



# Cognition

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PSYC 2040

L12: Social Cognition

Part 1






# logistics: what's coming up

- final is cumulative and in class
- worth 30%
- closed book + help sheet
- 20 multiple choice
  - 10 from L0-L10
  - 10 from L11-L12
- 4 short answer questions
  - with options
  - 2 questions from L11-L12
  - 2 mixed content
- practice questions available on Canvas

14	M: April 22, 2024	<b>Research Summary [QALMRI] due</b>
14	Wednesday, April 24, 2024	<a href="#">L12: Social Cognition</a>
14	Friday, April 26, 2024	L12 continued...
15	Wednesday, May 1, 2024	L0-L12 review!
15	Friday, May 3, 2024	<b>Final</b>
16	Wednesday, May 8, 2024	Wrapping up!
16	M: May 13, 2024	<b>Research Reflection due</b>

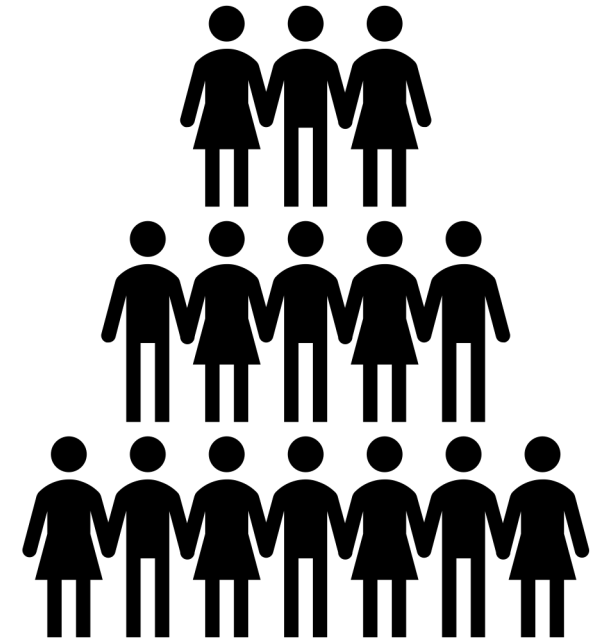
▼ Cumulative Final PRACTICE

 **Practice Final (Multiple Choice)**  
20 pts

 Practice Final (Short Answer Questions) 

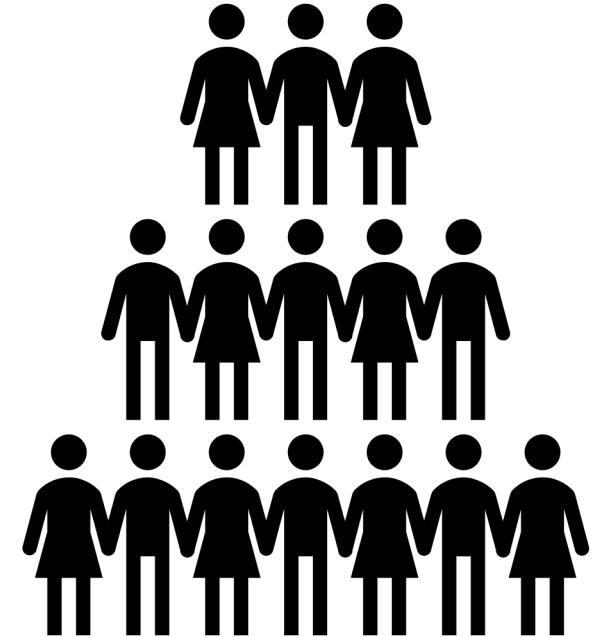
# today's agenda

- social preferences
- social learning
- social inference



# key questions in social cognition

- social cognition is a field that studies how people process, store, and retrieve information **in social contexts**
- many questions:
  - how do we collaborate/compete/cooperate?
  - how do we learn from others?
  - how do we interpret communicative signals?
  - how do we teach?



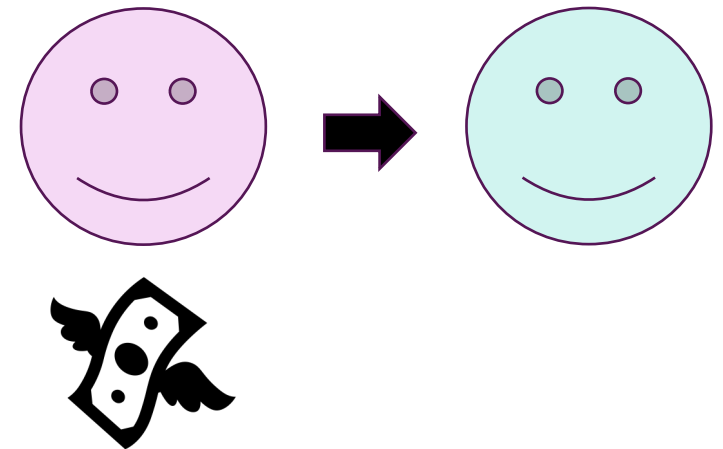
# social preferences

- social choice = choice between objects with rewards distributed across people
  - altruism
  - cooperation
  - trust
  - competition
- typically studied through “games” with monetary payoffs

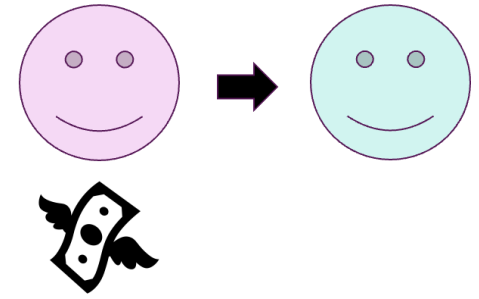


# dictator game

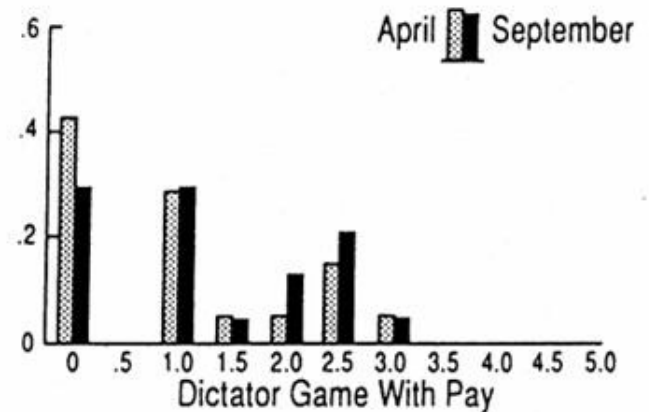
- proposers are given a certain amount of money and asked to divide it between themselves and a recipient
- proposers can give any amount (including nothing) without repercussions
- “narrow selfishness” theory: people maximize their own payoffs



