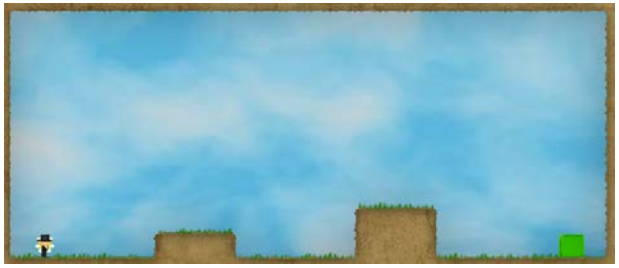

I haven't talked to anyone lately, but at least I can solve my own problems.



Which is harder?

Design Patterns

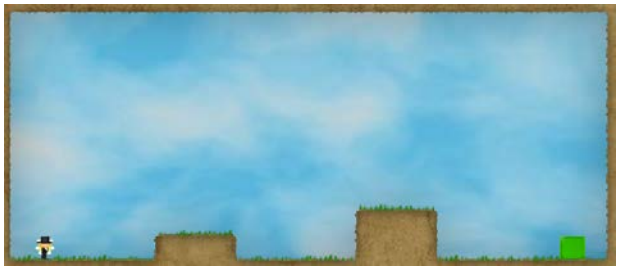
Level 1



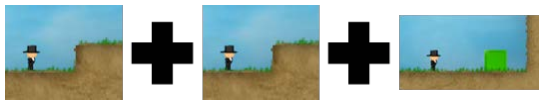
Level 2

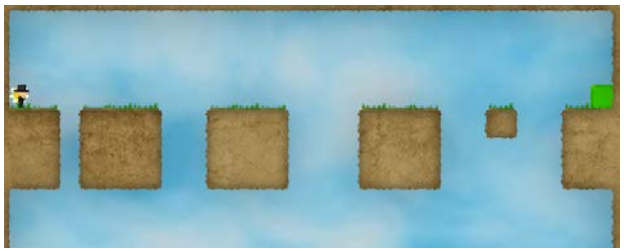
Which is harder?

Design Patterns

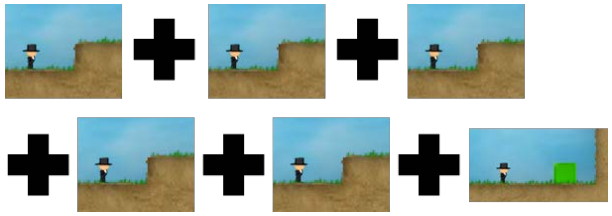


Level 2



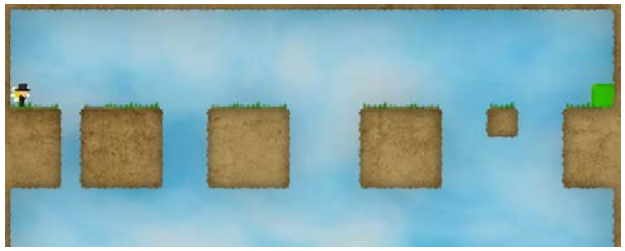


Level 3



Which is harder?

Design Patterns



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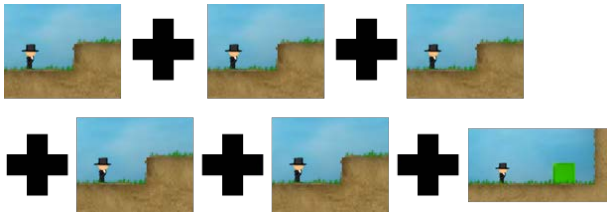
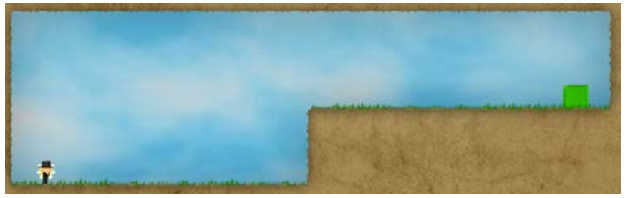
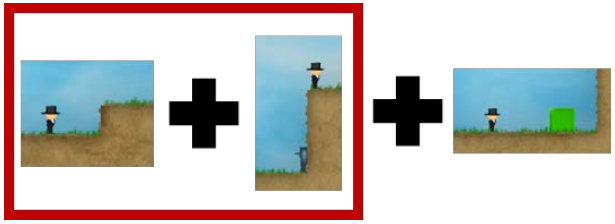


