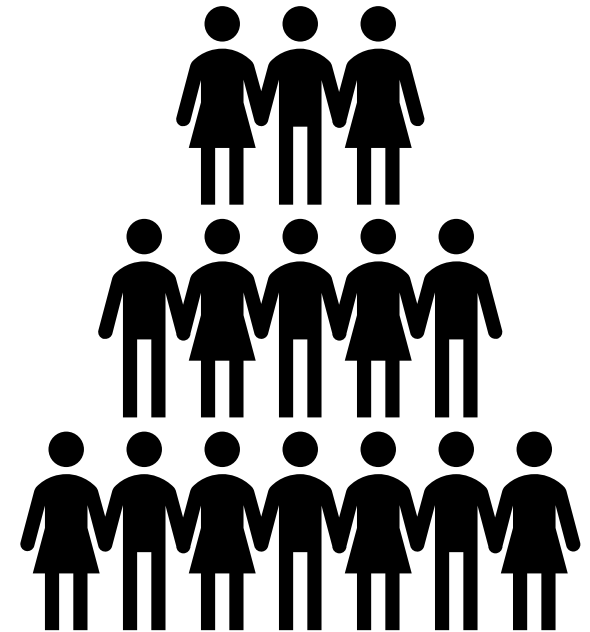# Cognition

PSYC 2040

W12: Social Cognition

Part 1

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?
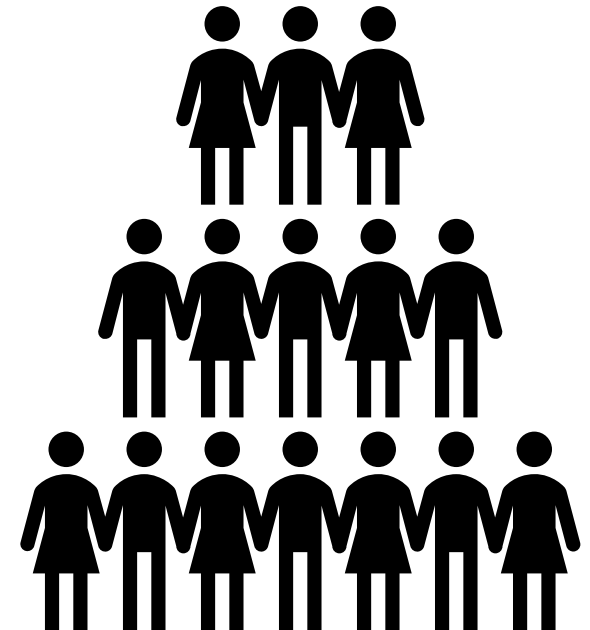
social preferences

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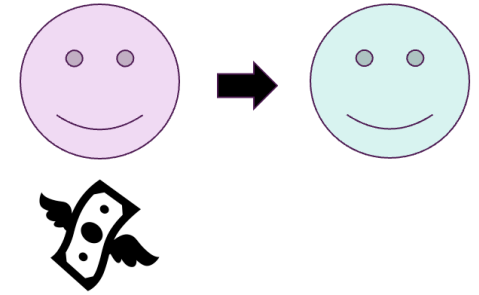- typically studied through "games" with monetary payoffs
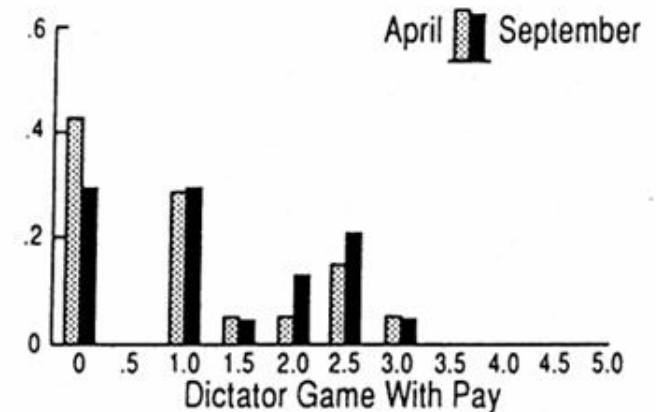
dictator game

- 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
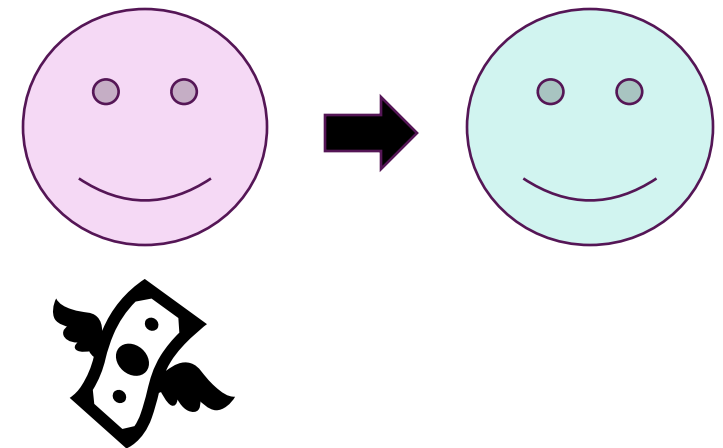
dictator game

