

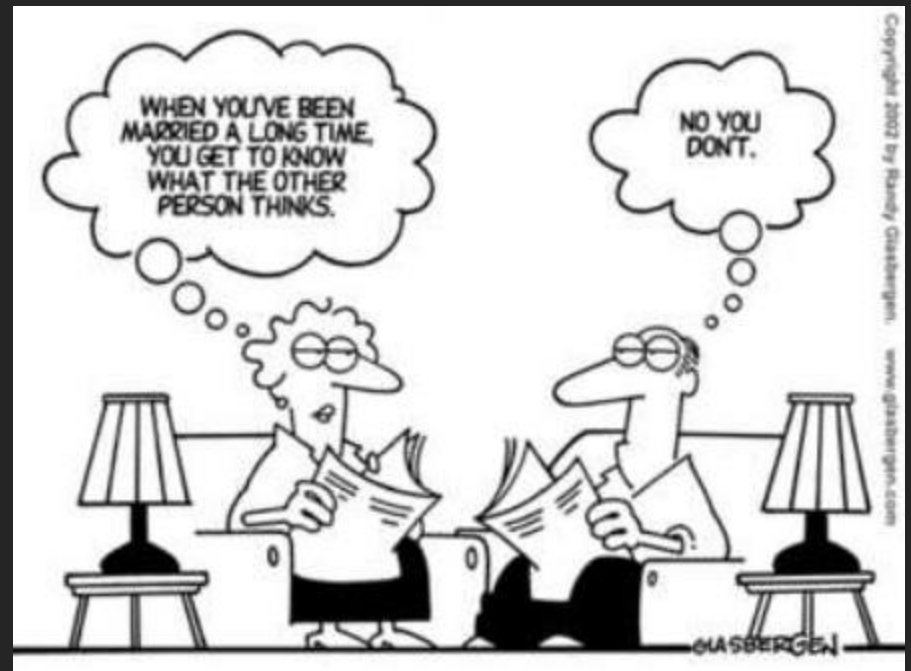
Psychology 3016

Social Cognition 2

Caroline Moul

Brennan MacCallum
Room: 338

caroline.moul@sydney.edu.au



Social Cognition Learning Outcomes

Learning Outcomes across the Social Cognition mini-course

LO1 – demonstrate a deep understanding of the evidence to show different aspects of social cognition in human children and the great apes.

LO2 – consider the strengths and limitations of experiments used to test social cognition in humans and apes.

LO3 – explain how results from experiments used to test social cognition provide evidence to show different aspects of social cognition.

LO4 – understand how experimental results of tests of social cognition can inform knowledge and practice regarding child social-cognitive development and autism spectrum disorder.

LO1 – critically consider what the research evidence tells us about the development of social cognition and determine what questions remain.

Basics – let's recap

- Mirror self recognition
- Empathy
 - Contagion
 - Helping
- Goal and intentions
- Perception and knowledge
- False belief understanding

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- Mirror self recognition
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Granted, young infants (<6 months) can do
some pretty remarkable things but,

Despite this high degree of sociality, however, in none of these interactive behaviors do infants demonstrate their own interests and attention to outside entities. Overt evidence for this understanding first emerges in the latter half of the first year of life as infants begin to incorporate outside objects into their social interactions with adults (p. 3)

Social cognition and communication from 9 to 15 months of age

Carpenter, Nagell & Tomasello (1998)

What does this mean?

- Very social with face-to-face interaction
 - smiling, giggling, shared affect, listening, vocalisations etc
- This does not mean that they realise the other person has thoughts, feelings or goals that may be different from their own
- The lack of referential communication (shared attention, following of gaze etc) suggests that infants < 6 months old do not appreciate that the other person has their own “mind”.

❖ PTC: would language have developed without a theory of mind?

