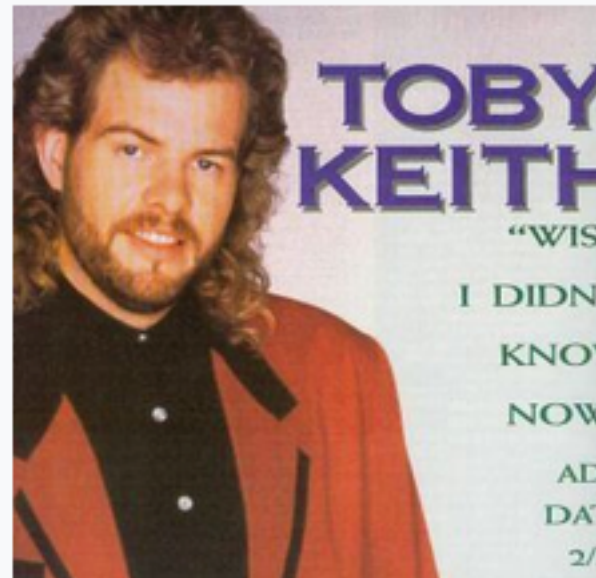


"Wish I Didn't Know Now"

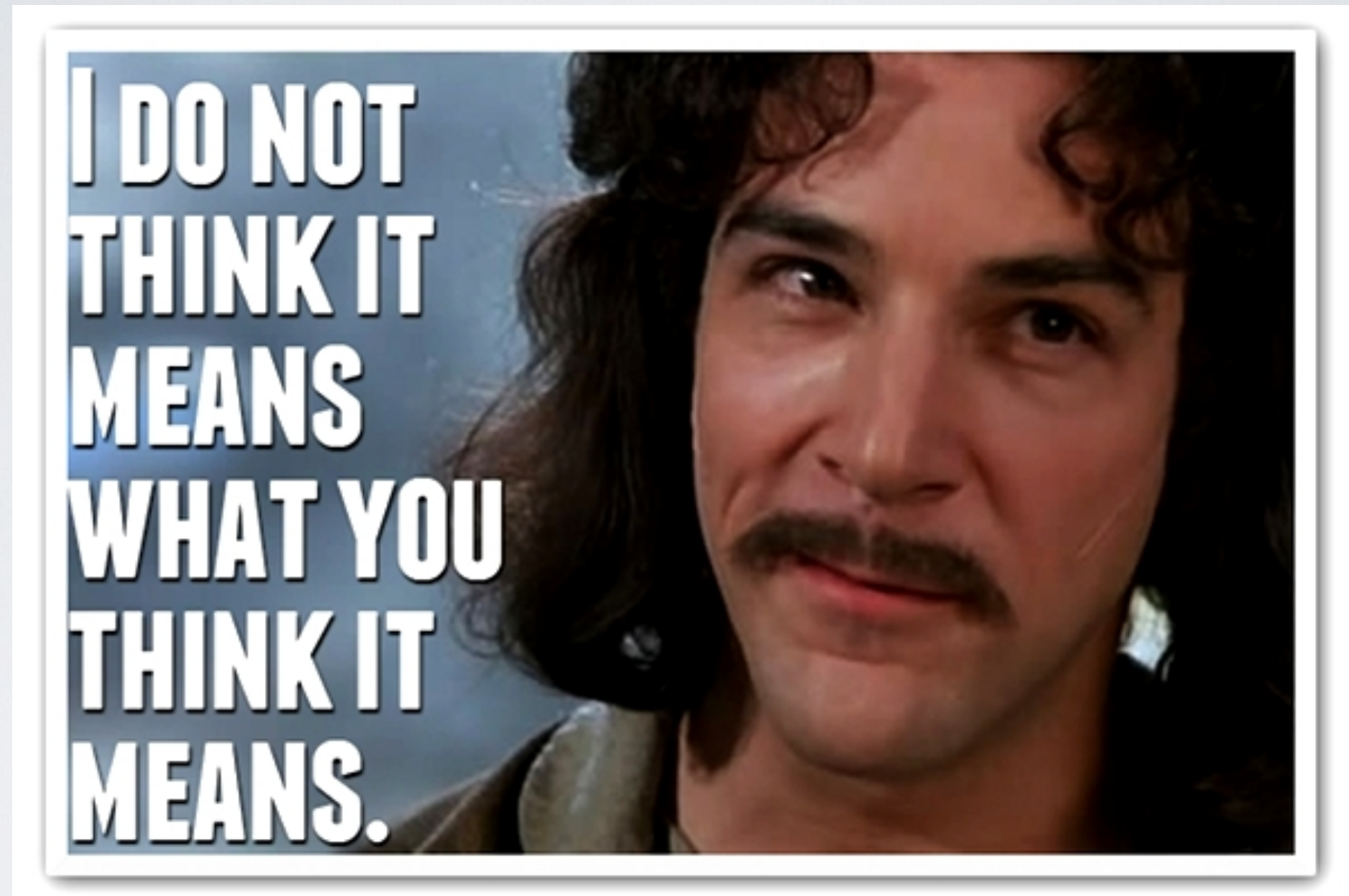


Single by Toby Keith

from the album *Toby Keith*

B-side	"Under the Fall"
Released	February 28, 1994
Genre	Country
Length	3:26
Label	PolyGram/Mercury 858290
Songwriter(s)	Toby Keith
Producer(s)	Nelson Larkin and Harold Shedd

THEORY OF MIND



Primate Social Behavior
10 March 2020

SOCIAL COGNITION

- Knowledge of others
- Knowledge of others' relationships
- Knowledge of others' minds

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- Knowledge of others' relationships
- **Knowledge of others' minds**

THEORY OF MIND (ToM)

- Ability to attribute mental states (intentions, desires, knowledge, belief) to others
- AKA: perspective-taking, mind reading, mentalizing

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Why is it important or interesting?

THEORY OF MIND (ToM)

- Central to many human capacities (e.g., language, teaching, altruism)
- May explain many cognitive differences between humans and nonhumans
- Poor ToM is widespread in humans; causes variety of problems

Count the number of mental state attributions in this conversation

TODAY'S OUTLINE

- Others' intention
- Others' knowledge/ignorance
- Others' false belief

UNWILLING VS UNABLE

- Two ways to not give a capuchin a raisin
 - Unwilling: experimenter holds out raisin, then pulls it away
 - Unable: experimenter holds out raisin, then second experimenter steals it

Phillips et al. 2009

Unwilling vs. unable in capuchin monkeys 941

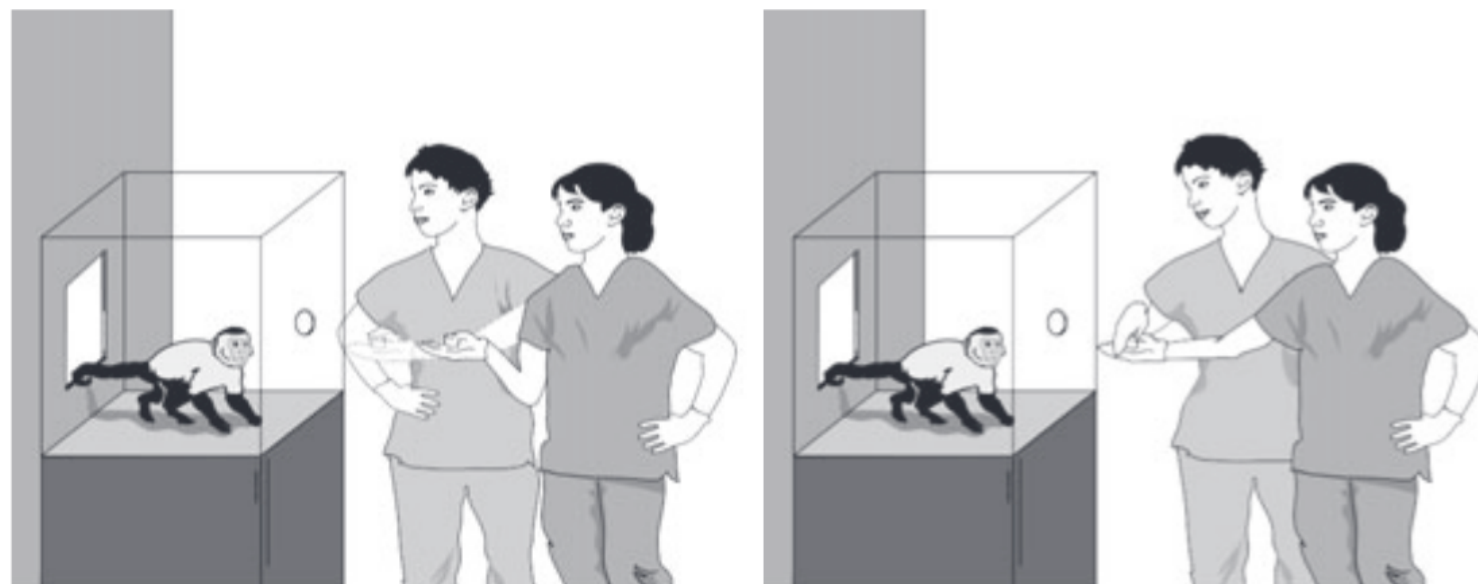


Figure 2 A depiction of unwilling (left) versus unable (right) test events in Experiment 2.

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How long will capuchin stick around?