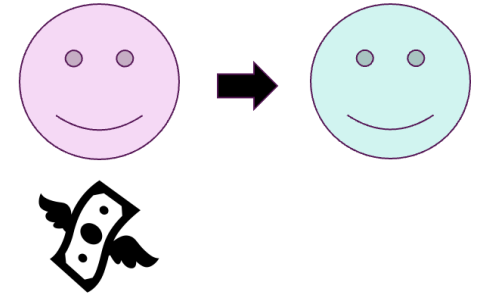
# dictator game



- Forsythe et al. 1994
- dictators had \$5 to divide between themselves and the recipient



# dictator game



- List and Cherry: proposers had \$20 or \$100 to divide

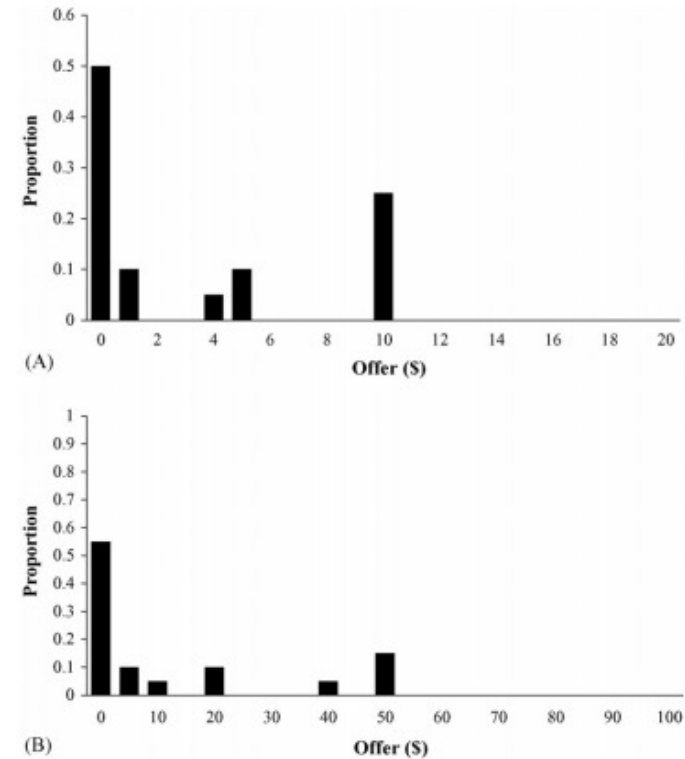
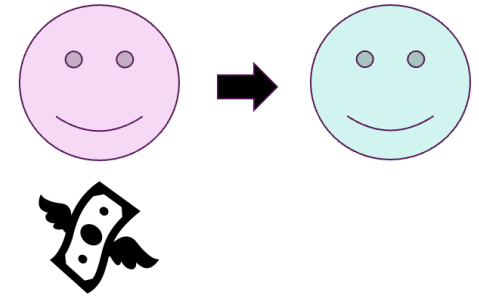


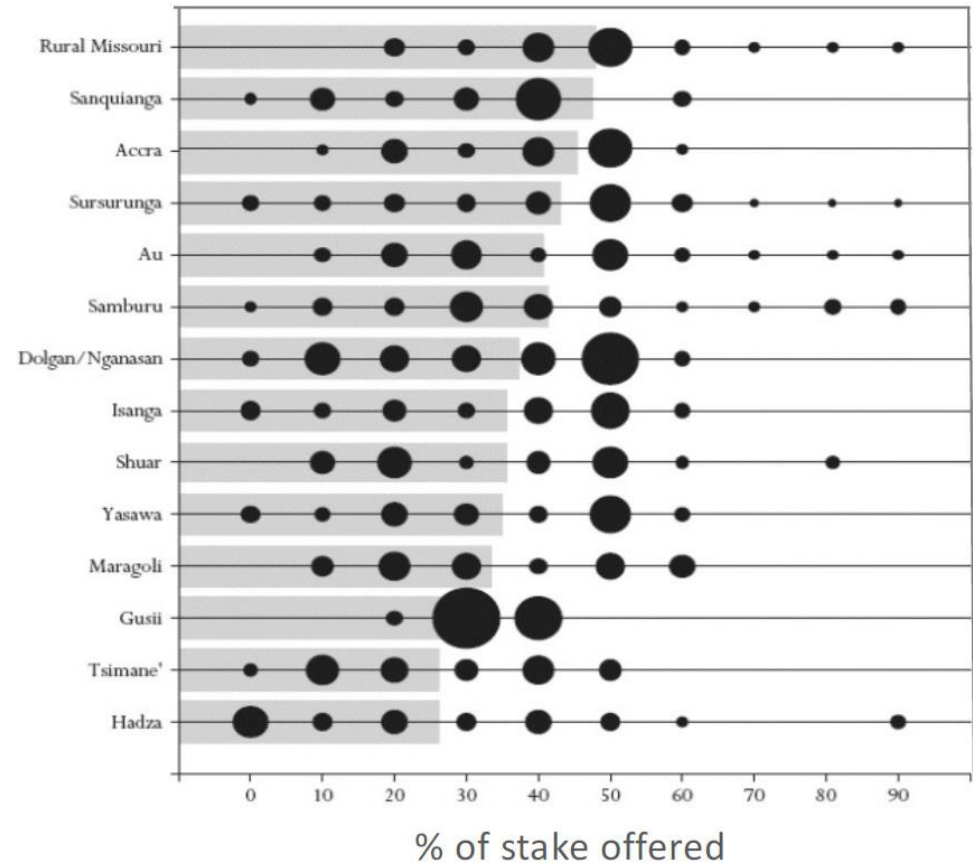
Fig. 1. (A) Experiment BS20 (dictator baseline with unearned \$20). (B) Experiment BS100 (dictator baseline with unearned \$100).