- Forsythe et al. 1994

- participants were randomly assigned to the role of dictator or recipient, and each dictator was anonymously matched with a recipient

- dictators had $5 to divide between themselves and the recipient

Dictator Game Without Pay

April ▨ ▮ September

Dictator Game With Pay
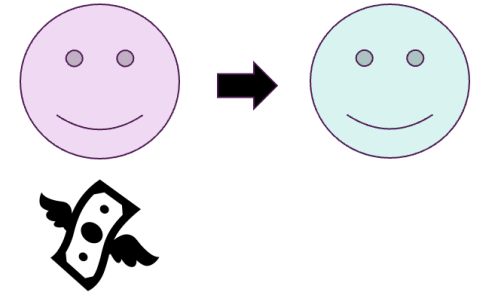
dictator game

- List and Cherry: proposers had $20 or $100 to divide
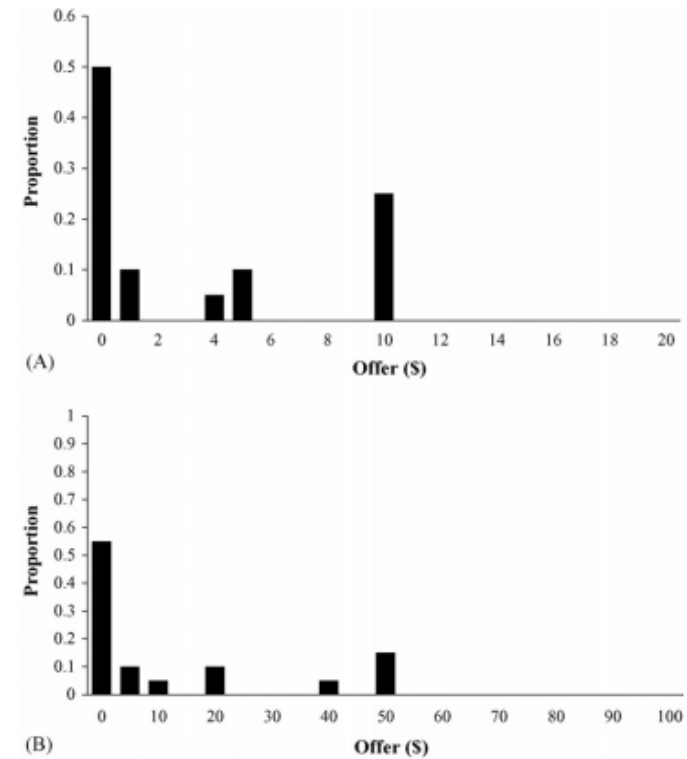
Fig. 1. (A) Experiment B$20 (dictator baseline with unearned $20). (B) Experiment B$100 (dictator baseline with unearned $100).

dictator game
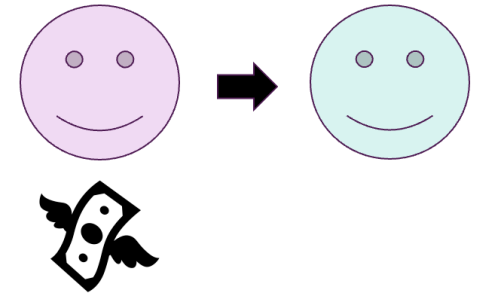
- Benenson et al. ran this game with children and with stickers instead of money
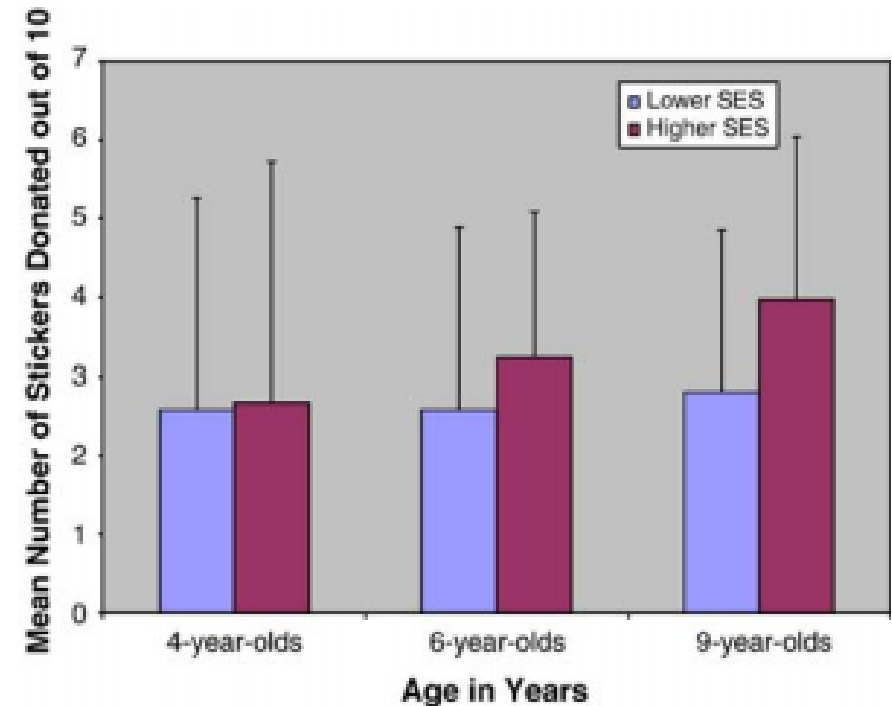
Fig. 1. The mean number (and standard deviation) of stickers donated to another classmate, by age level and SES, for the complete sample.