Phillips et al. 2009

Unwilling vs. unable in capuchin monkeys 941

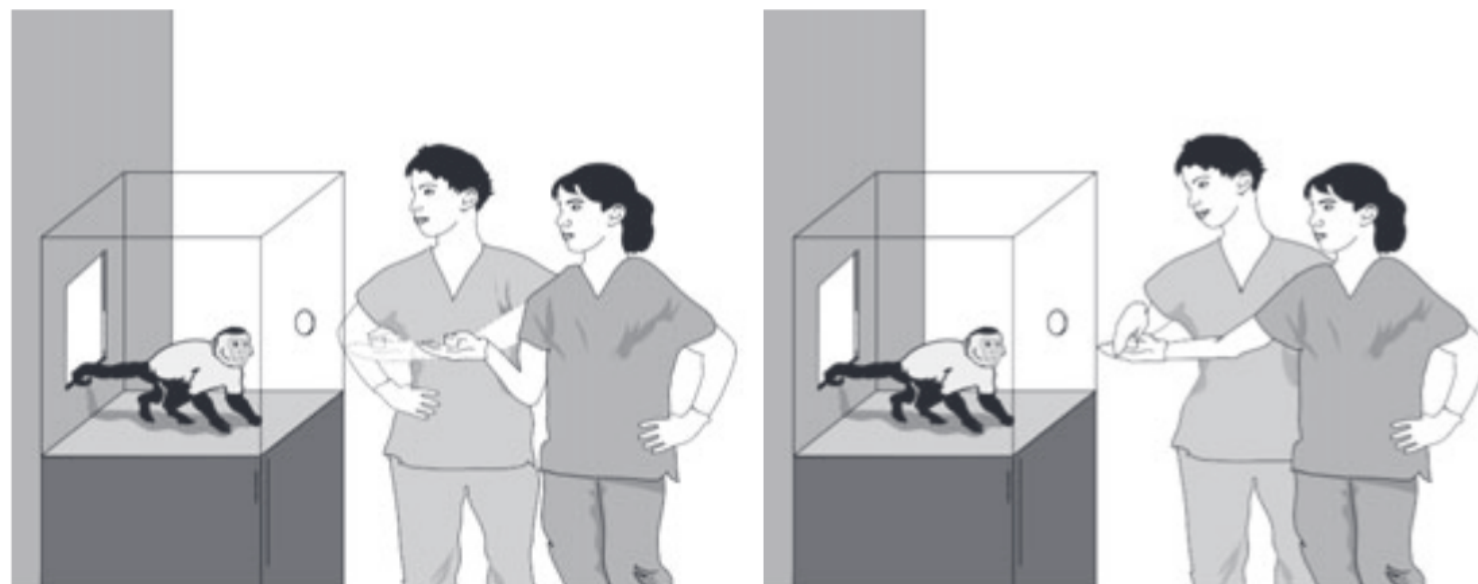


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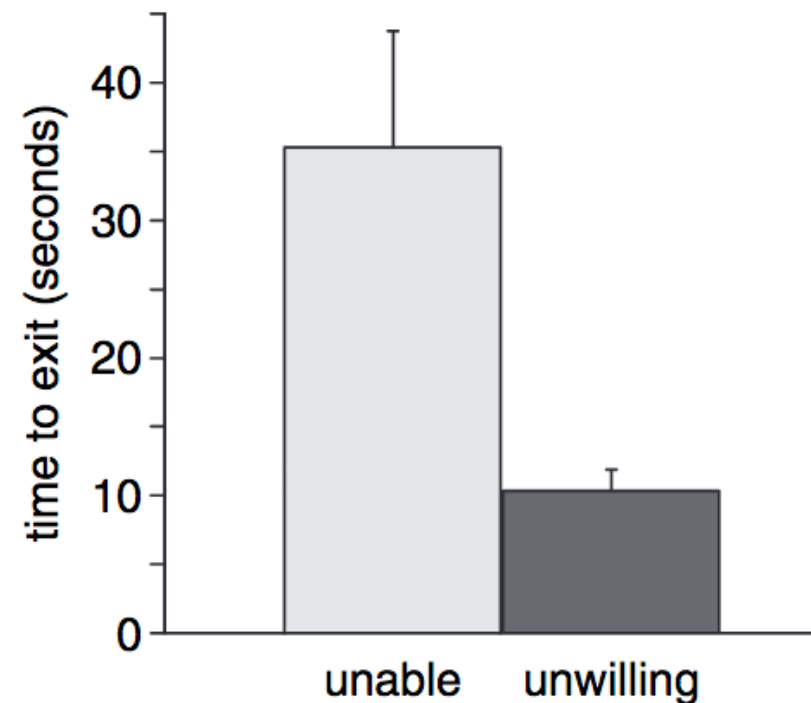


Figure 3 Mean amount of time ($\pm$ standard error) monkeys remained inside the testing box during Experiment 2.

MONKEYS REJECT UNEQUAL PAY?

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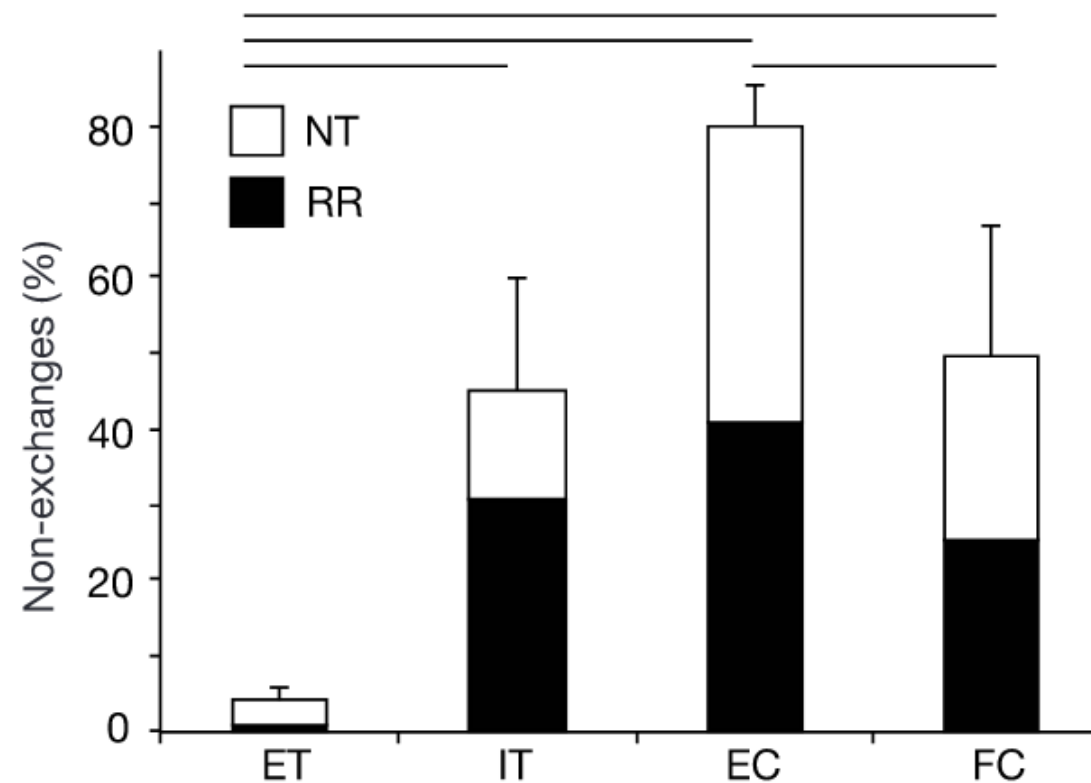
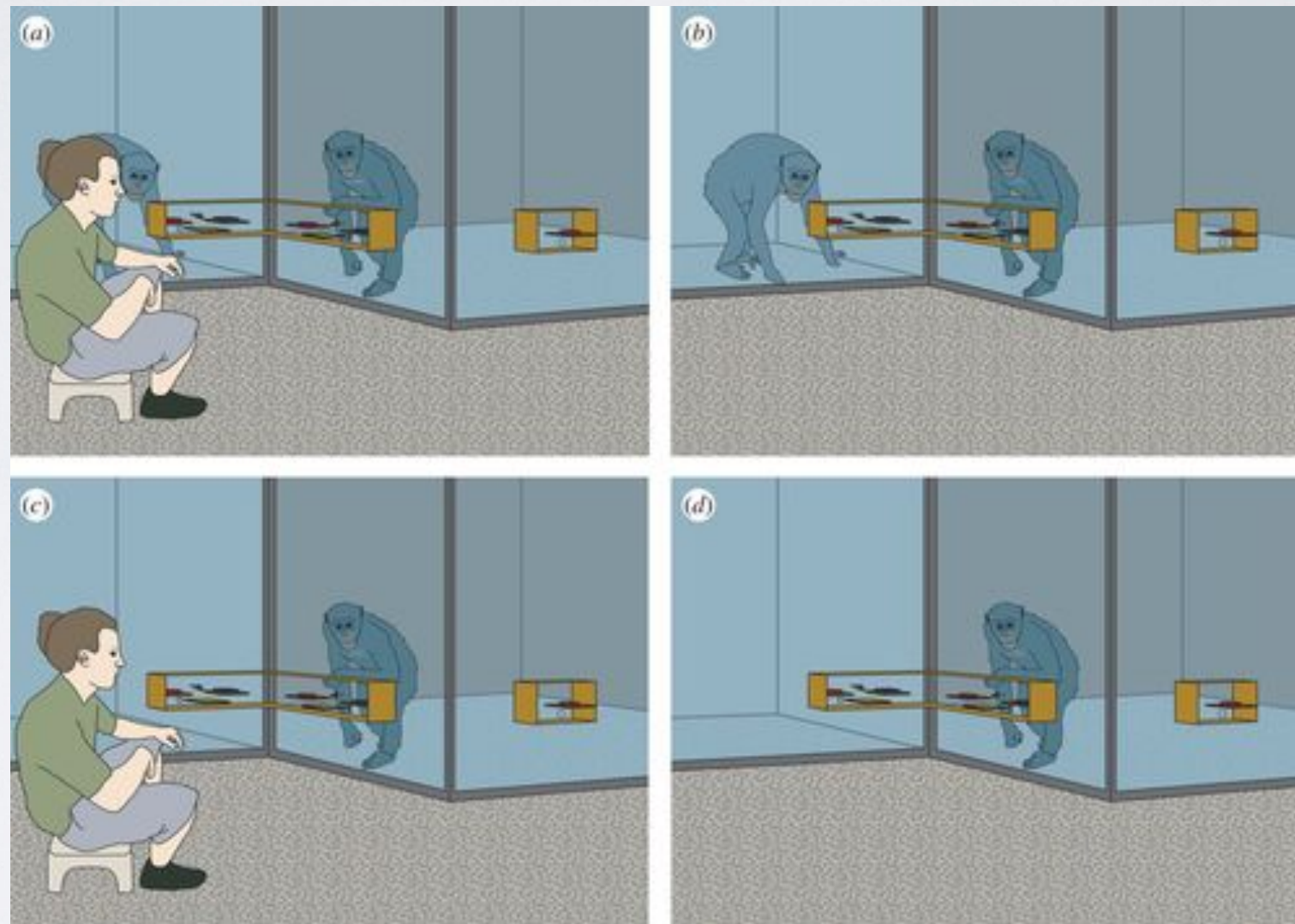


Figure 1 Mean percentage $\pm$ s.e.m. of failures to exchange for females across the four test types. Black bars (RR) represent the proportion of non-exchanges due to refusals to accept the reward; white bars (NT) represent those due to refusals to return the token. s.e.m. is for combined non-exchanges. Lines indicate significant differences between conditions (Tukey's multiple comparisons). ET, equality test; IT, inequality test; EC, effort control; FC, food control.