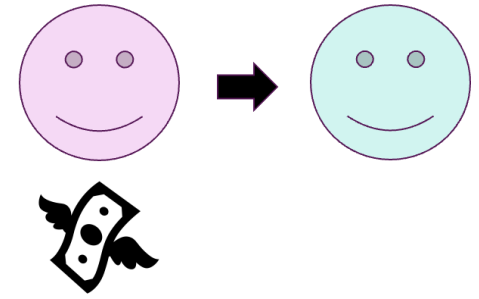
# dictator game



- Henrich et al. studied this game across cultures



# dictator game



- Benenson et al. ran this game with children and with stickers instead of money

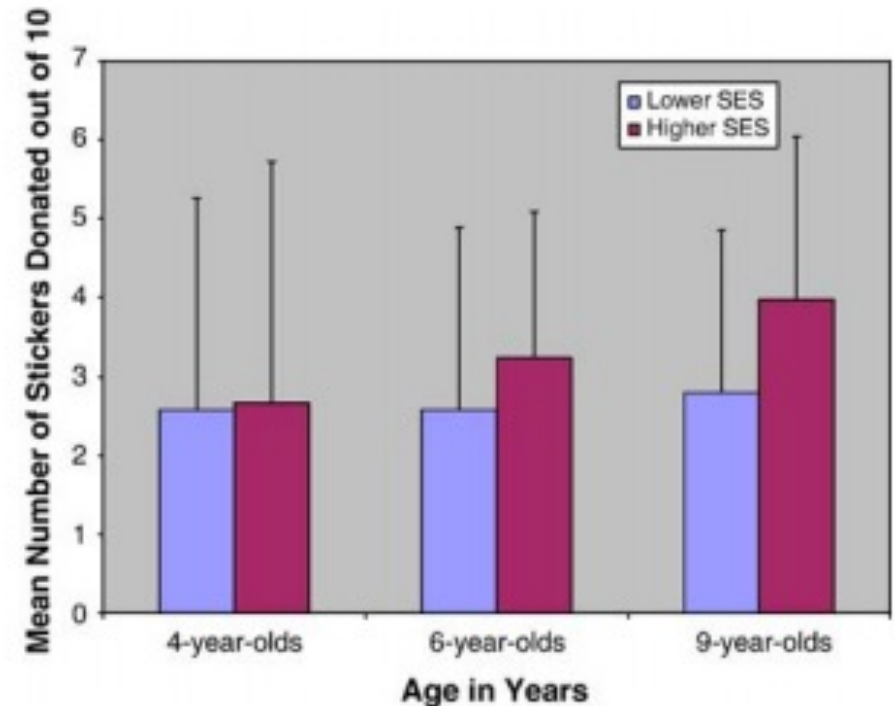
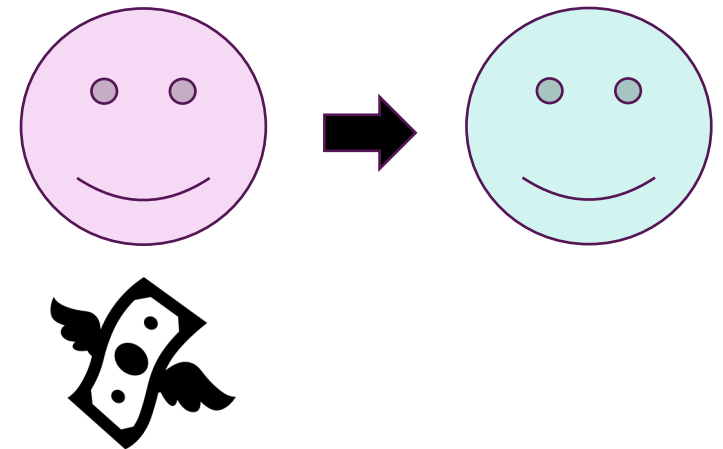


Fig. 1. The mean number (and standard deviation) of stickers donated to another classmate, by age level and SES, for the complete sample.

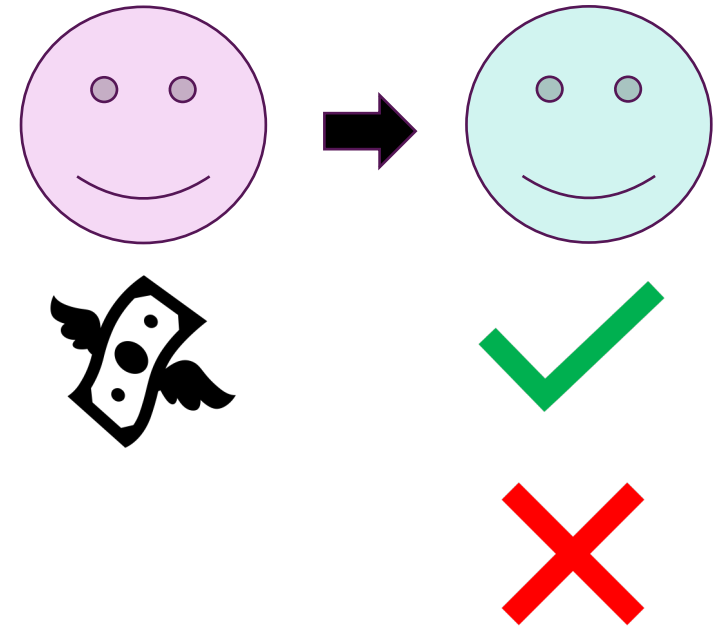
# dictator game

- **broad finding:** people typically give away **some** amount of money
- is this consistent with the “narrow selfishness” account?



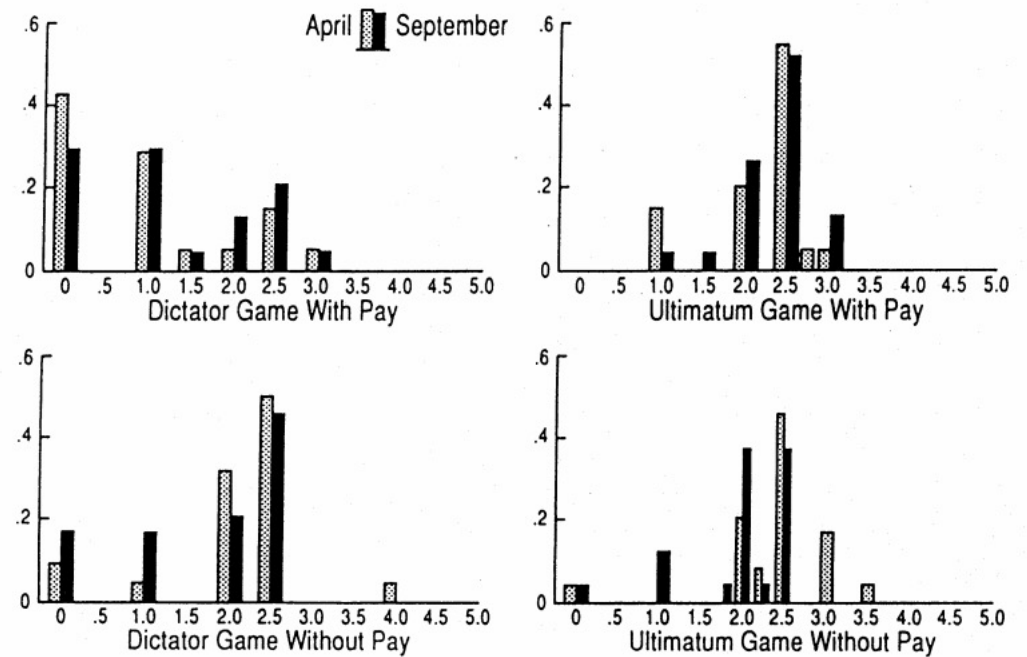
# ultimatum game

- proposers are given a certain amount of money and asked to divide it between themselves and a recipient
- the recipient can choose to reject the offer in which case neither the proposer nor the recipient get anything
- what would narrow selfishness predict?