dictator game

- broad finding: people typically give away some amount of money

- is this consistent with the "narrow selfishness" account?
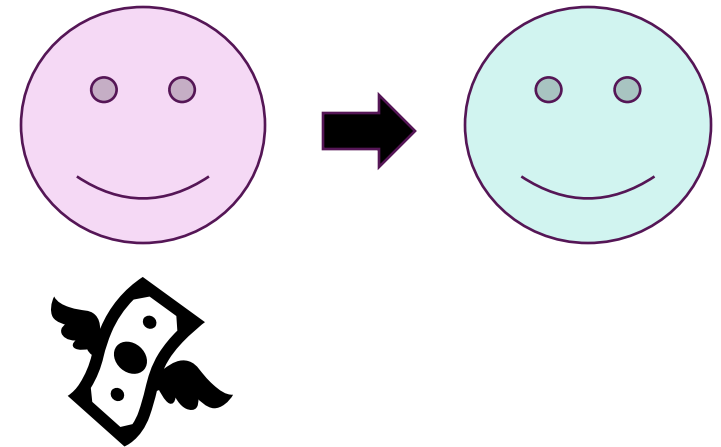
ultimatum game

- 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?
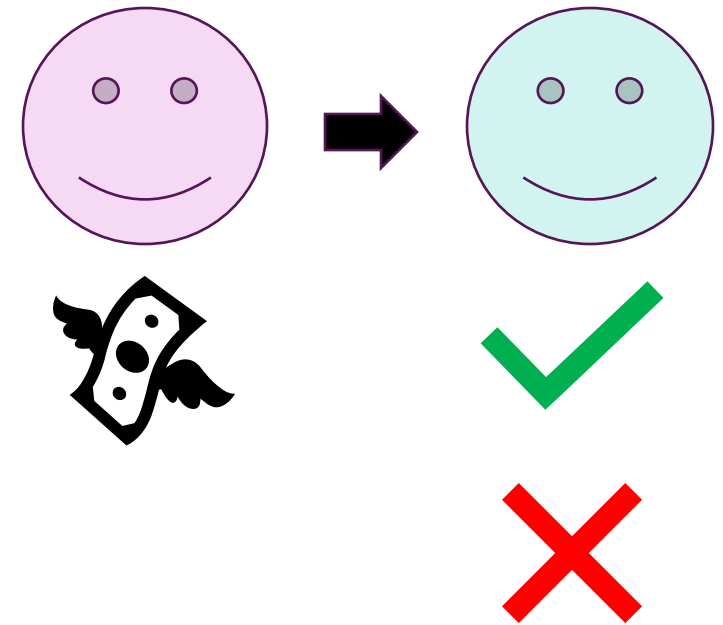
ultimatum game

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

https://youtu.be/meiU6TxysCg?feature=shared&t=84
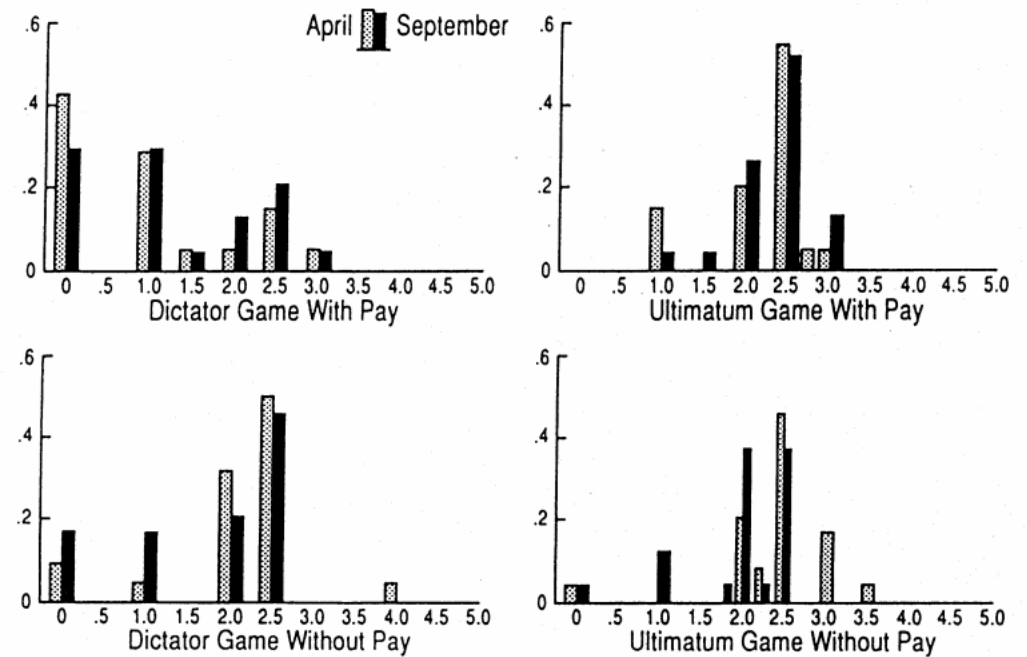
inequality aversion

- 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
  - ....