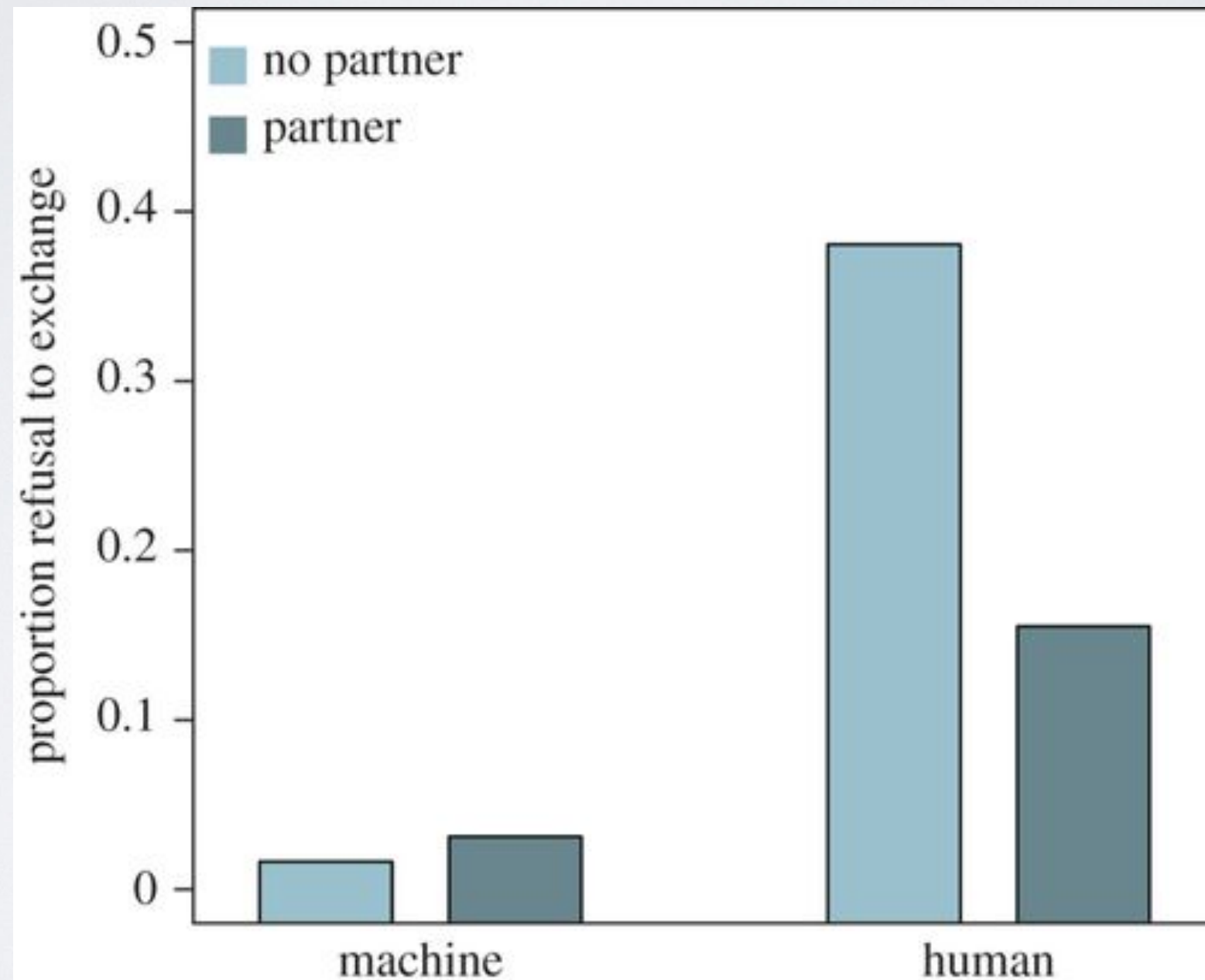
INTENTIONS

UNFAIR OR JUST MAD AT EXPERIMENTER?



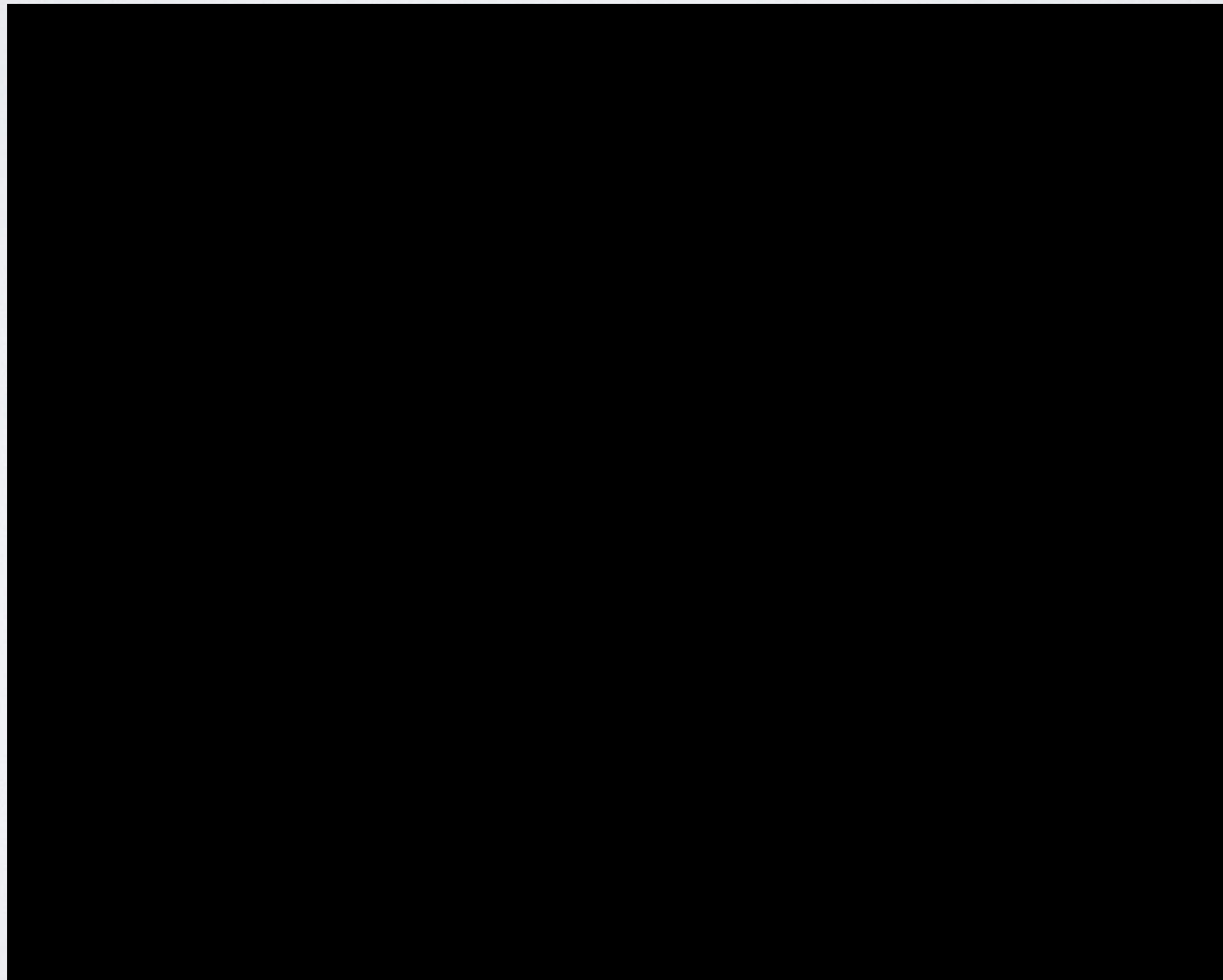
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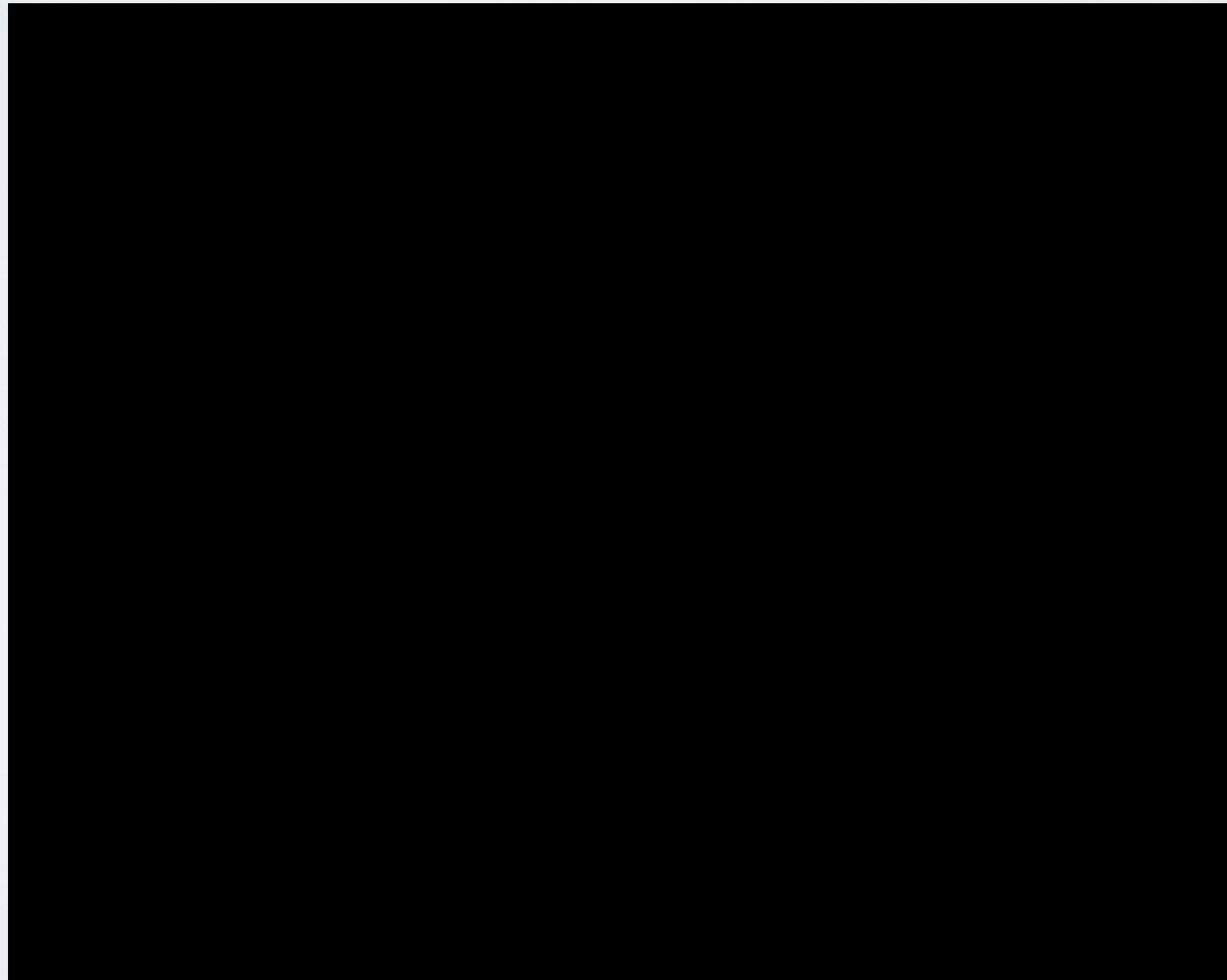
LEND ME A HAND?

- Will apes and children help a human experimenter without being rewarded?