# ultimatum game

- **broad finding:** proposers often send high amounts, and recipients often reject low amounts



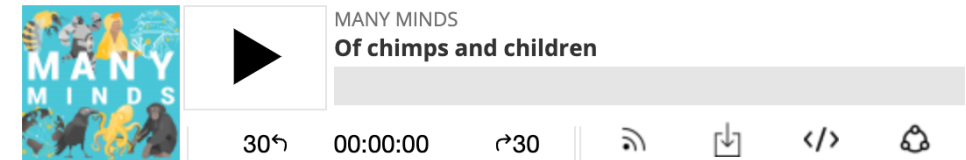
# inequality aversion

- people assign [negative utility to inequality](#), and proposers and recipients take this into account when making social decisions
- BUT it assumes stable preferences and ignores context
- decisions in social games also depend upon:
  - anonymity
  - quiet exits
  - effort
  - giving vs. taking
  - ....
- other games: [trust game](#)! (writing option this week)

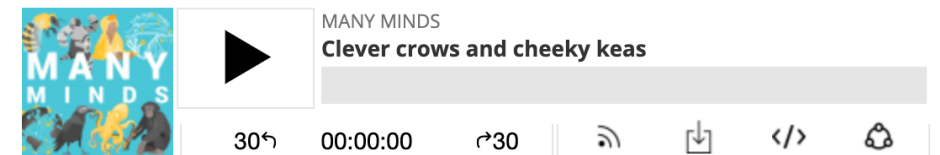
# social learning

- social learning = learning from others
- humans appear to have harnessed social learning for complex purposes, e.g., developing and managing systems and institutions

## Of chimps and children



## Clever crows and cheeky keas



# mechanisms: imitation

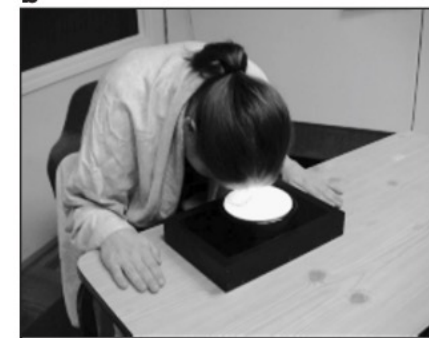
- imitation, or **copying others**, is considered a fundamental mechanism for social transmission





# faithful imitation

- Meltzoff (1988) tested 14-month-old infants
- first session, three conditions:
  - **imitation**: performed a target action (e.g., head touch)
  - **baseline** control: no exposure to the toys or actions
    - why?
  - **manipulation** control: other non-target actions
    - why?
- second session: 1 week delay
  - 20 seconds to play with six objects
- infants in the **imitation** condition produced **more target behaviors** than baseline or manipulation control conditions

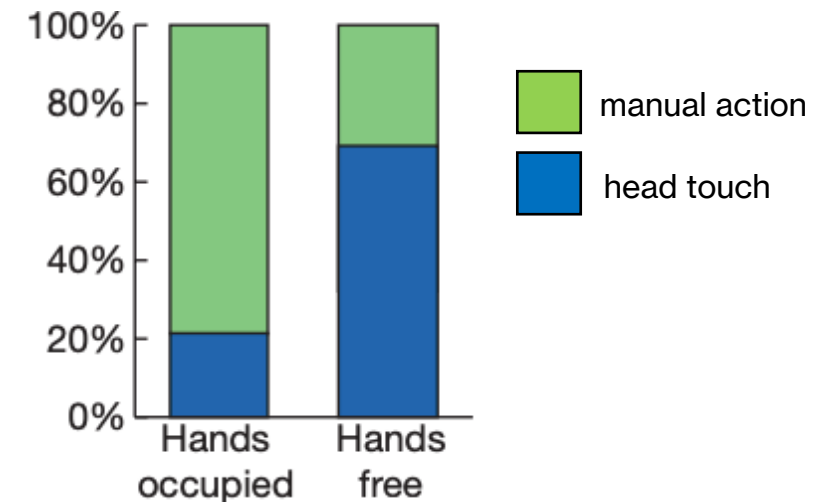
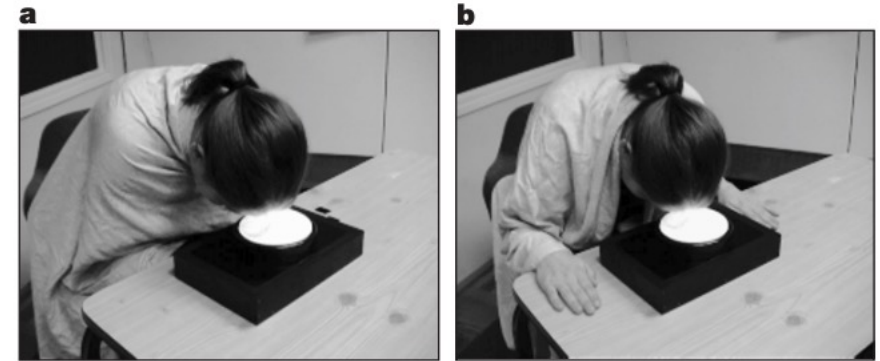


Proportion of Subjects Producing Each Target Act as a Function of the Test Condition

Target act	Test condition		
	Baseline ( <i>n</i> = 12)	Adult-manipulation ( <i>n</i> = 12)	Imitation ( <i>n</i> = 12)
Head touching	.000	.000	.667
Object pulling	.167	.250	.833
Button pushing	.667	.750	.833
Egg shaking	.083	.083	.250
Hinge folding	.333	.417	.750
Bear dancing	.000	.167	.083
<i>M</i>	.208	.278	.569

# rational imitation

- Gergely, Bekkering and Király (2002) modified the original Meltzoff study
  - **hands-free** condition
  - **hands-occupied** condition
- logic?
- infants **imitated** the head touch in the **hands-free** condition, but to a **much lesser degree** in the **hands-occupied** condition