Social cognition and communication from 9 to 15 months of age

Carpenter, Nagell & Tomasello (1998)

1. Sharing attention (triadic interactions):

- Joint engagement

2. Following attention:

- Skill of attention following
 - Gaze-following
 - Point-following
- Skill of imitation (remember the foot button?)
 - Instrumental action
 - Arbitrary action

3. Directing attention and behavior:

- Declarative gesture
- Imperative gesture

Joint attention

Triadic
interactions

Sharing
attention

Trevarthen & Hubely (1978)

Gaze alternation between infant and parent (e.g., Tracey)

Methodologically, want to be sure that looks to object and parent are not incidental

Following
attention

Scaife & Bruner (1975)

Deliberate attention following, much less ambiguous

Follow attention via gaze

Follow behavior via imitation

Directing
attention

Bates, Camaioni & Volterra (1975)

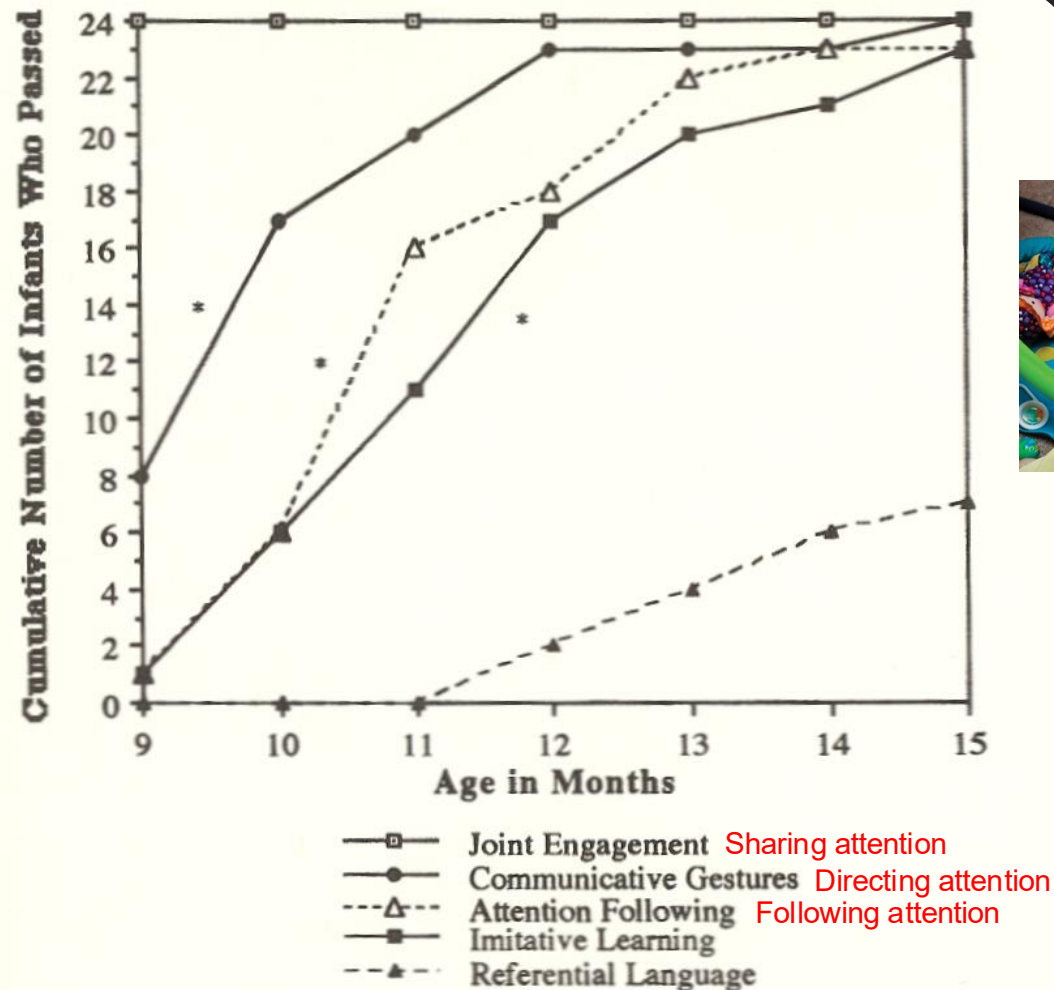
Imperative gestures

Declarative gestures

Verbal communication

Social cognition and communication from 9 to 15 months of age

Carpenter, Nagell & Tomasello (1998)



NB: Not referred to – already there in diadic context



FIGURE 9.—Cumulative number of infants passing each of the main social-cognitive skill at each time point (* $p < .05$).