Trust game

- discuss your general impressions after playing the game

- what behaviors are highlighted by the game as being cooperative?

- what other factors may influence how people behave in social situations?

Trust game

Game theory has shown us the three things we need for the evolution of trust:
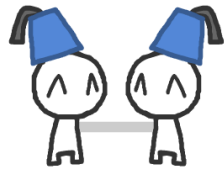
1. REPEAT INTERACTIONS

Trust keeps a relationship going, but you need the knowledge of possible future repeat interactions *before* trust can evolve.

2. POSSIBLE WIN-WINS

You must be playing a non-zero-sum game, a game where it's at least possible that *both* players can be better off -- a win-win.

3. LOW MISCOMMUNICATION

If the level of miscommunication is *too* high, trust breaks down. But when there's a little bit of miscommunication, it pays to be *more* forgiving.

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
- other animals also do some of this
- **how** do we learn from others?

Of chimps and children

MANY MINDS
Of chimps and children

30 00:00:00 30

Clever crows and cheeky keas

MANY MINDS
Clever crows and cheeky keas

30 00:00:00 30
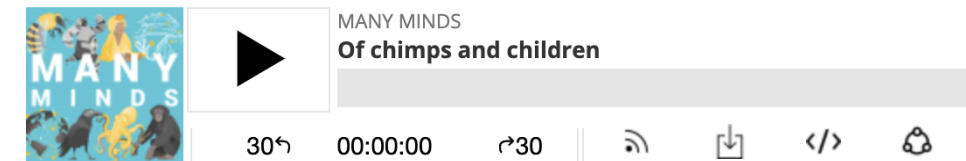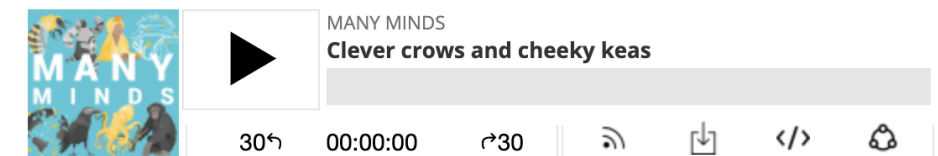
mechanisms: imitation

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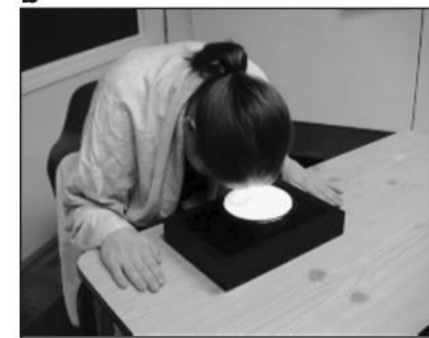
Proportion of Subjects Producing Each Target Act as a Function of the Test Condition

Target act	Baseline (n = 12)	Adult-manipulation (n = 12)	Imitation (n = 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
M	.208	.278	.569

paper

rational imitation

- Gergely, Bekkering and Király (2002) modified the original Meltzoff study
  - hands-free condition
  - hands-occupied condition

- logic?

paper
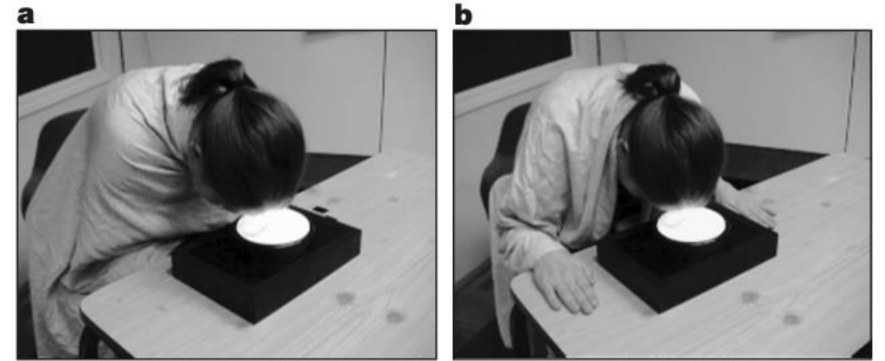
rational imitation

- infants imitated the head touch in the hands-free condition, but to a much lesser degree in the hands-occupied condition