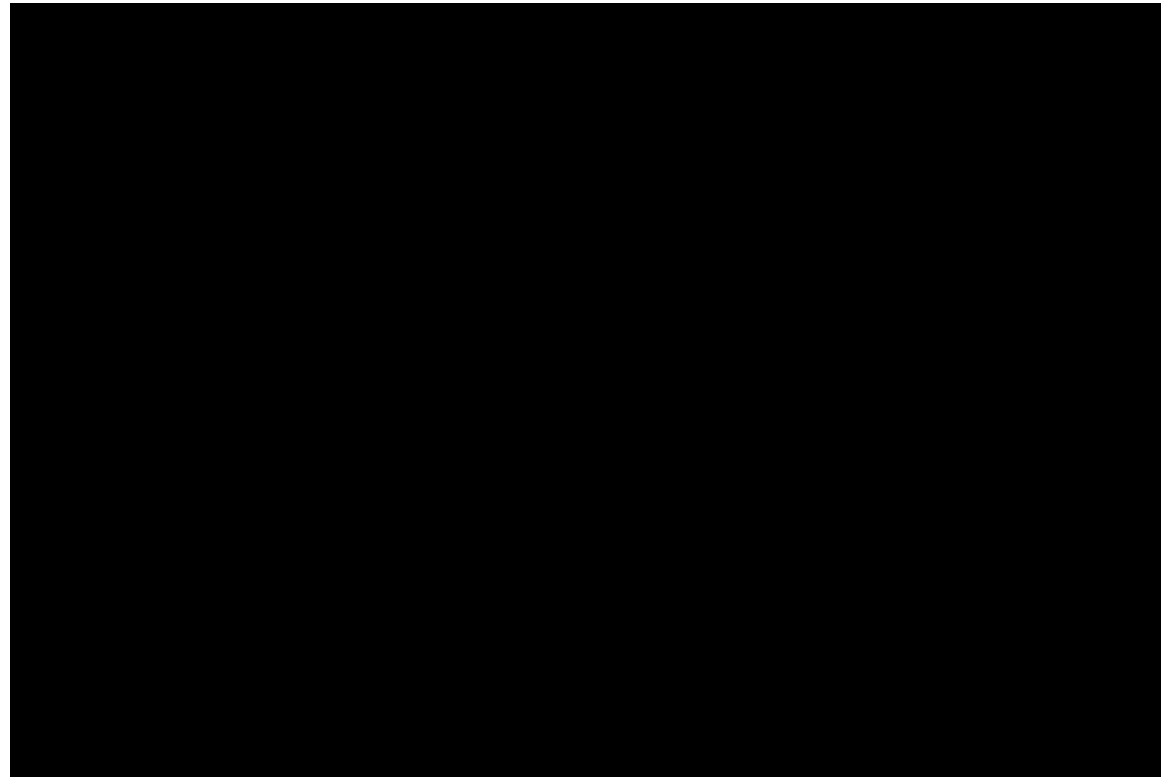


# overimitation

- Lyons, Young, and Keil (2007) tested 3-5-year-olds on a set of **relevant (necessary)** and **irrelevant (unnecessary)** actions that led to opening a box
- children were **trained** to distinguish between **relevant** and **irrelevant** actions using familiar objects
- children were then **tested** on novel objects

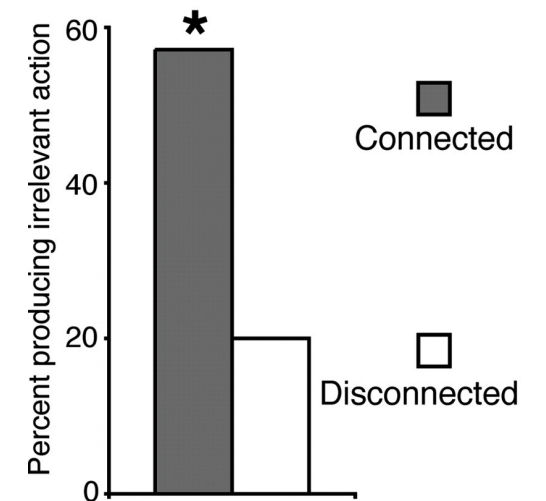
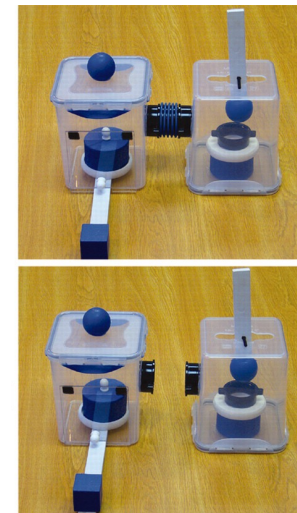
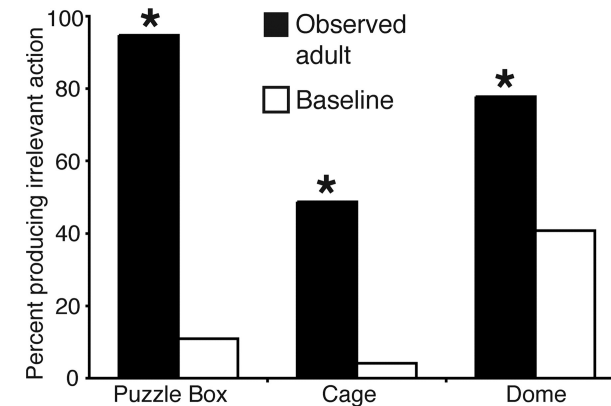


# overimitation: test



# overimitation

- children **repeated** the **irrelevant actions** for all objects, despite training
- follow-ups:
  - took away the pressure of test: same pattern
  - explicitly instructed to avoid irrelevant actions: same pattern
  - violate **causal connection**: overimitation more in the connected igloo compared to the disconnected igloo
- inference: overimitation is driven by **causal reasoning** and not simply social motivation or curiosity



# mechanisms: inference

- a more recent theory frames social learning as **inferential reasoning**
- key idea: humans learn by drawing inferences from observation and interaction with others
- this is not easy!



# guess $\frac{2}{3}$ the average

- pick a number between 0 and 100
- you win if your number is closest to  $\frac{2}{3}$  of the average of the class
- what do you pick?