Social cognition and communication from 9 to 15 months of age

Carpenter, Nagell & Tomasello (1998)

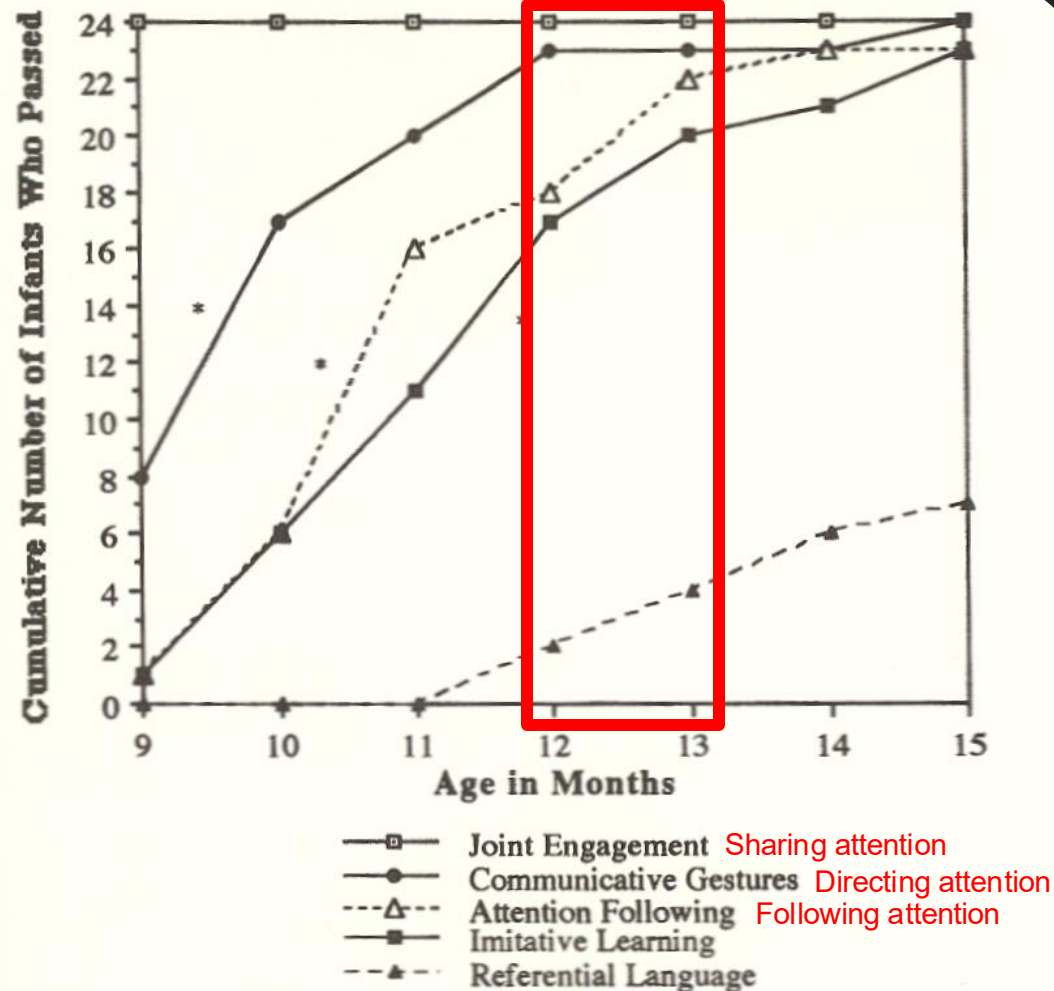


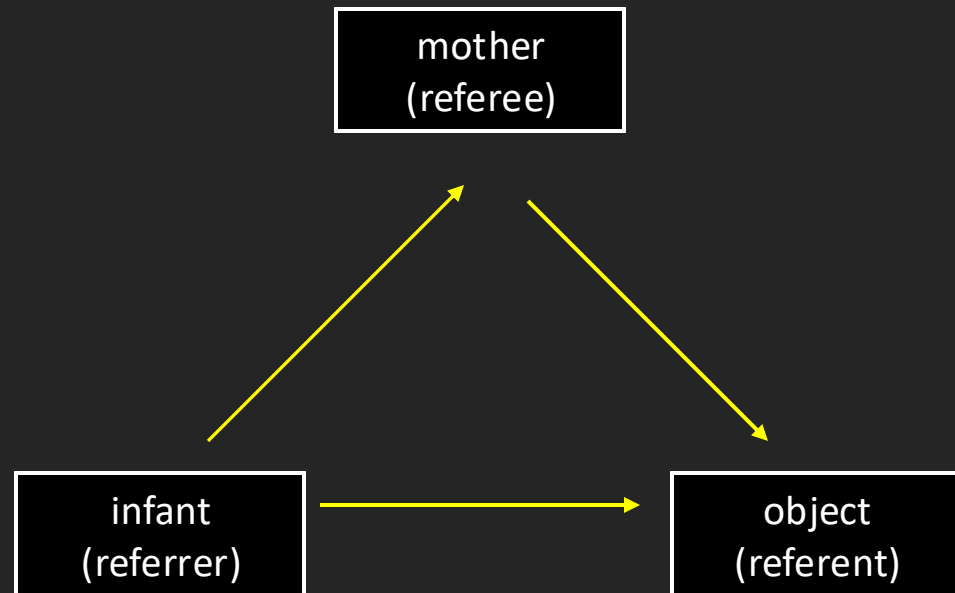
FIGURE 9.—Cumulative number of infants passing each of the main social-cognitive skill at each time point (* $p < .05$).

Social referencing (PSYC1002):

The coming together of social information gathering (Baldwin & Moses, 1996)

When infants (~12 months) encounter a novel object they sometimes look towards a parent and (sometimes!) subsequently respond to the object in accord with the affect displayed by the parent

E.g....



Social referencing: The visual cliff

Sorce, Emde, Campos & Klinnert (1985)

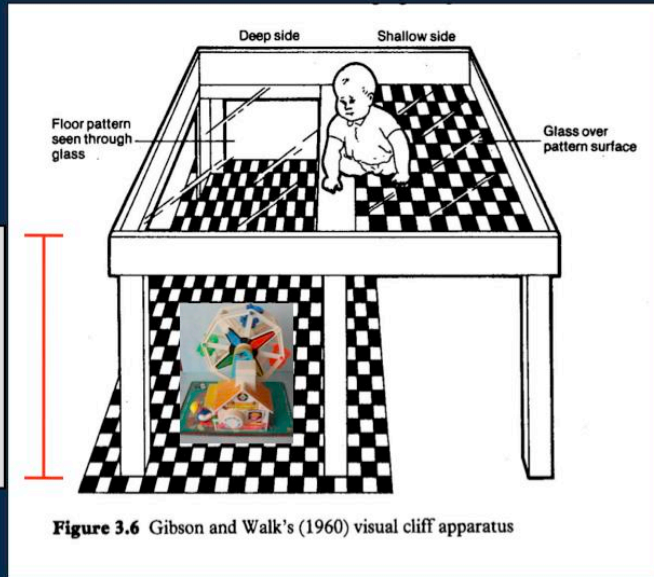
Table 1
Effect of Mothers' Facial Expressions on Infant Behavior

| Variable | Study 1 | | Study 2 | | Study 3 |
|--|-----------------|------------------|----------------------|-------------------|---------------------|
| | Joy (N = 19) | Fear (N = 17) | Interest (N = 15) | Anger (N = 18) | Sadness (N = 19) |
| Percentage of infants crossing deep side | 74% | 0 | 73% | 11% | 33% |
| Mean number of retreats per minute to shallow side | .420 | 1.08 | .420 | .72 | .660 |
| Mean rating of hedonic tone | 1.62 | 2.12 | 2.00 | 1.92 | 1.92 |
| Mean number of references per minute | 3.60 | 2.46 | 5.70 | 2.94 | 4.59 |

Joy \approx 75% } Categorically different
 Fear = 0% }
 Anger = 11% } generalised negative affect



30cm
 +
 FP
 Musical
 Ferris
 Wheel!