- inference: infants were rationalizing whether or not the head touch was necessary to turn on the light: a selective, inferential process

paper
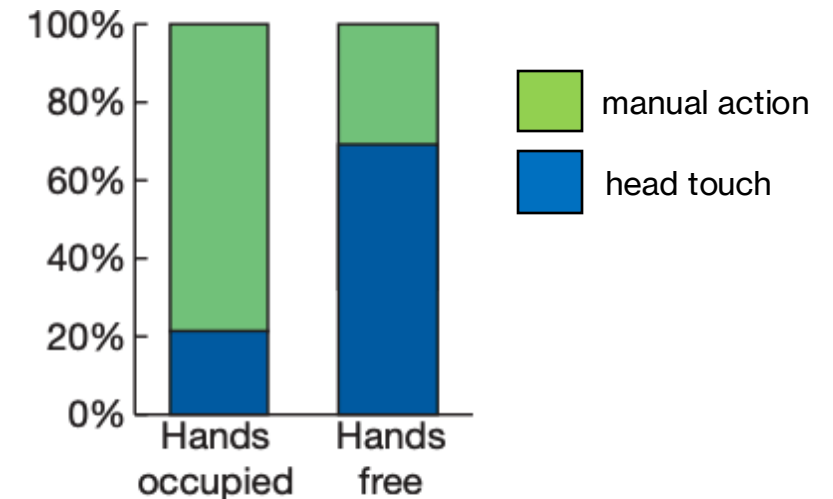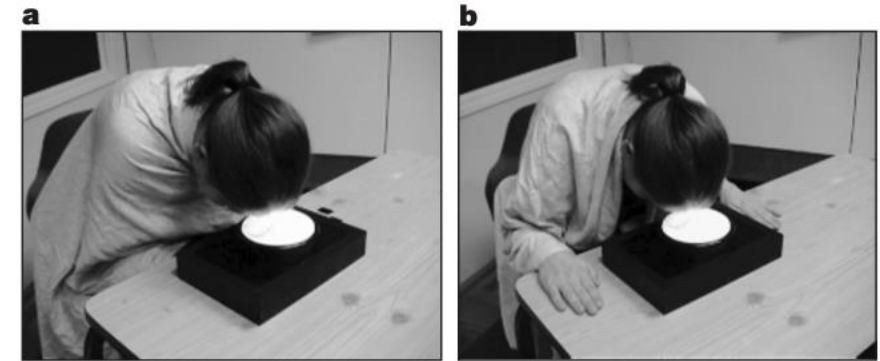
overimitation

- 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
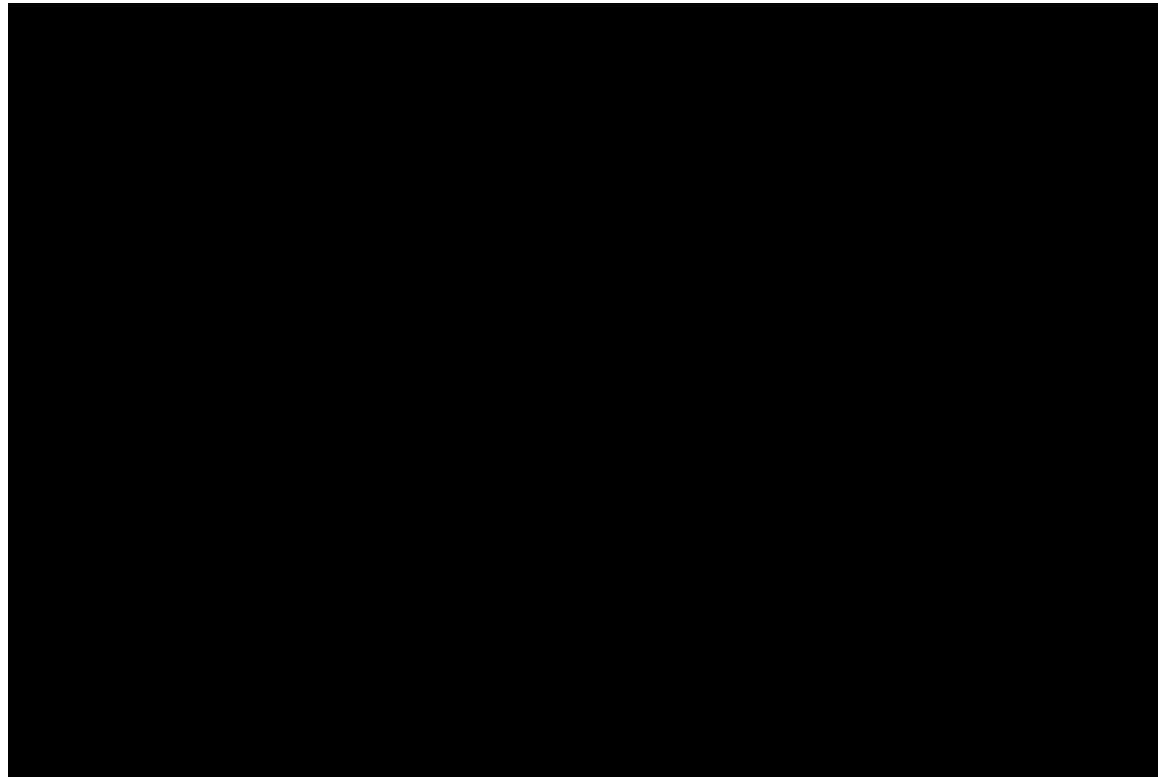
overimitation