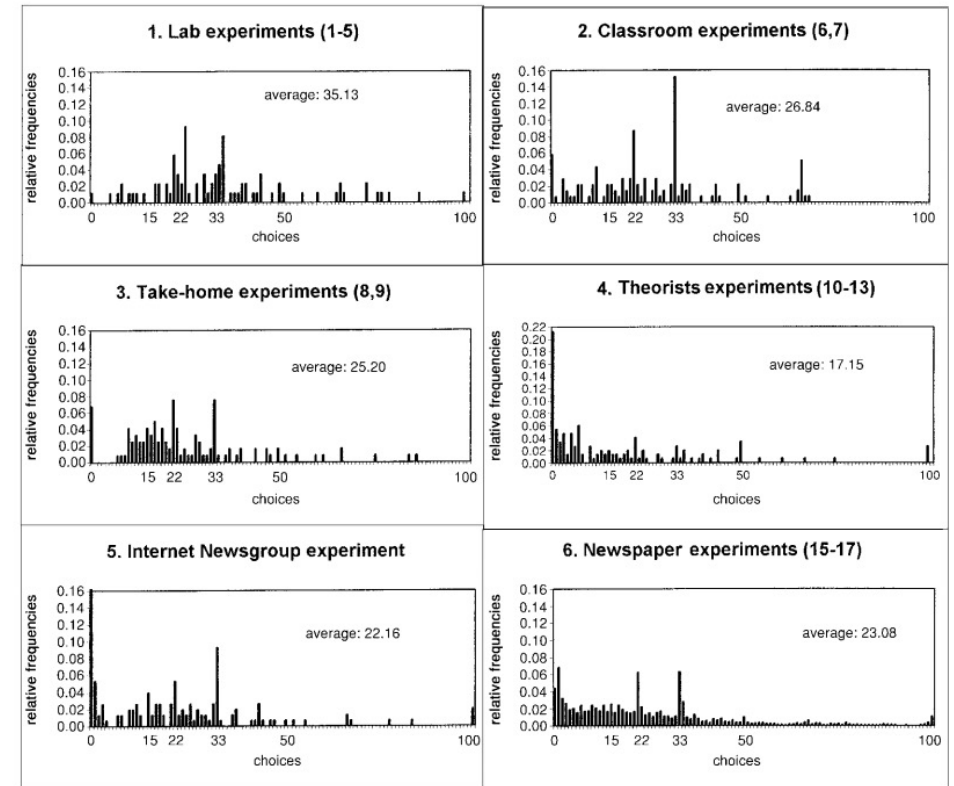
# strategic reasoning

- the consequences for individuals often depend on each other's choices, and they have to reason through what others will do in order to decide what they should do
- **Nash Theory** assumes that everyone is strategically rational, that is, they can reason through what others will do and they always best respond to this



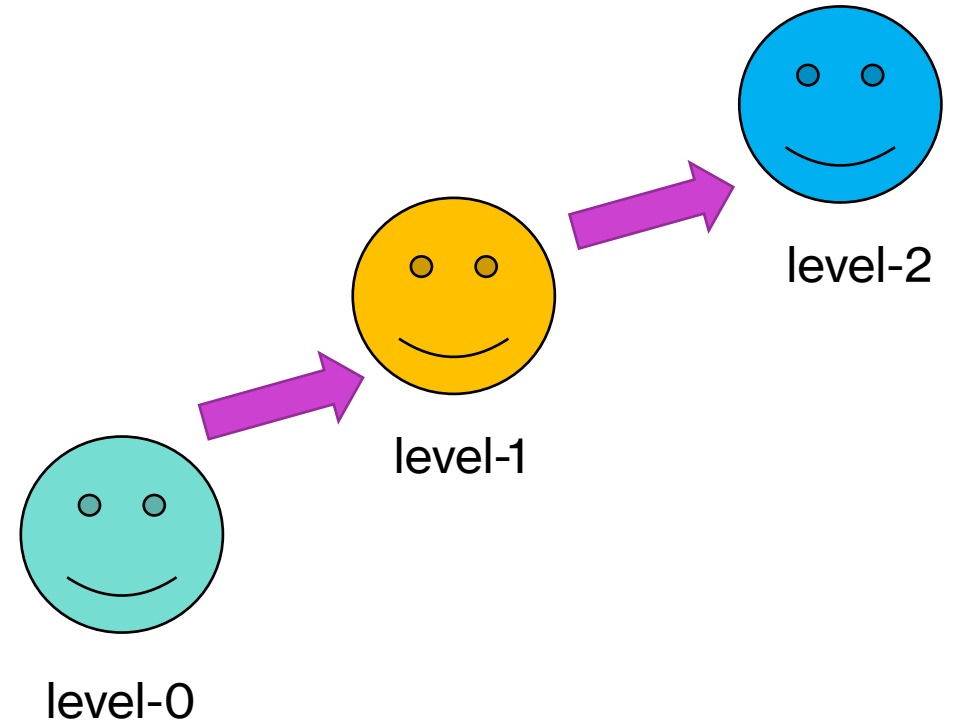
# strategic reasoning

- Bosch-Domenech et al. studied Nash predictions in the Guess 2/3 the Average game
- Nash theory predicts guess of 0



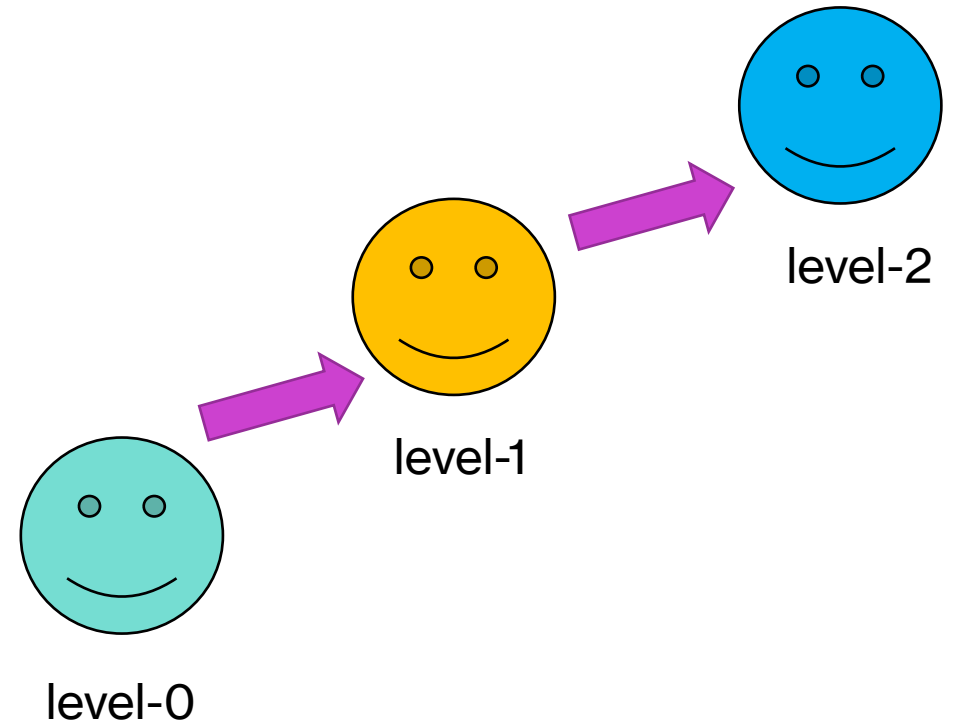
# level-k reasoning

- people can vary in terms of their strategic sophistication
  - level-0: completely random
  - level-1: believes that other people are level-0 and best responds to this
  - level-2: believes that other people are level-1 and best responds to this
  - ...
  - level- $\infty$  decision maker