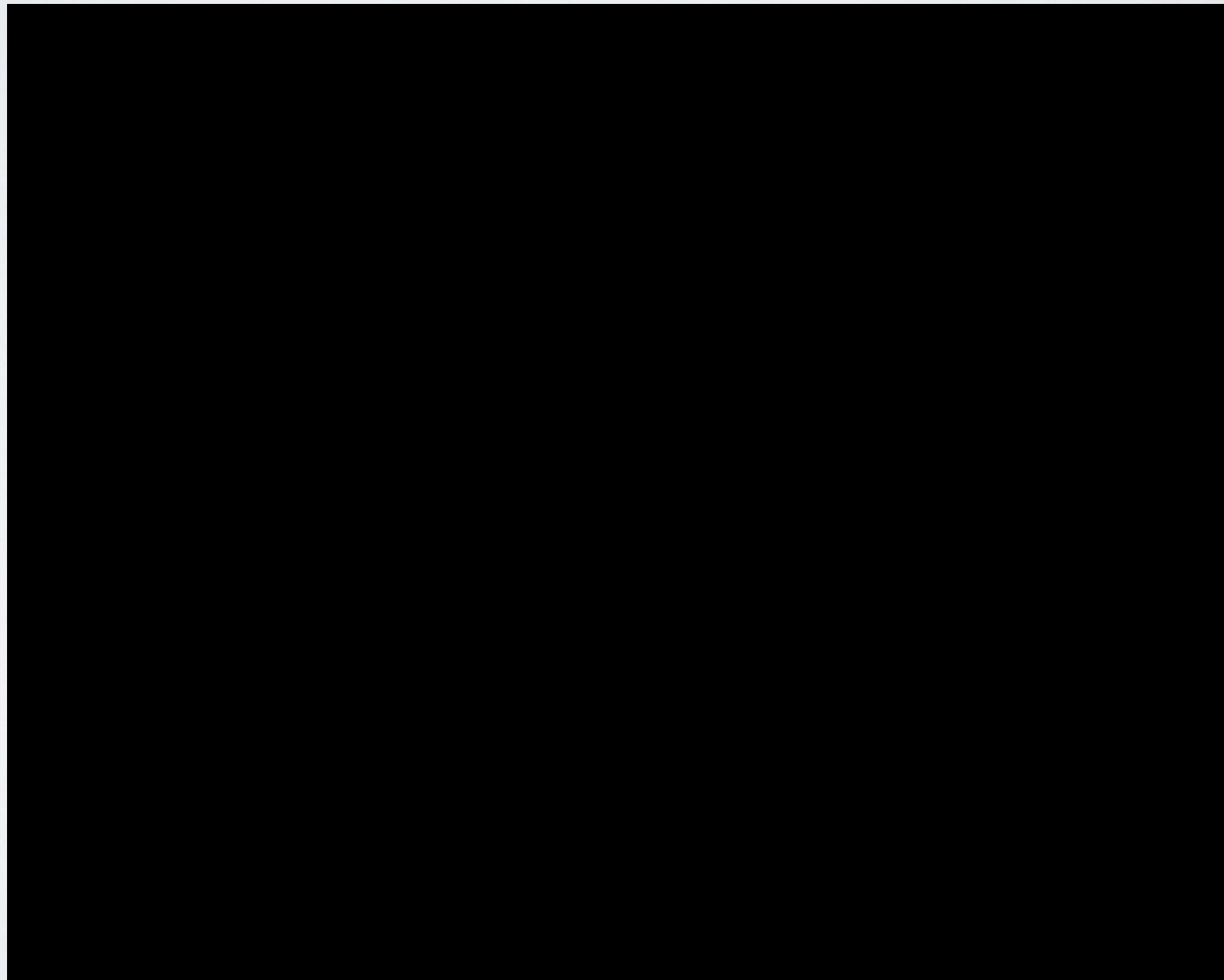
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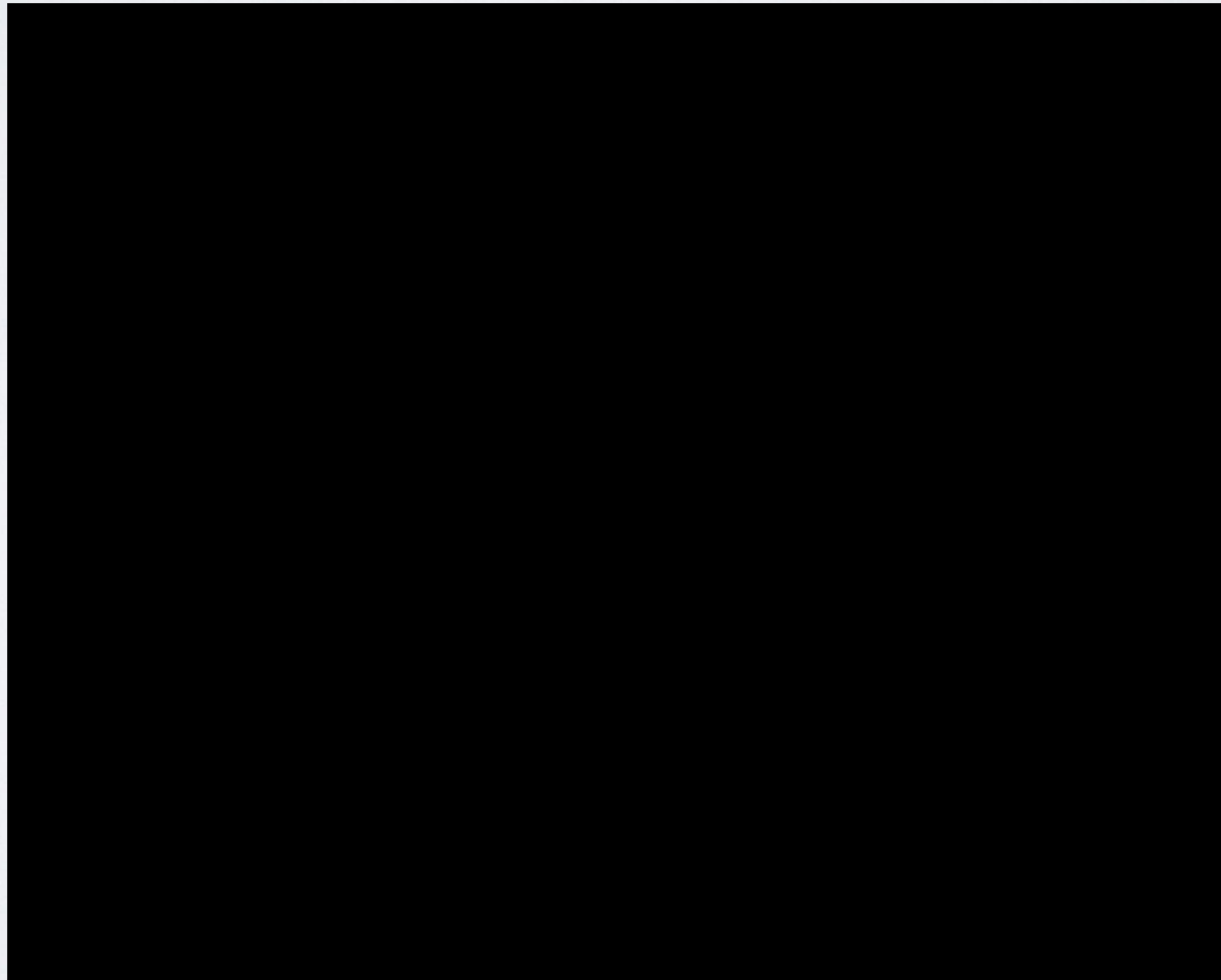
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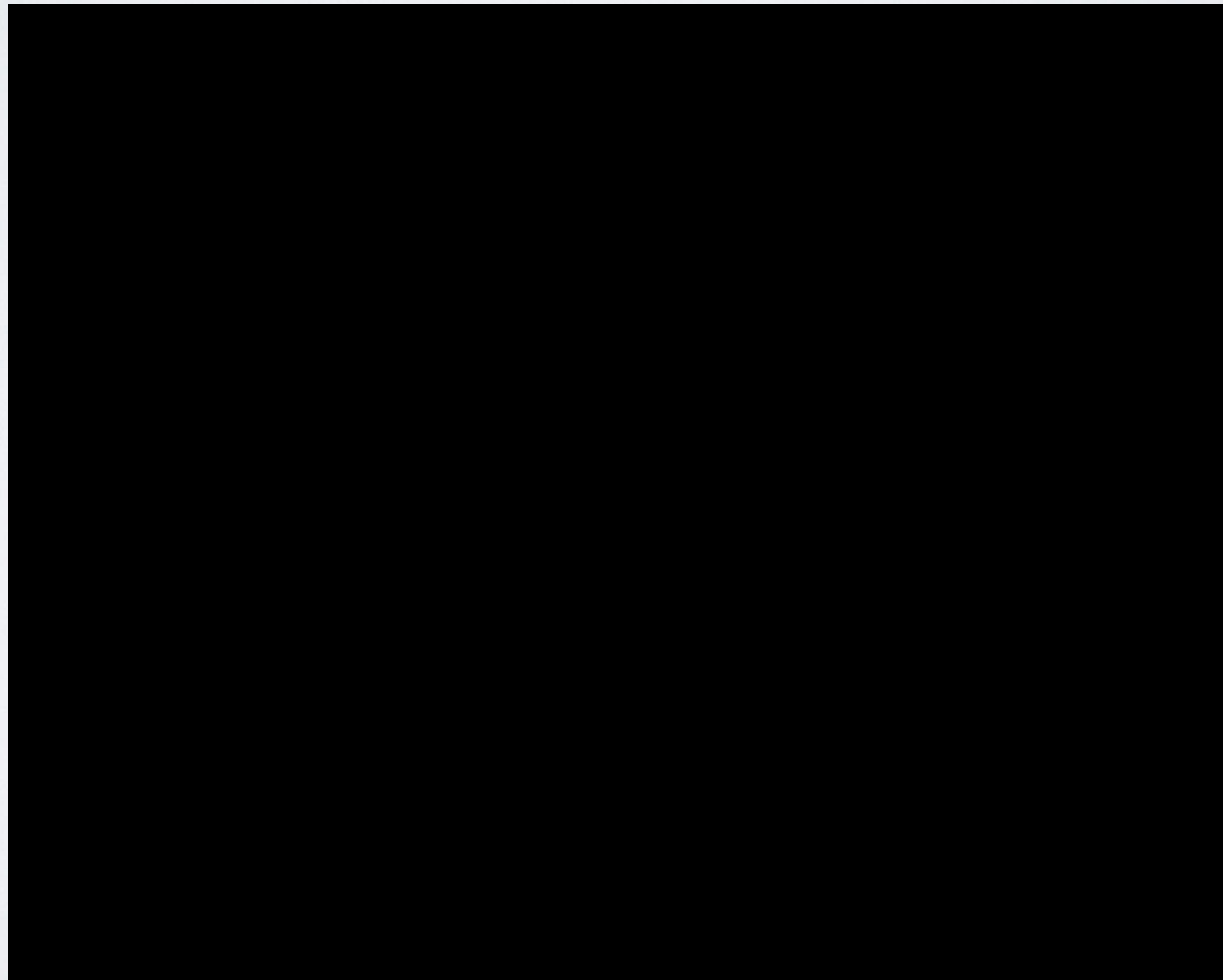
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LEND ME A HAND?

- Children helped in all experimental conditions (e.g., when experimenter's hands were full, when toy had fallen into a box)
- Apes only helped in trials involving reaching

INTENTIONS

LEND ME A HAND?

- Children helped in all experimental conditions (e.g., when experimenter's hands were full, when toy had fallen into a box)
- Apes only helped in trials involving reaching

Why?

LEND ME A HAND?