- 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
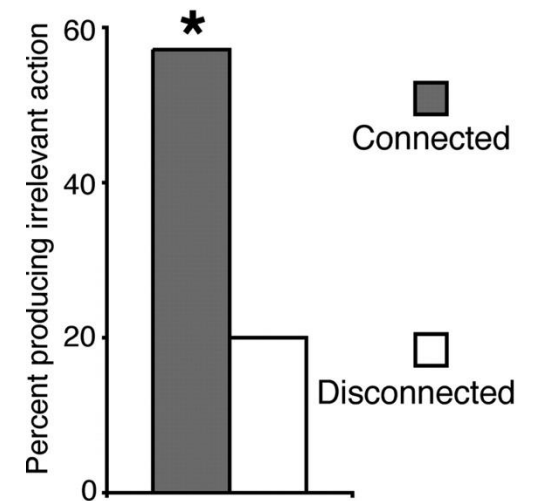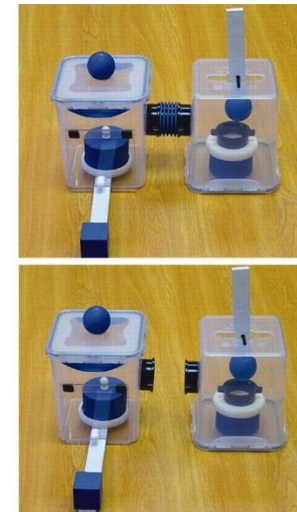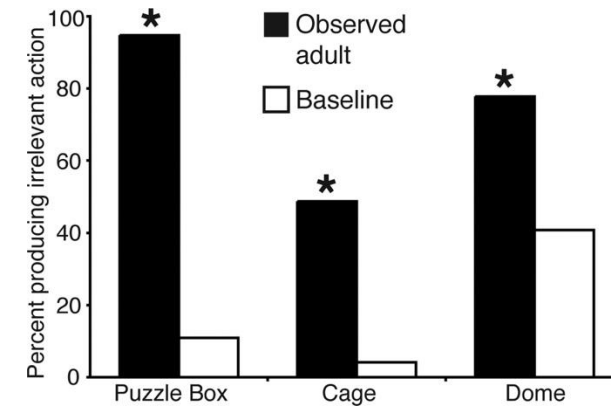
mechanisms: inference

- 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!

activity

- **https://i3n1xnph9k.cognition.run**

guess 2/3 the average

- how did you pick the number?

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
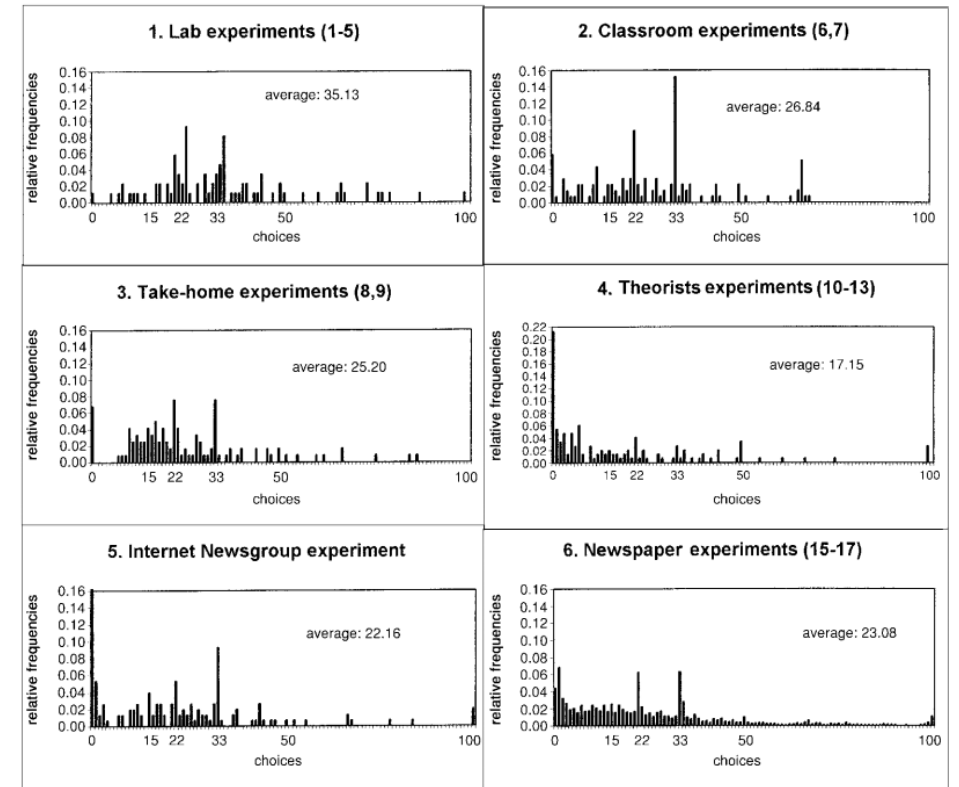
level-k reasoning