Social referencing

Implications

- Infants appreciate that parents can supply information—in the form of an emotional appraisal—about novel *objects* (i.e., person, thing or situation) *emotions contain meaning?*
communicative intent
- Infants spontaneously use such information from a third party or *referee* (e.g., parent or experimental confederate) to resolve their own uncertainty and to guide their actions

*Mothers
Emotion as
Information*
↓
*used to actively
resolve
uncertainty
&
guide
behavior*

Social referencing

Pre-requisites (Baldwin & Moses, 1996)

- Infant needs to be able to *decode* signal
- Infant must understand *referential quality* of information
- Infant must appreciate the *potential for social communication* of information

Signal
Decomposition

Referential
Quality

Communicative
intent.

Is it *shared* attention or *communication* of information?

Do infants update you if a change occurs in your absence?

Do 12 month old infants use social gestures (i.e., pointing) to:

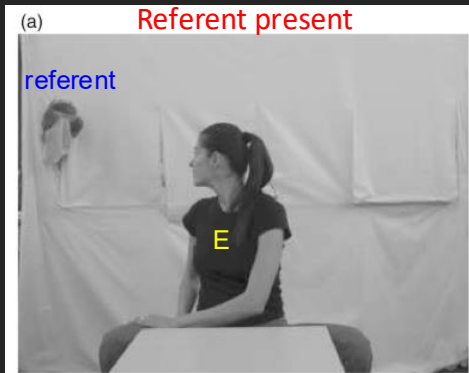
1. Inform others of new or changed information
2. Share *mental attitudes* – that is, communicate with the intention of ... communicating

If they do these things, particularly the first, then it is extremely likely that infants know what other people are likely to know on the basis of what they can see

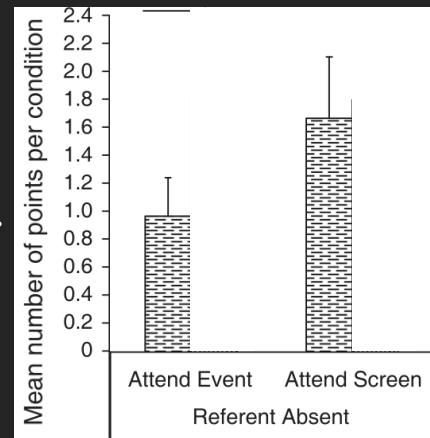
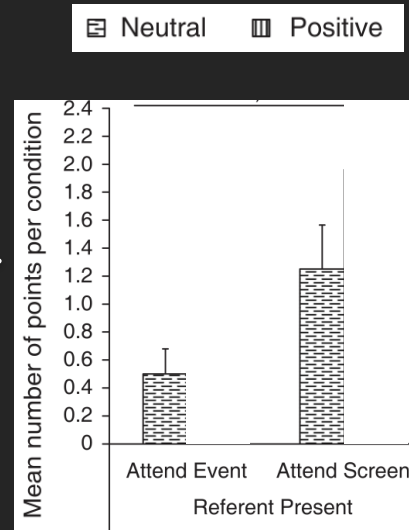
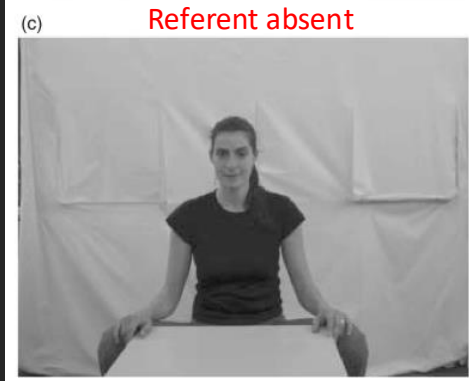
Under what conditions do infants (12 months) point?