- Children helped in all experimental conditions (e.g., when experimenter's hands were full, when toy had fallen into a box)
- Apes only helped in trials involving reaching

Why?

- Apes easily understand experimenter's goal when reaching
- Inferring experimenter's intention or goal in absence of obvious signal may be more difficult

UNDERSTANDING KNOWLEDGE OF OTHERS

OFFERING MATERNAL ADVICE?

- Japanese macaque mothers could see a bunch of apple slices in two conditions:
 - Offspring knowledgeable: her offspring could also see the apples
 - Offspring ignorant: her offspring could not see the apples



OFFERING MATERNAL ADVICE?

- Japanese macaque mothers could see a vet with a net in two conditions:
 - Offspring knowledgeable: her offspring could also see the vet
 - Offspring ignorant: her offspring could not see the vet



OFFERING MATERNAL ADVICE?

- Mothers' behavior did not differ in two conditions
- Seem to be unable to represent the knowledge/ignorance of another individual



BUCKET HEAD

- Do chimpanzees understand what a person with a bucket on their head can see?

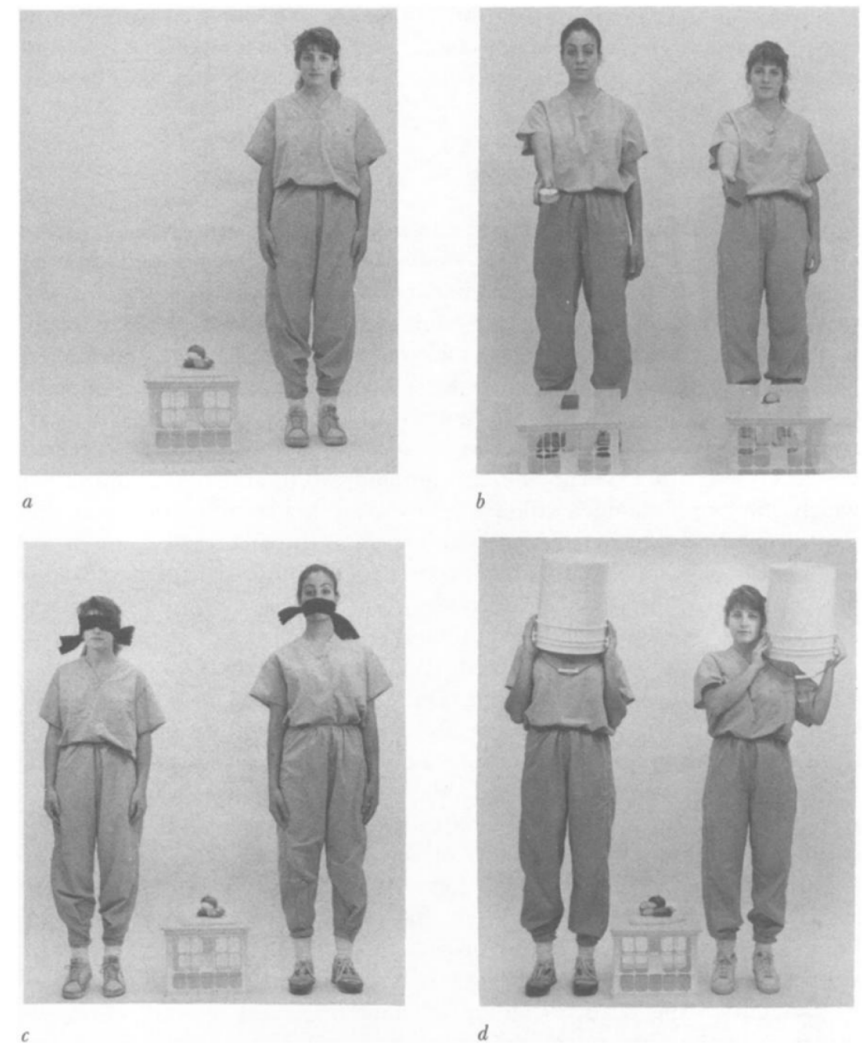


FIG. 4.—*a*, The configuration for standard trials that surrounded all probe trials (see also Fig. 3 above). *b*, The configuration for baseline probe trials (A) in which subjects chose between one experimenter offering food (the experimenter on the left) and another offering a block of wood (the experimenter on the right). (Note the position of the tables that contain the opposite stimuli of what each experimenter is offering.) *c*, The stimulus configuration for blindfold probe trials (B). *d*, The stimulus configuration for bucket probe trials (B').

BUCKET HEAD

- Chimpanzees beg from a person with a bucket on their head
- But they won't beg from somebody whose back is turned

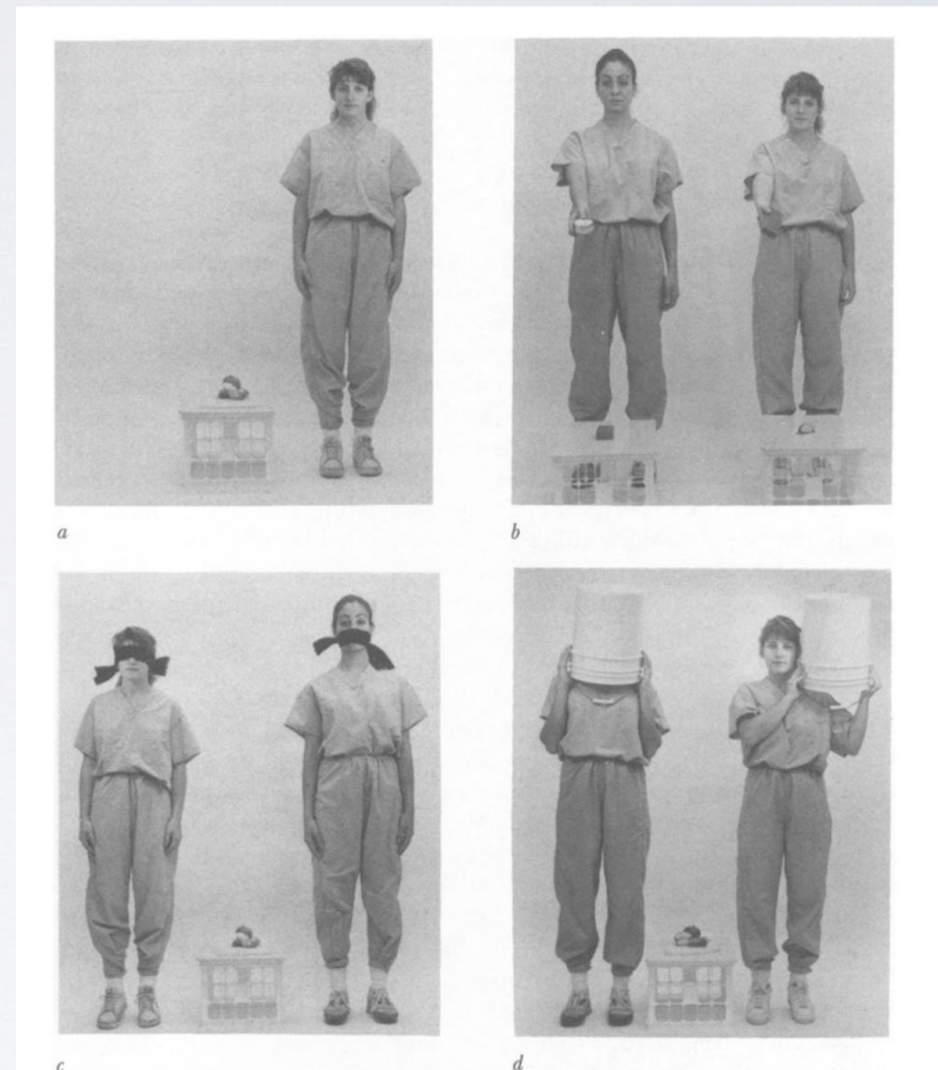


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CAN YOU SEE WHAT I SEE?

- Competitive interactions may be more ecologically relevant to chimpanzees

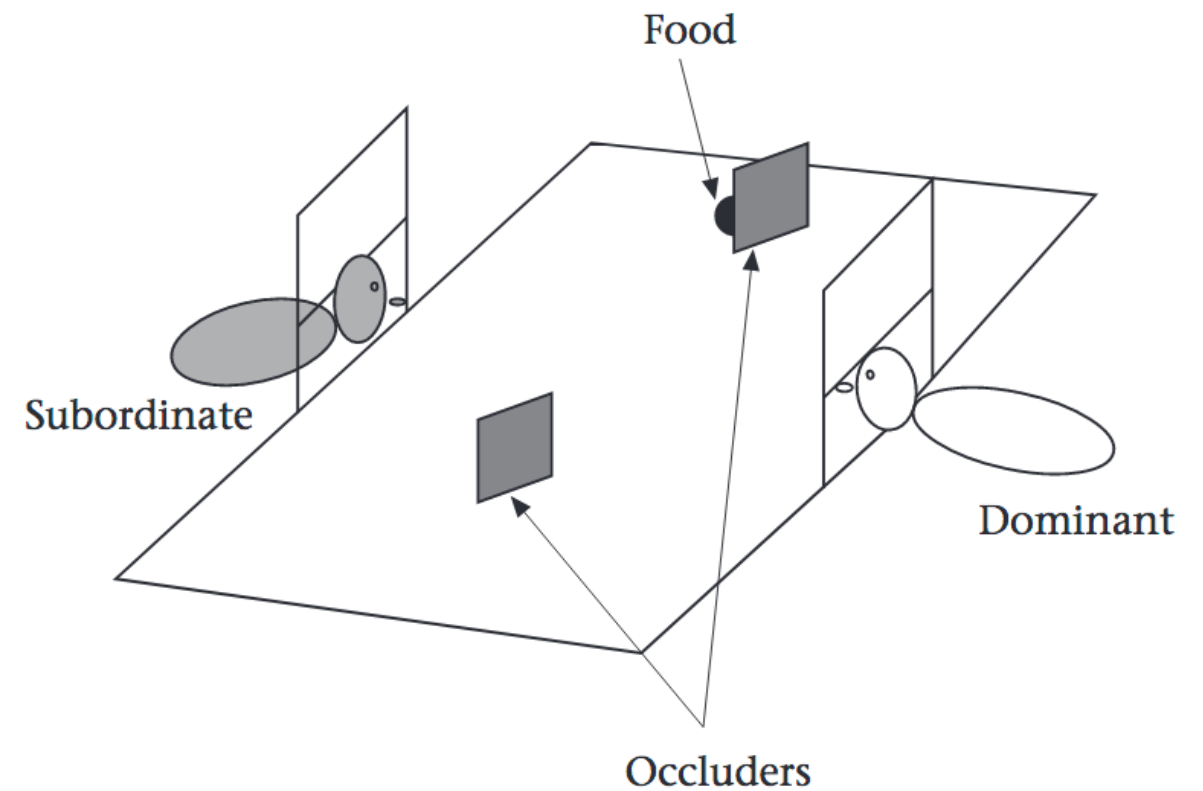


Figure 1. General experimental set-up in experiments 1–3.

Hare et al. 2001

CAN YOU SEE WHAT I SEE?