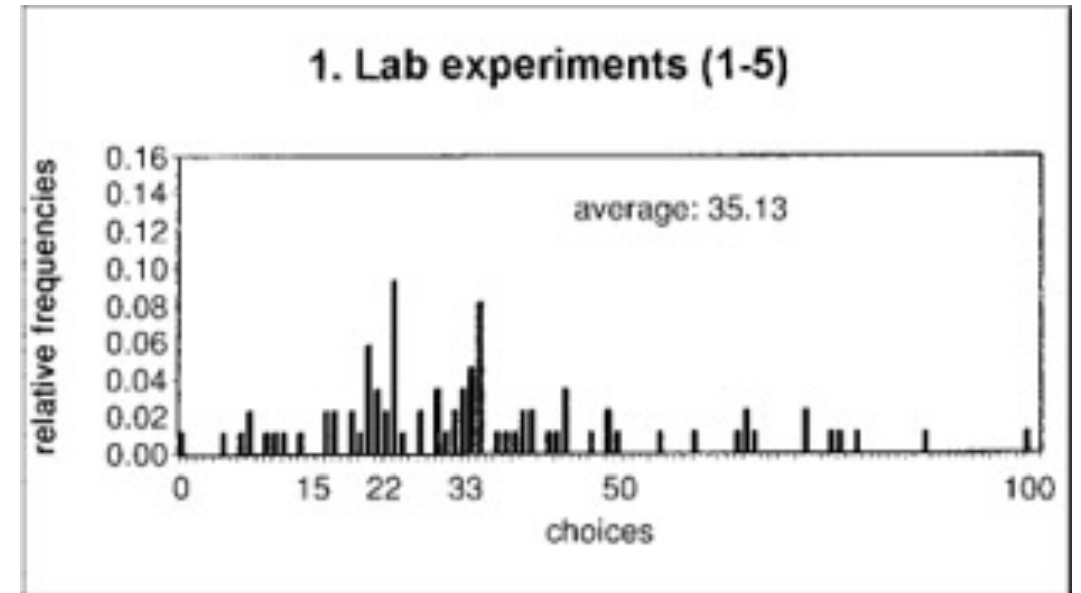
# level-k reasoning

- level-0: random
- level-1: choose 33
- level-2: choose 22
- ...
- ...
- level- $\infty$ : choose 0

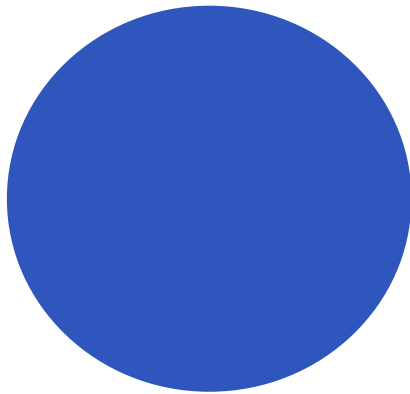


# level-k reasoning

- level-0: random
- level-1: choose 33
- level-2: choose 22
- ...
- ...
- level- $\infty$ : choose 0



# an inference game!



# pragmatic inference

BLUE



- pragmatic inference: what a speaker did not say conveys as much information as what they did say
- how do we design an “agent” that mimics this behavior?

# modeling inference

	blue square	blue circle	green square
blue	1	1	0
circle	0	1	0
square	1	0	1
green	0	0	1

**ground truth**  
records whether  
a label refers to  
an object or not

# level-0 listener choices

	blue square	blue circle	green square
blue	0.5	0.5	0
circle	0	1	0
square	0.5	0	0.5
green	0	0	1

level-0 listener uses ground truth to make decisions about objects using a given label by scaling for each label



# level-0 listener probabilities

	blue square	blue circle	green square
blue	0.5	0.5	0
circle	0	1	0
square	0.5	0	0.5
green	0	0	1

level-0 listener uses ground truth to make decisions about objects using a given label

# level-1 speaker choices

	blue square	blue circle	green square
blue	0.5	0.5	0
circle	0	1	0
square	0.5	0	0.5
green	0	0	1

level-1 speaker uses level-0 listener to assess the value of different labels given a target object

# level-1 speaker probabilities

	blue square	blue circle	green square
blue	0.5	0.5	0
circle	0	1	0
square	0.5	0	0.5
green	0	0	1

level-1 speaker  
uses level-0 listener  
to assess the value  
of different labels  
given a target  
object

# level-1 speaker probabilities

	blue square	blue circle	green square
blue	0.5	0.33	0
circle	0	0.67	0
square	0.5	0	0.33
green	0	0	0.67

level-1 speaker  
uses level-0 listener  
to assess the value  
of different labels  
given a target  
object

# level-2 listener choices

	blue square	blue circle	green square
blue	0.5	0.33	0
circle	0	0.67	0
square	0.5	0	0.33
green	0	0	0.67