Liszkowski, Carpenter and Tomasello (2007). *Developmental Science*, 12(2), 1-7

Attend event



Attend screen



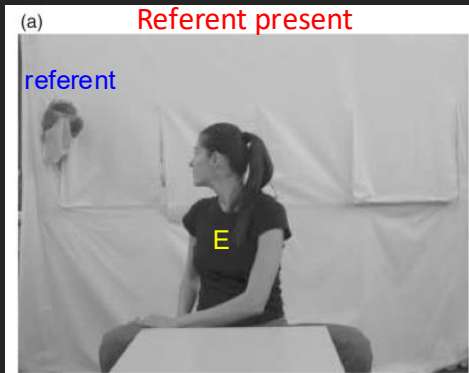
Infants point more when the E is attending (or attended to) the screen ...

Consistent with idea that infants know E didn't see the event (i.e., the referent)

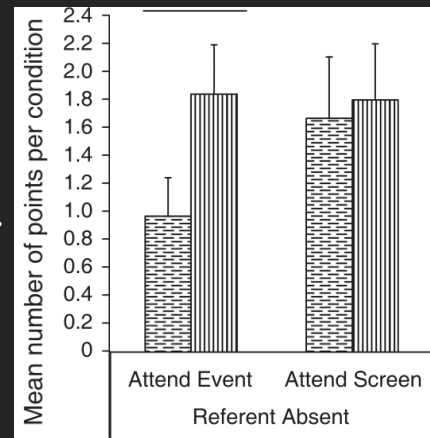
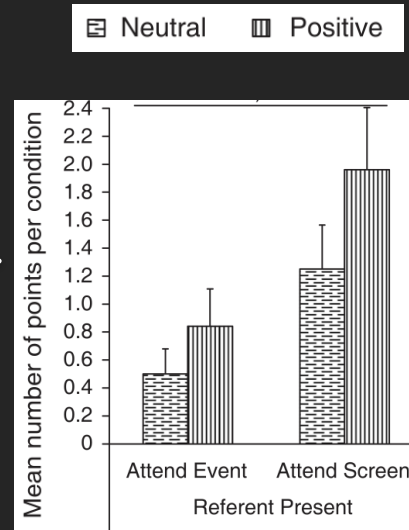
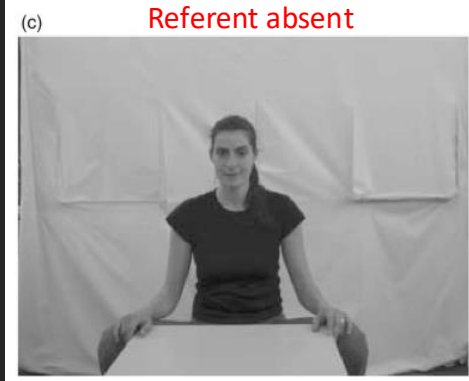
Under what conditions do infants (12 months) point?

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Attend event



Attend screen



All infants experience
all E behaviors for
Neutral **OR** Positive
conditions

Infants also point more when E
expressed a positive emotion

The authors conclude that
these two findings correspond
to:

1. Informing (point)
2. Sharing (commune)

❖ PTC: What does this mean for
parenting styles?

Updating – basic experiment

- Interact positively with one toy
- Someone else puts toy in cupboard
- Adult doesn't see, baby sees
- Adult comes back – what does baby do?
- Point to cupboard (12-14 months)
- *Don't point* if adult sees the move



Can apes update you?

- Apes really don't point (but they kind of gesture)
- Apes don't do eye tracking, as far as we can establish (but they seem to follow gaze by movements of the head)
- So how do we establish whether apes understand others' perception and knowledge states?