- Informed vs uninformed
- Informed vs misinformed

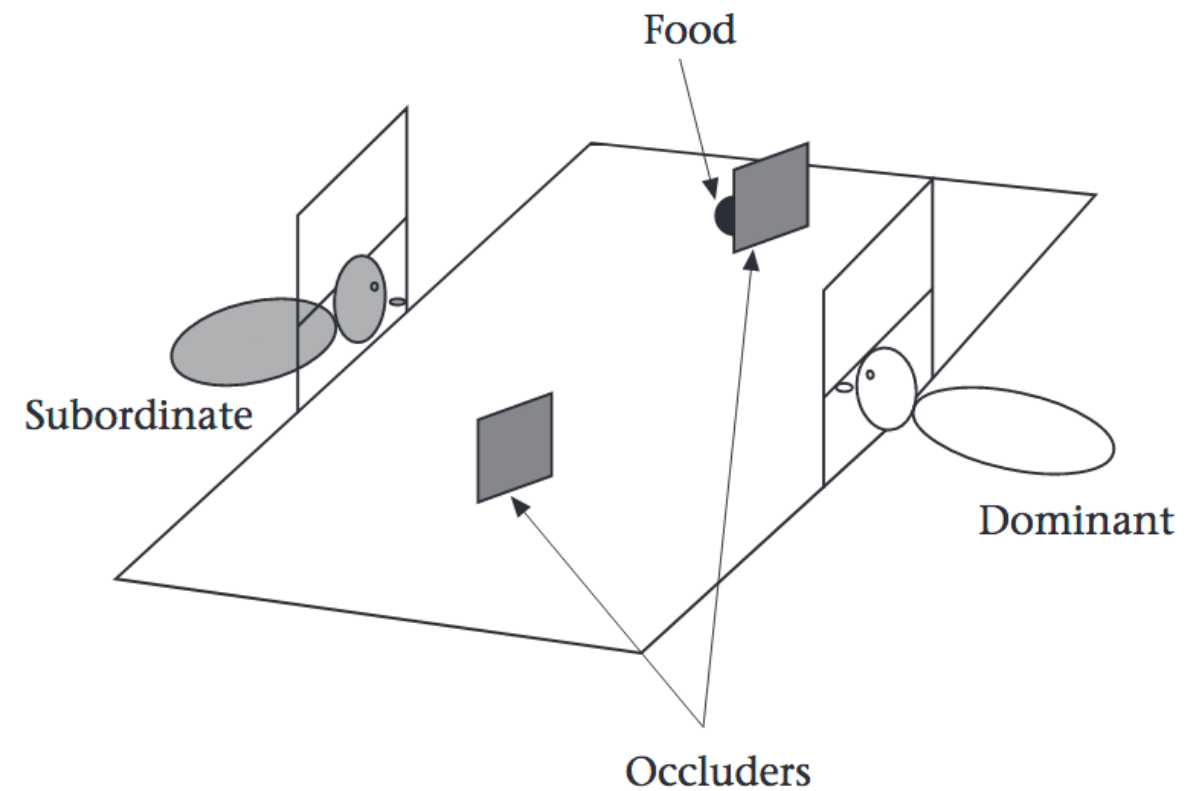


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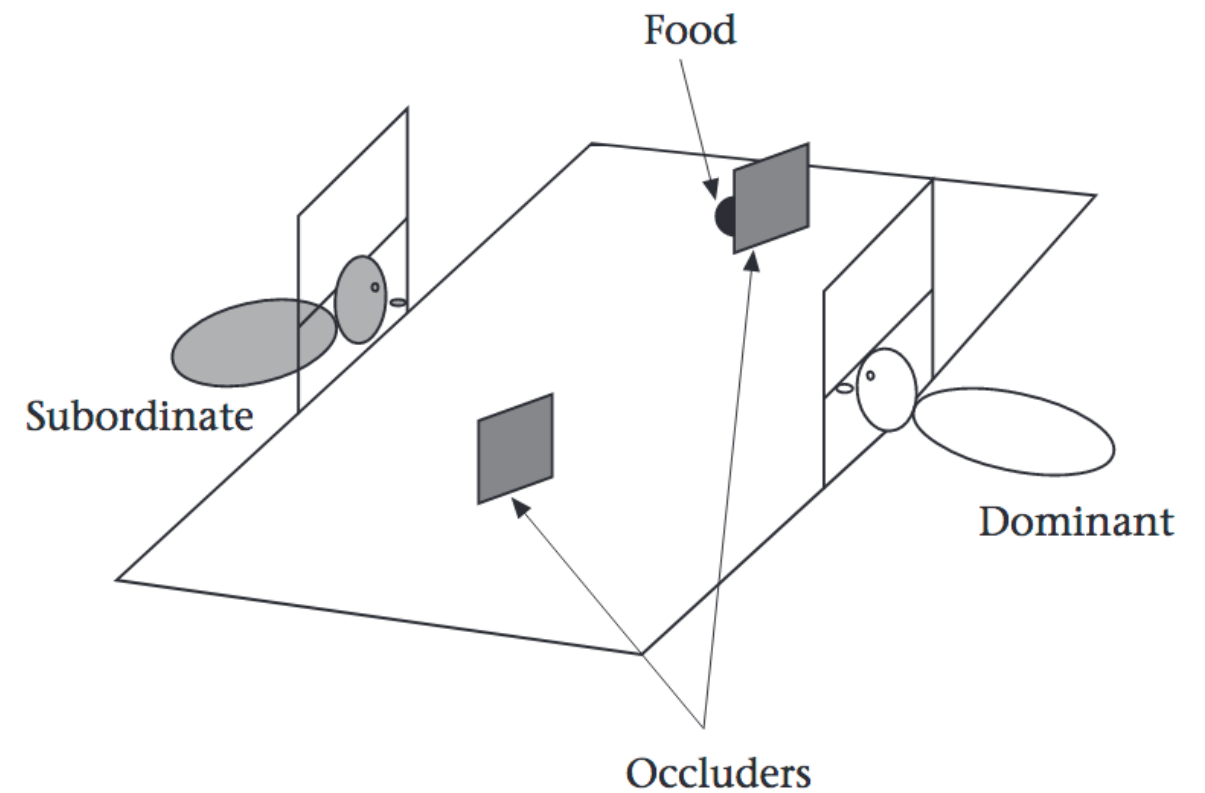
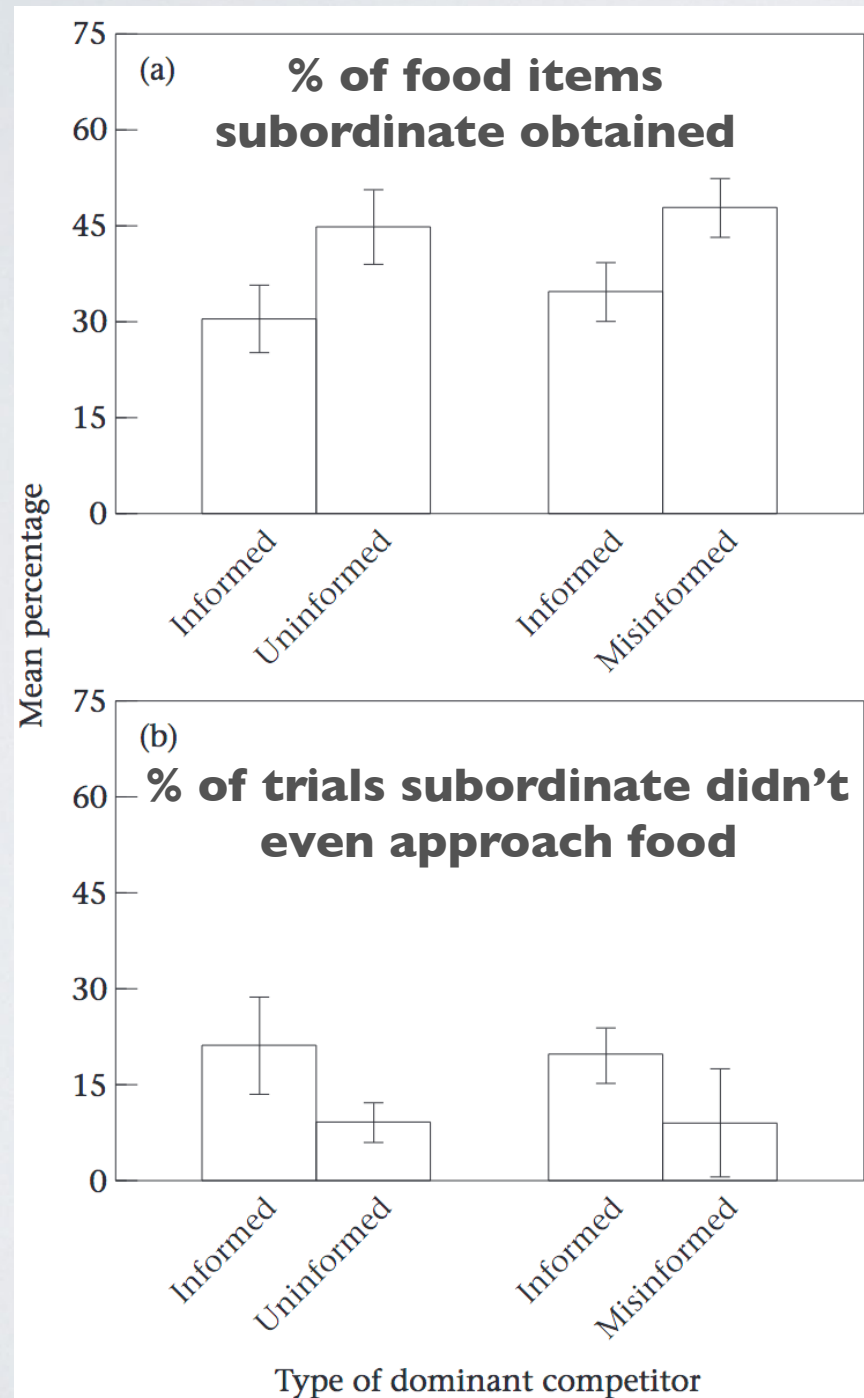
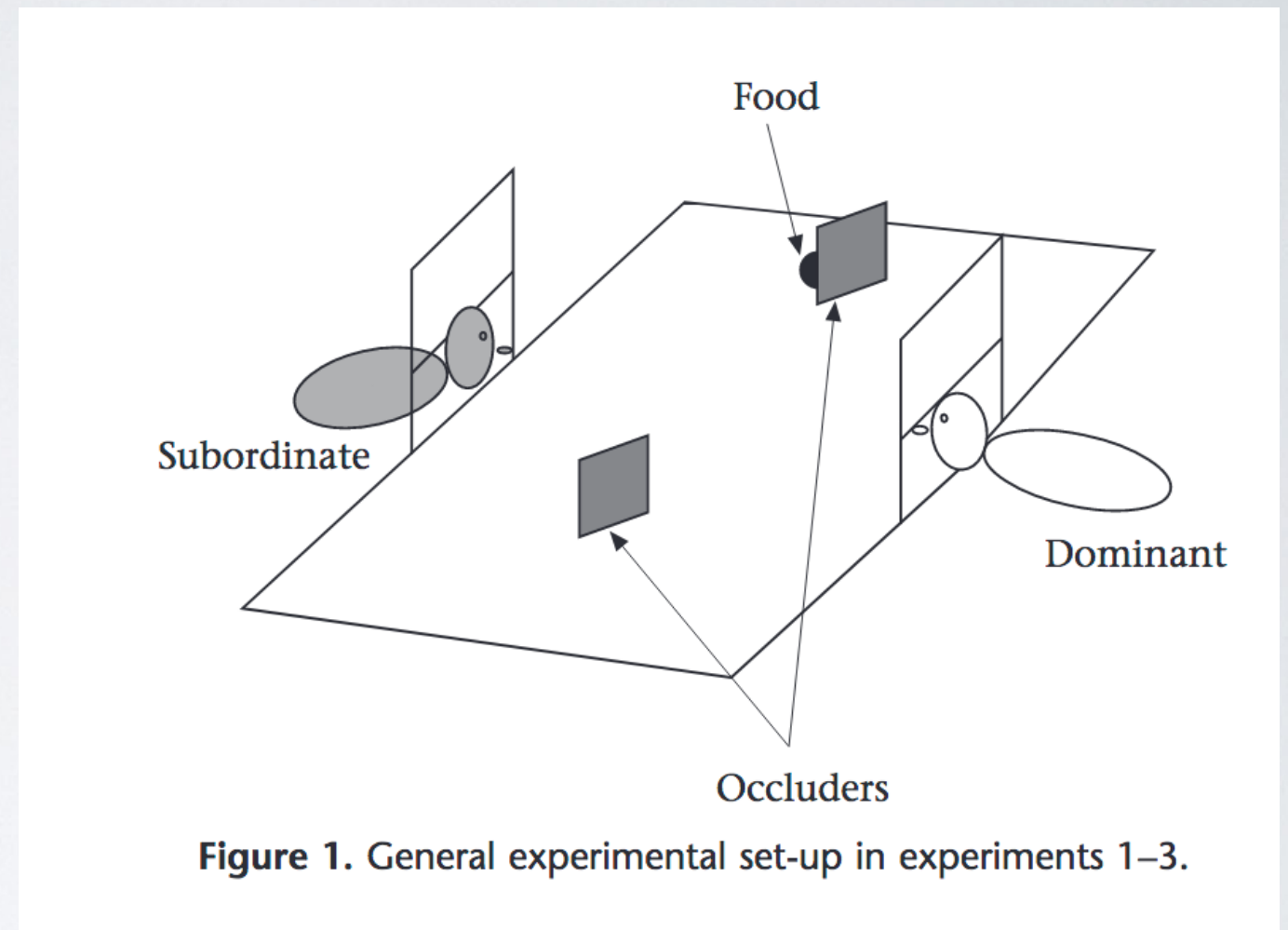
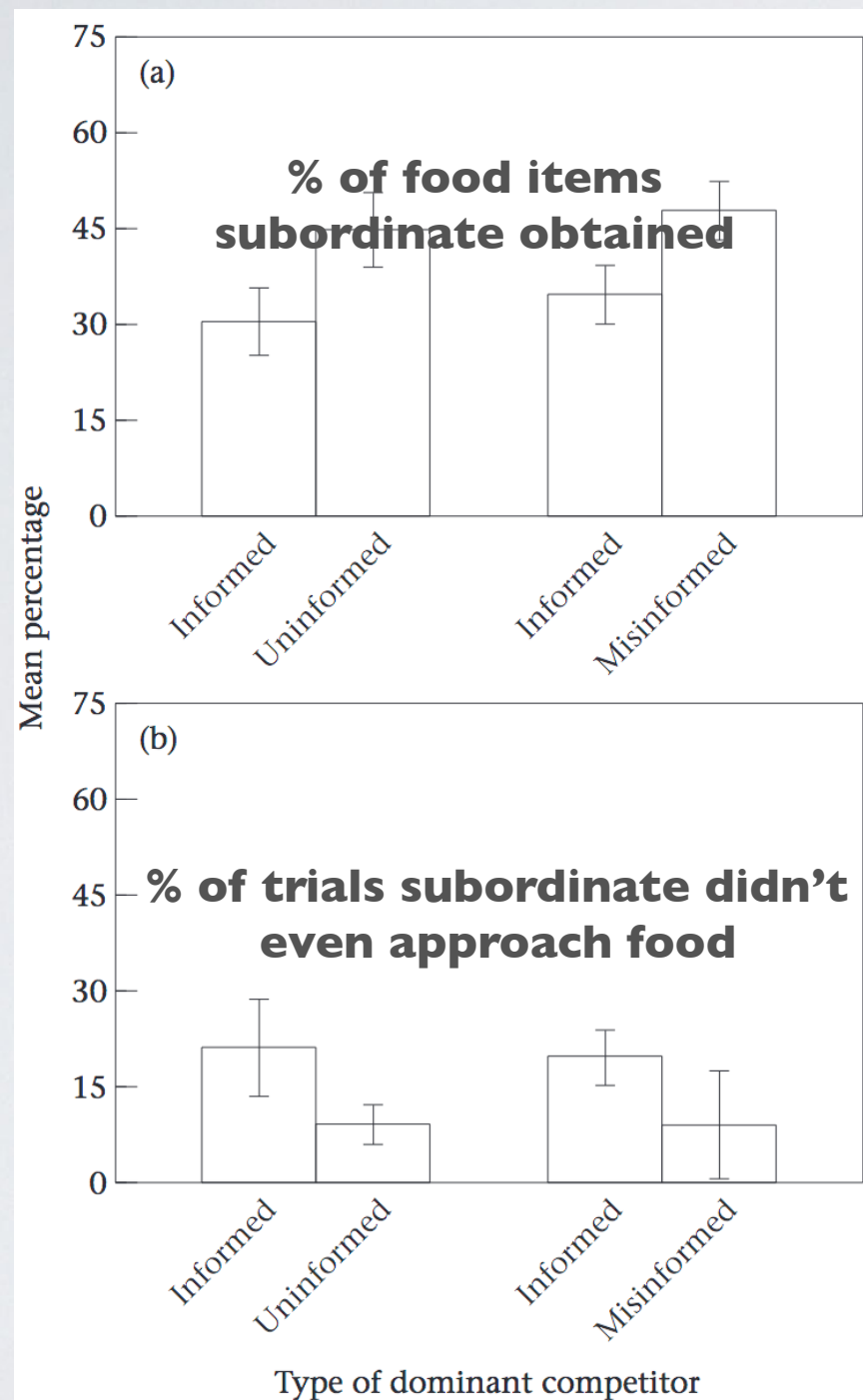