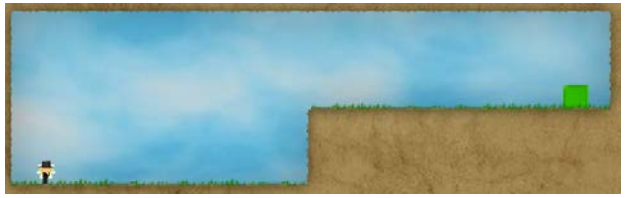


Level 4

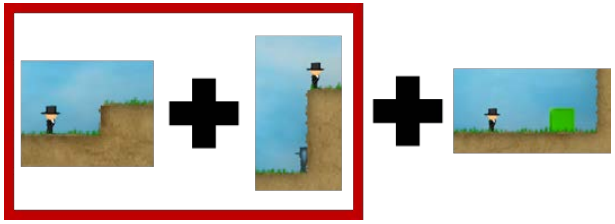


Which is harder?

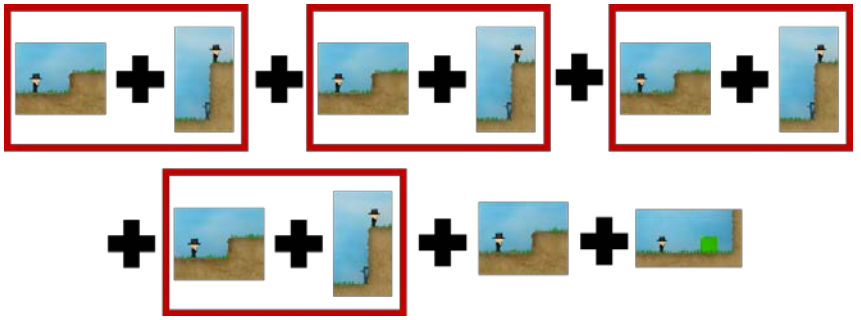
Design Patterns



Level 4

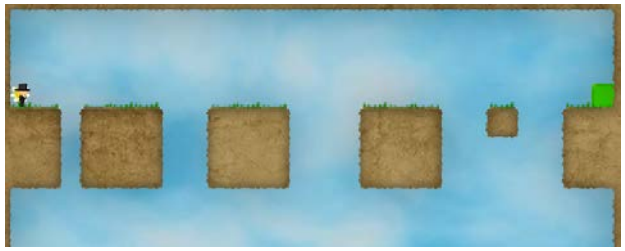


Level 5



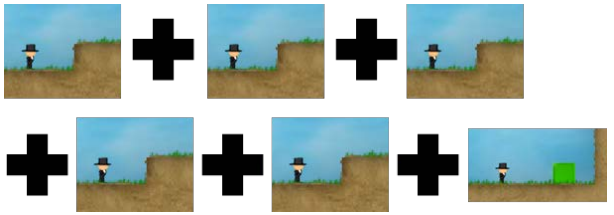
Which is harder?