- 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-∞ decision maker
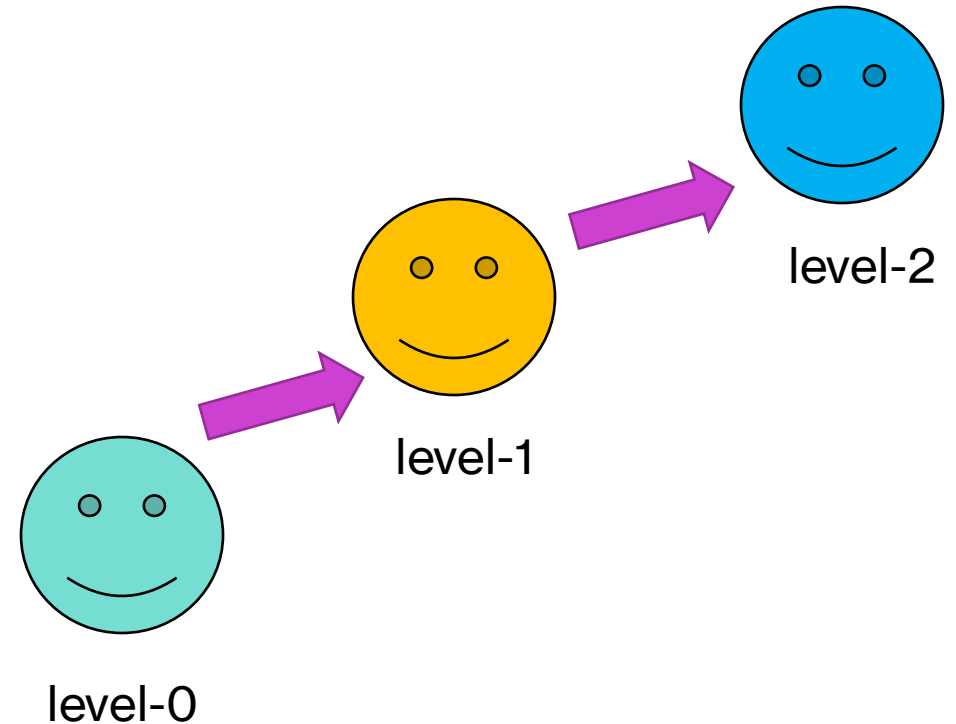
level-2

level-1

level-0

level-k reasoning

- level-0: random (average = 50)
- level-1: choose 33 (2/3rd of 50)
- level-2: choose 22 (2/3rd of 33)
- ...
- ...
- level-∞: choose 0
- ~21 k-levels to reach 0, the Nash equilibrium

level-2

level-1

level-0

level-k reasoning

- level-0: random (average = 50)
- level-1: choose 33 (2/3rd of 50)
- level-2: choose 22 (2/3rd of 33)
- ...
- ...
- level-∞: choose 0
- ~21 k-levels to reach 0, the Nash equilibrium