Figure 1. General experimental set-up in experiments 1–3.

Hare et al. 2001

CAN YOU SEE WHAT I SEE?



Hare et al. 2001

What is an explanation for these results that does not require attribution of knowledge?

KNOWING WHAT OTHERS CAN SEE

- When tested in right conditions, chimpanzees appear to understand what other can see
- May also understand of relationship between seeing and knowledge
- But results could be explained by behavioral-rules, not dependent on mental state attribution

UNDERSTANDING OTHERS' FALSE BELIEFS

FALSE BELIEF

The 'Sally-Anne Test'
(a false belief test used to
assess Theory of Mind)

Mark McDermott
[FOR EDUCATIONAL USE ONLY]

FALSE BELIEF I

- Four conditions:
 1. Visible displacement
 2. Invisible displacement
 3. Ignore Communicator
 4. False belief

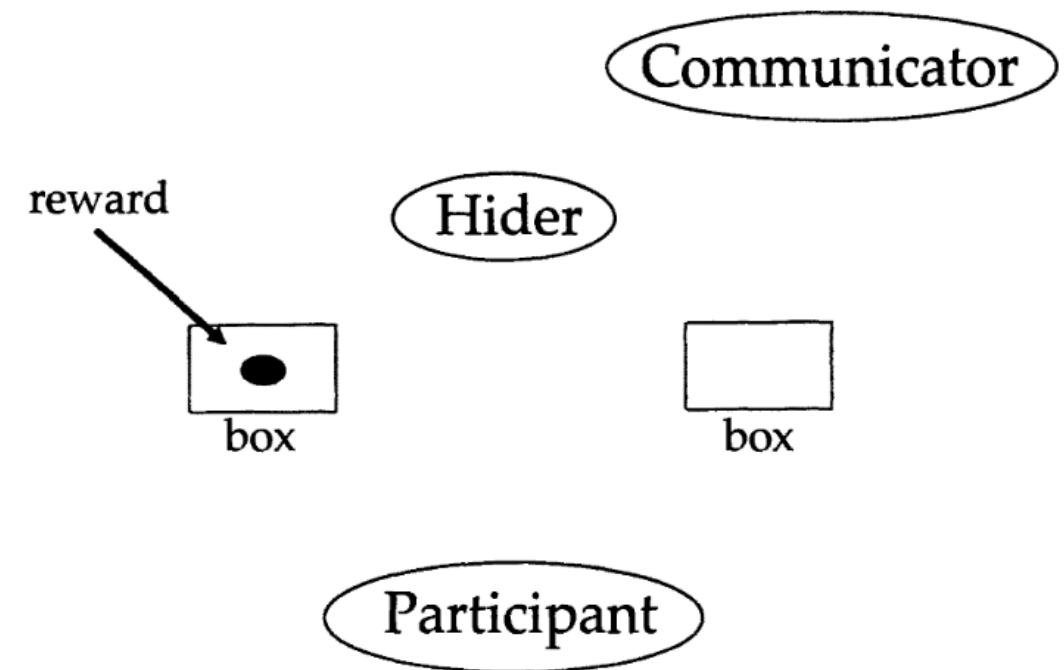
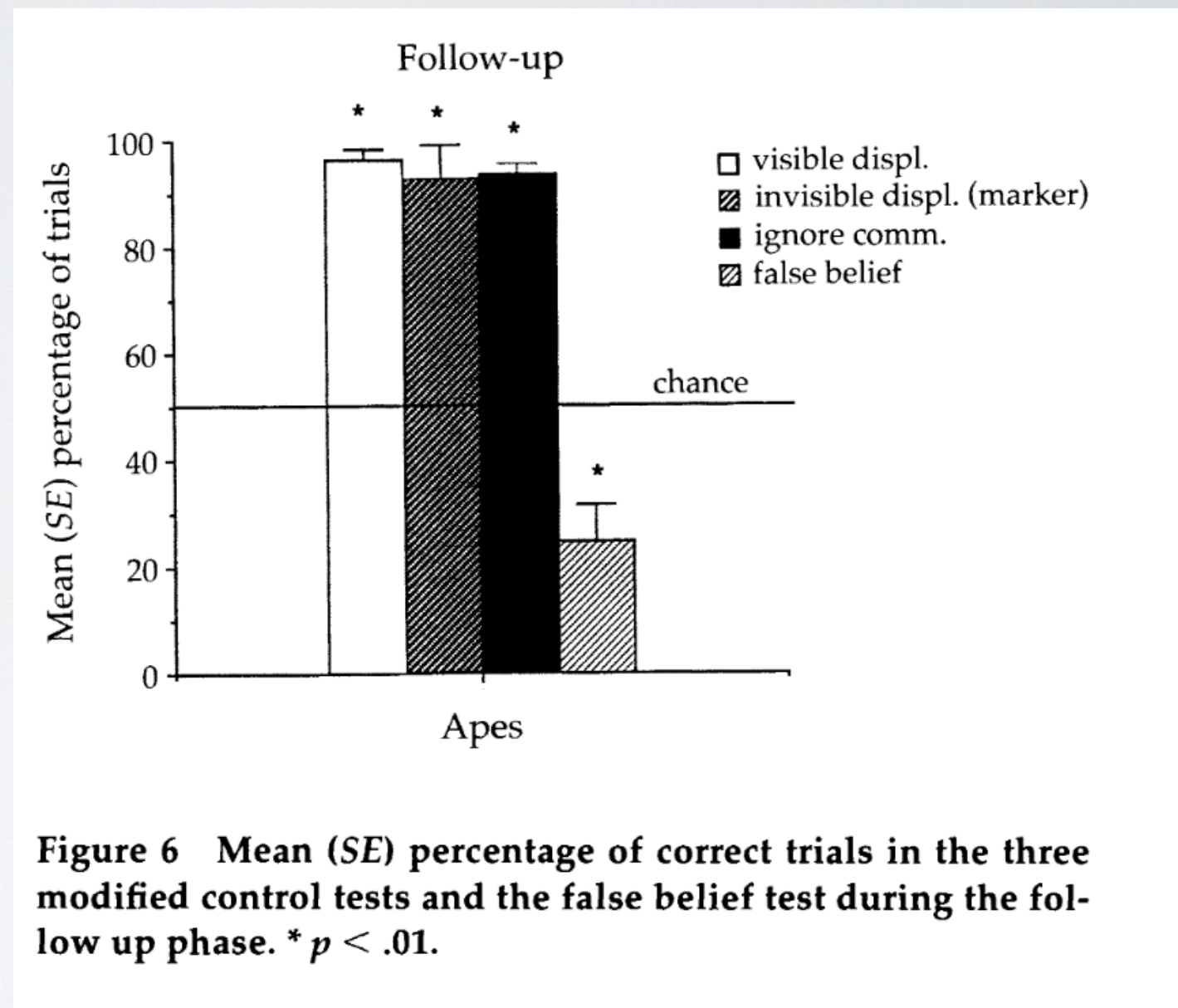