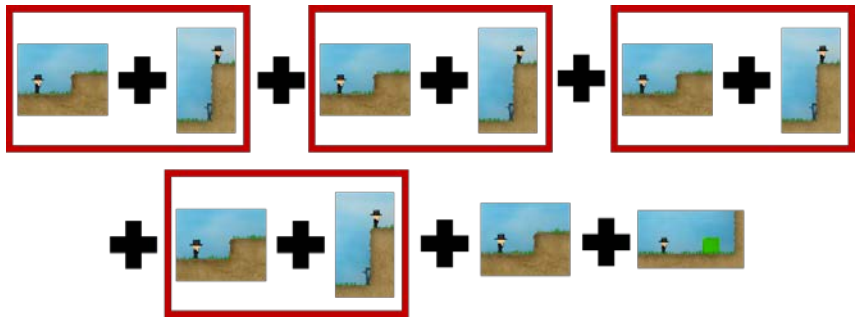
Design Patterns



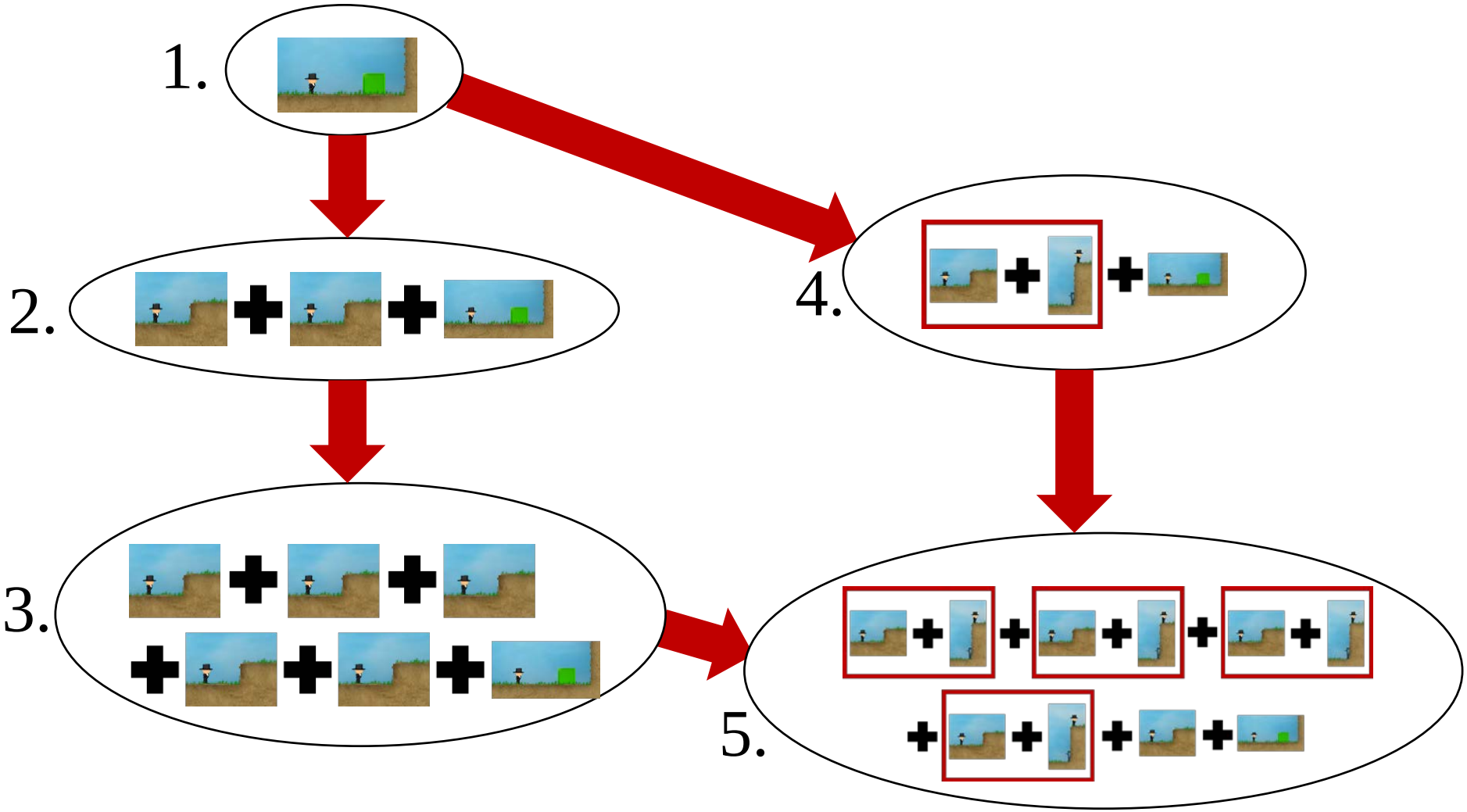
Level 3

Level 5



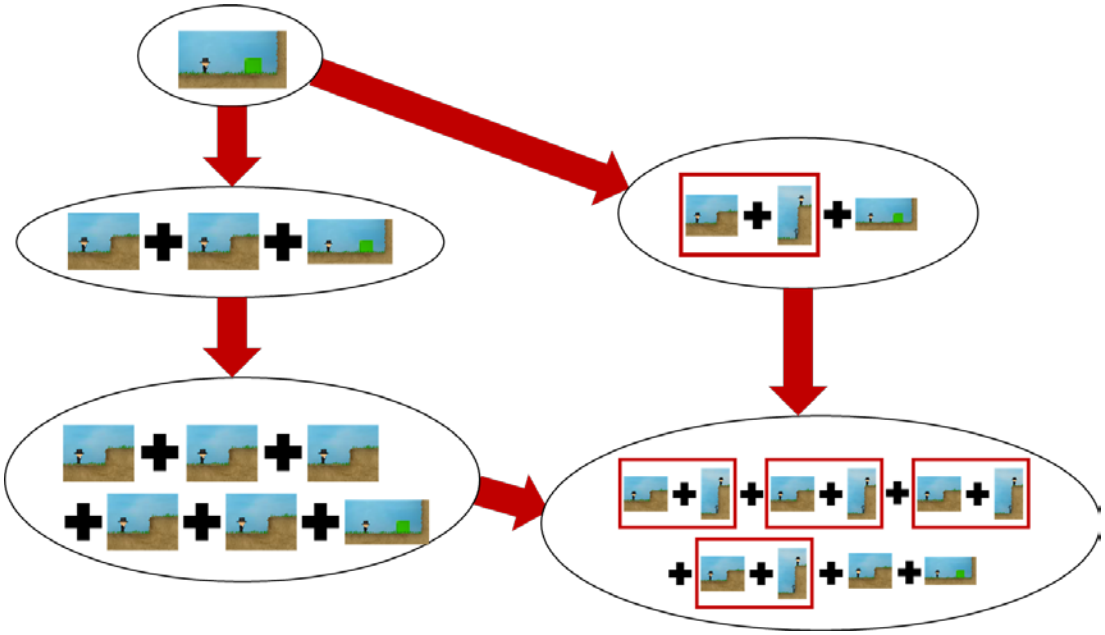


ITCOM Skill Tree



ITCOM Skill Tree

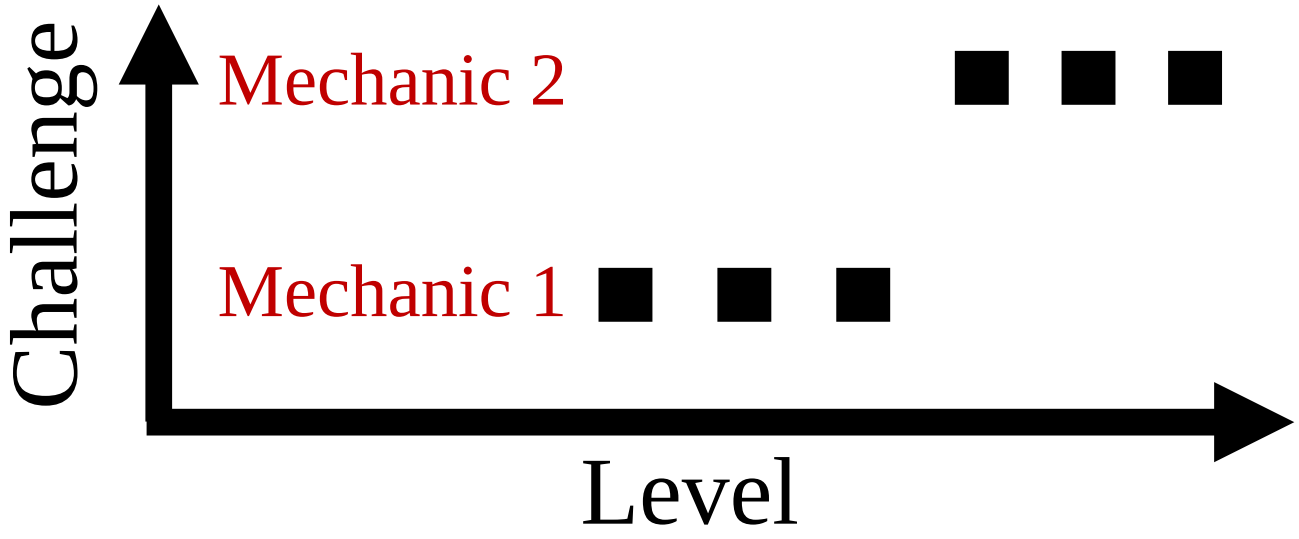
- Two promising learning pathways:
  - move → complex jumps → clone and jump → clone and complex jumps
  - move → clone and jump → complex jumps → clone and complex jumps



Outline

1. More thoughts on difficulty
2. Learning pathways
3. Group activity: *progression design*

Group activity #2: plan your tasks



Step 1. Make an (Ideal) Gantt Chart for your game
Step 2. Design a level that ***reinforces*** a mechanic
Step 3. Design a level that ***combines*** two mechanics