1. Lab experiments (1-5)

average: 35.13
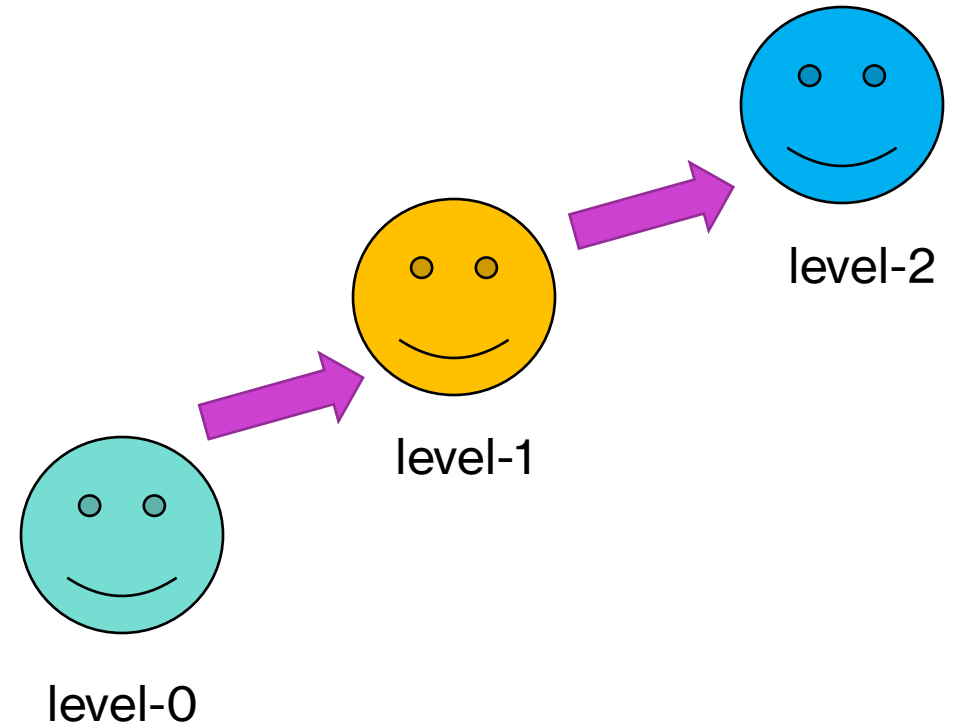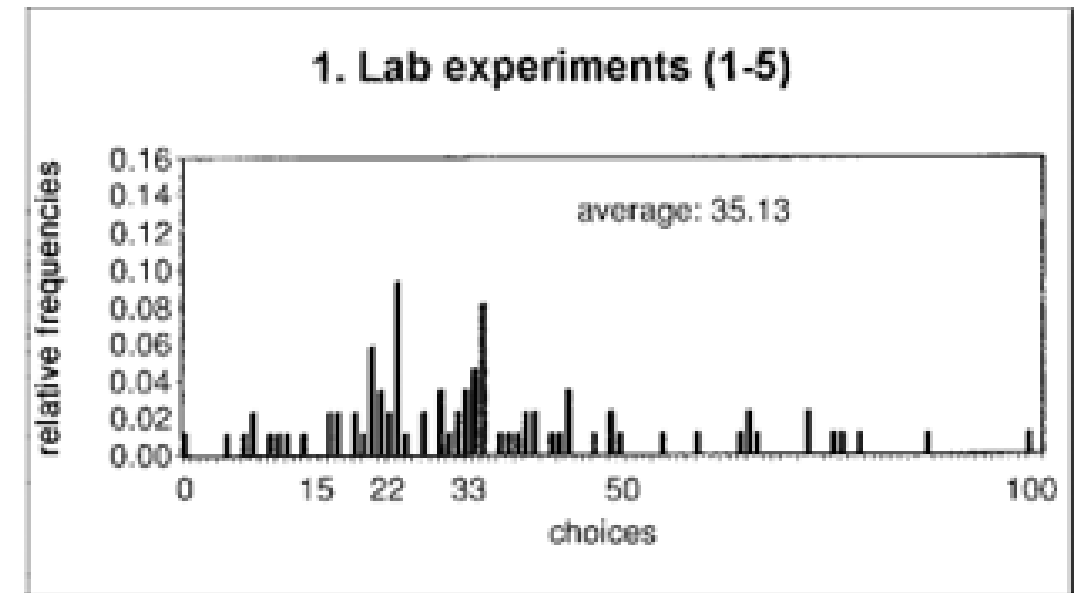
pragmatic inference

BLUE

- pragmatic inference: what a speaker <u>did not say</u> conveys as much information as what they did say

- how do we design an "agent" that mimics this behavior?

Frank and Goodman (2012)

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

Frank and Goodman (2012)

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

Frank and Goodman (2012)

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

Frank and Goodman (2012)

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

Frank and Goodman (2012)

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

Frank and Goodman (2012)

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

Frank and Goodman (2012)

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

Frank and Goodman (2012)

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

Frank and Goodman (2012)

inference = recursive thinking

level-2 listener

level-1 speaker

level-0 listener

ground truth

Ground truth:

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

Level-0 listener:

	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:

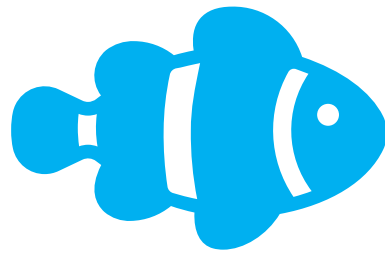|	blue square	blue circle	green square
blue	0.5	0.33	0
circle	0	0.67	0
square	0.5	0	0.33
green	0	0	0.67

Level-2 listener:

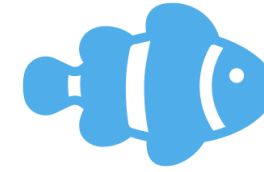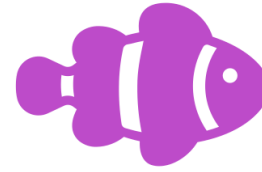|	blue square	blue circle	green square
blue	0.60	0.40	0
circle	0	1	0
square	0.60	0	0.40
green	0	0	1

Frank and Goodman (2012)

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			

exit ticket + next class

- social cognition contd.

Here are the to-do's for the week:

- Week 12 Exit Ticket (due Thursday)

- Week 12 Quiz (due Sunday)

- Post any lingering questions here

- Extra credit opportunities:

    - Submit Exra Credit Questions (1 point for 8 submissions)
    - Submit Optional Meme Submission (1 point for winners!)

Before Tuesday

- Complete W12 Activity 1

Before Thursday

- Complete W12 Activity 2

After Thursday

- See the Apply section