Figure 1 Experimental setting depicting the location of the two experimenters, the participant, and the testing materials.

FALSE BELIEF I

- Chimpanzees perform worse than chance on False Belief task



FALSE BELIEF II

- New eye tracking technology
- Anticipatory looking can measure apes' implicit knowledge

FALSE BELIEF II

Familiarization
Bonobo Jasongo

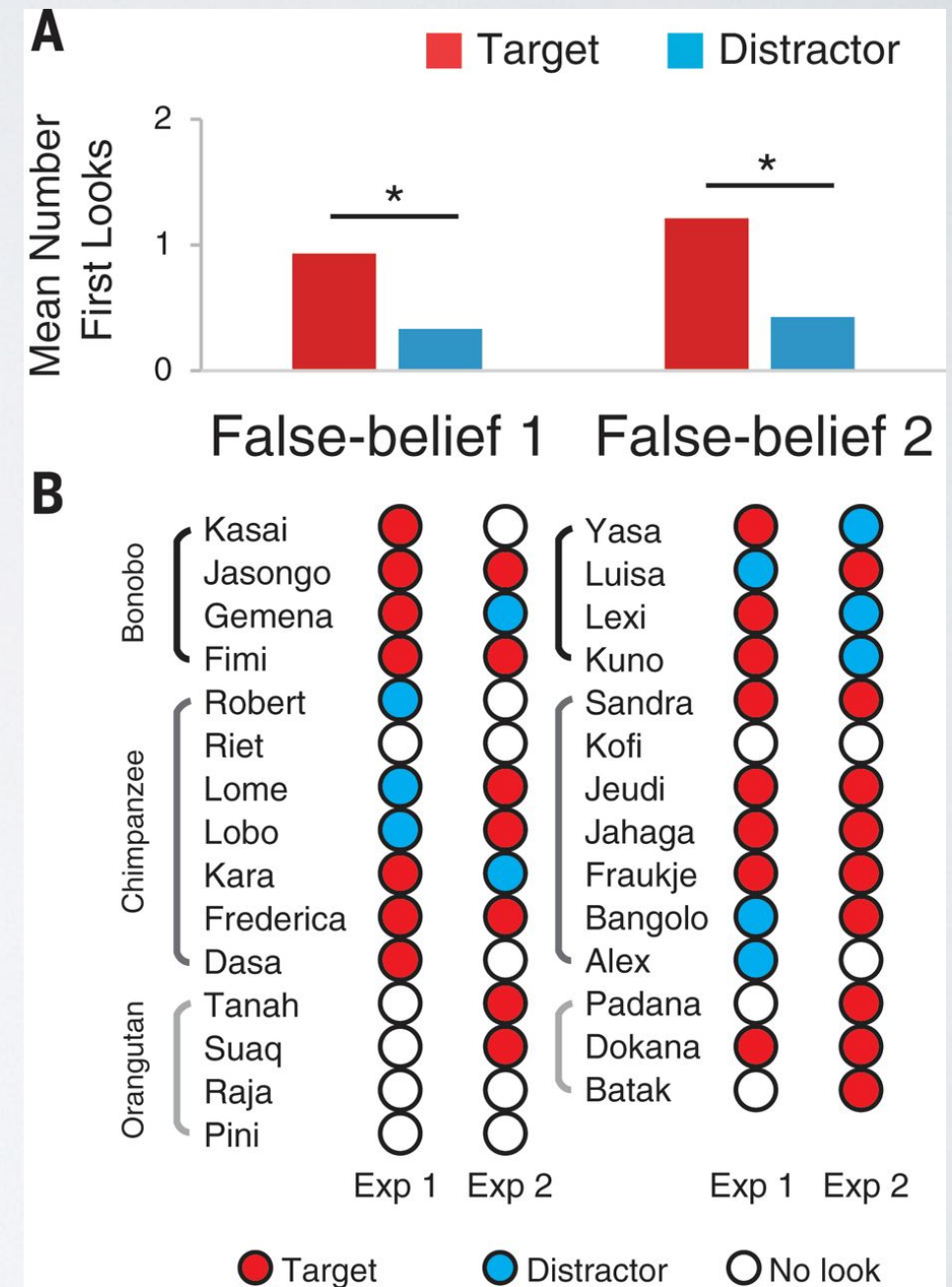
FALSE BELIEF II

False-belief 1

Chimpanzee Hatsuka

FALSE BELIEF II

- Great apes can attribute false belief!



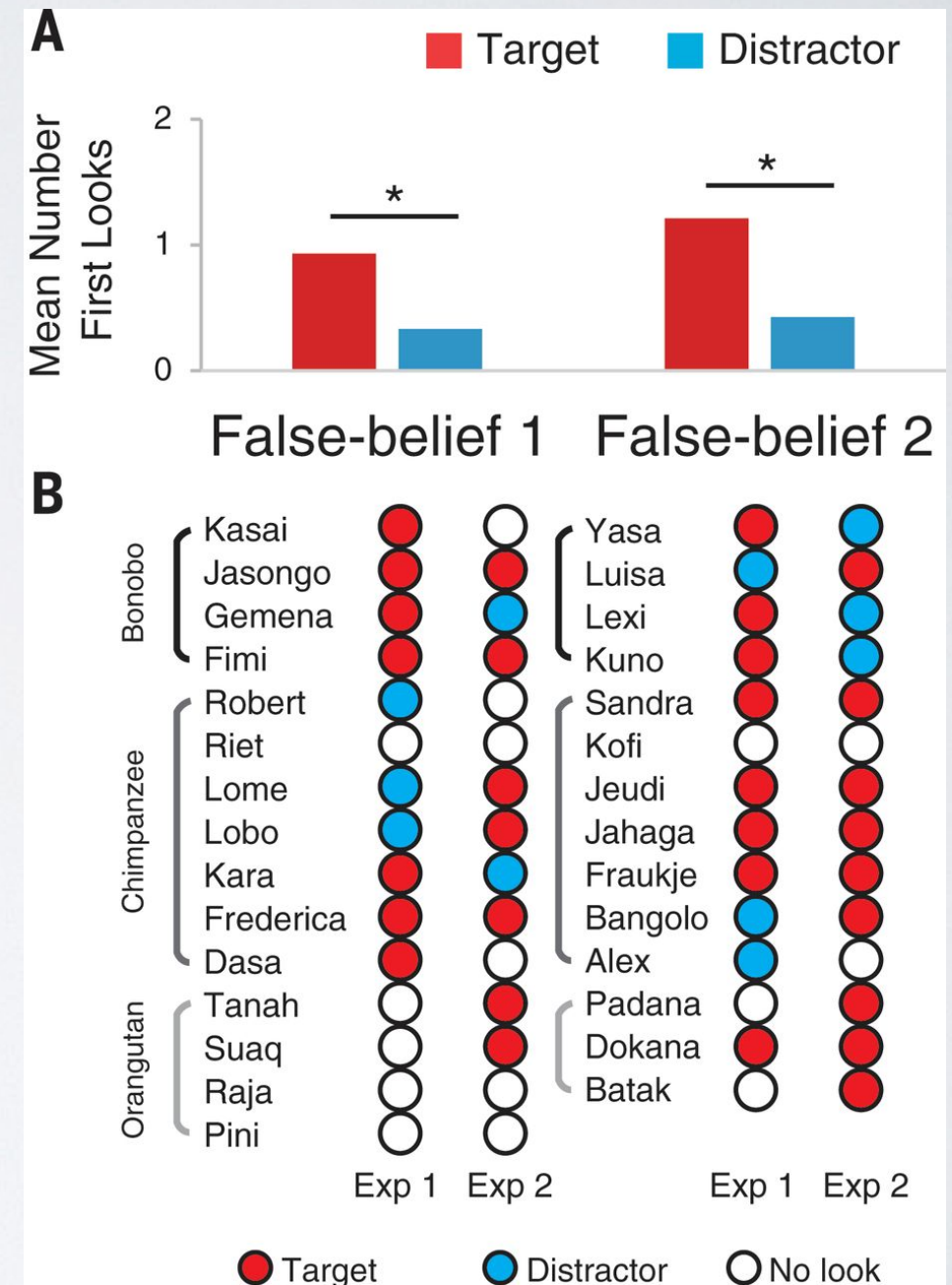
FALSE BELIEF II

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How might you critique this study?

What caveats might you want to add to the authors' interpretation?

How does it compare to the Sally-Anne task?



THEORY OF MIND: SUMMARY

- Apes and monkeys can attribute intentions to other individuals
- Apes can also attribute knowledge and false belief
- Results are fragile (i.e., positive results occur under very particular conditions)
- Task demands (e.g., inhibition control) often interfere with performance
- Alternative non-mentalist accounts can explain some results

QUESTIONS?