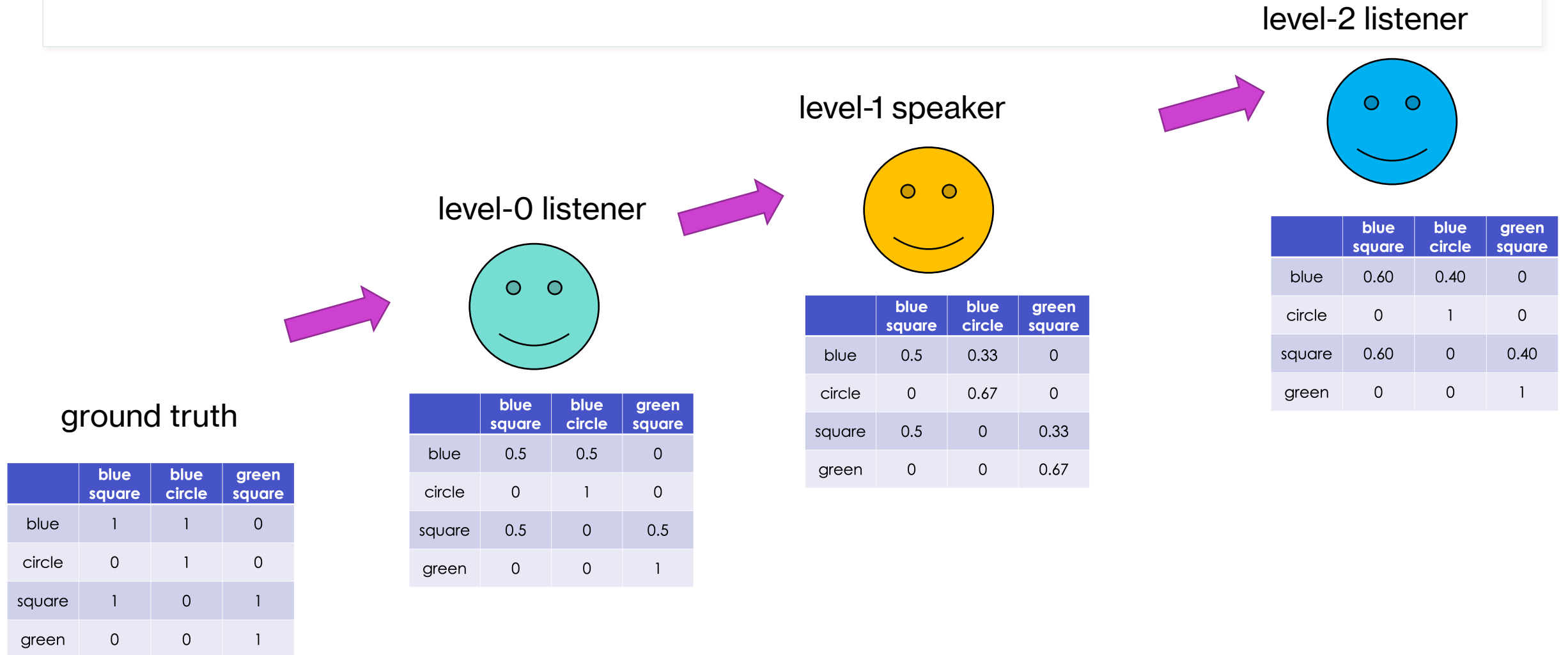
level-2 listener  
uses level-1 speaker  
to assess the most  
likely object given a  
label

# level-2 listener probabilities

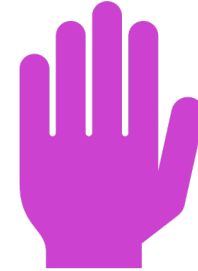
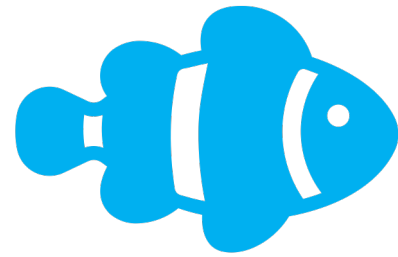
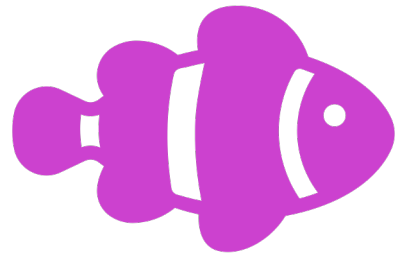
	blue square	blue circle	green square
blue	0.60	0.40	0
circle	0	1	0
square	0.60	0	0.40
green	0	0	1

level-2 listener  
uses level-1 speaker  
to assess the most  
likely object given a  
label

# inference = recursive thinking

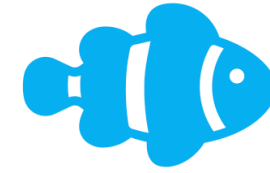
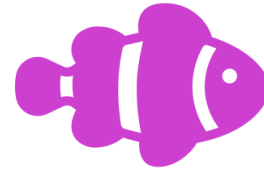


# inference activity





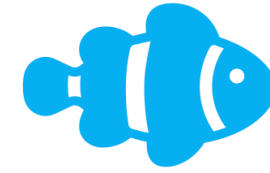
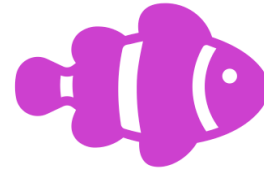
# inference activity



- if I said “pink” which object would a level-0 listener think I am referring to?
- what about a level-2 listener?

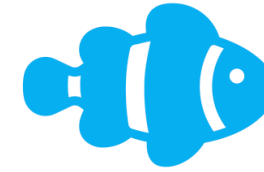
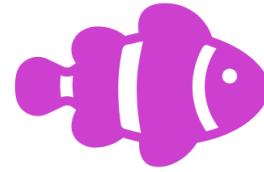
	pink fish	blue fish	pink glove
pink			
fish			
blue			
glove			

# ground truth



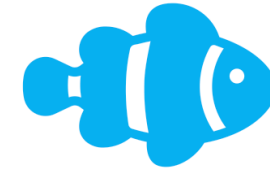
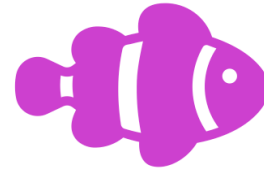
	pink fish	blue fish	pink glove
pink	1	0	1
fish	1	1	0
blue	0	1	0
glove	0	0	1

# level-0 listener



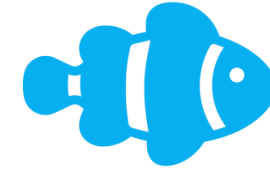
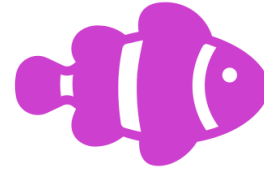
	pink fish	blue fish	pink glove
pink	0.5	0	0.5
fish	0.5	0.5	0
blue	0	1	0
glove	0	0	1

# level-1 speaker



	pink fish	blue fish	pink glove
pink	0.5	0	0.33
fish	0.5	0.33	0
blue	0	0.67	0
glove	0	0	0.67

# level-2 listener



	pink fish	blue fish	pink glove
pink	0.60	0	0.40
fish	0.60	0.40	0
blue	0	1	0
glove	0	0	1

# next class



- **before** class:
  - *finish*: L11 reading
  - *start reviewing*: practice materials on Canvas
- **during** class:
  - social cognition contd.