Food competition

Hare et al. (2006), Melis et al. (2006)

- When competing with others for food, chimpanzees take into account what others can and cannot see (also what others can and cannot hear!) (Naturalistic observation)
- Indeed, there even seems to be some evidence that chimps will try to influence what someone can see or hear
- Chimpanzees, “know what others know in the sense that they keep track of what another has just seen a moment before” (Call and Tomasello, 2008)

Food competition

Brauer et al. (2007)

Experiment 2

Experiment 1

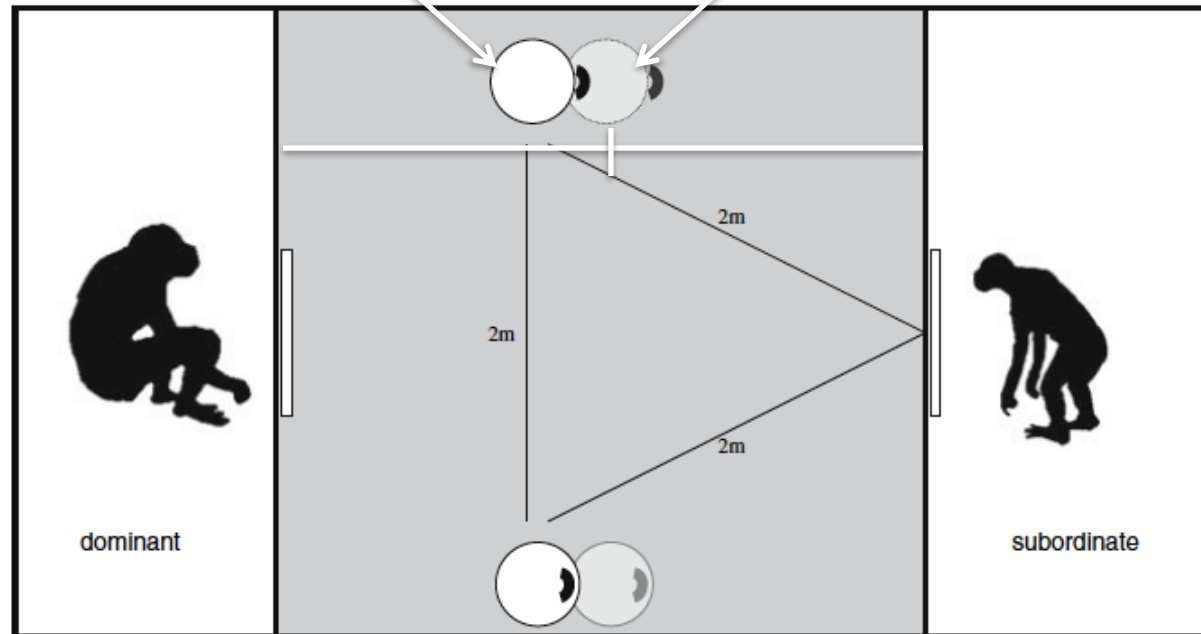


Fig. 1 Experimental set-up to scale in the condition Hidden-Visible for Experiment 1 (*gray buckets*) and Experiment 2 (*white buckets*)

Normally: one bit of food – dominant gets it most of the time

Food competition

Brauer et al. (2007)

Three conditions

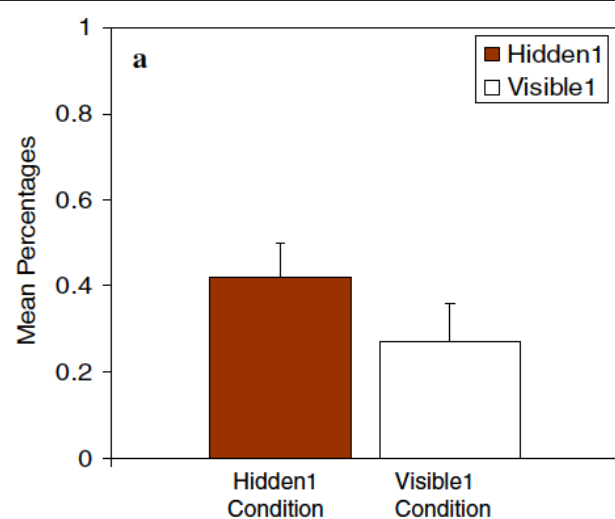
- **Visible1:**
one piece of food on top of bucket, visible to all
- **Hidden1:**
one piece of food inside bucket (only visible to subordinate)
- **Hidden-Visible:**
one piece of food on top and one inside bucket (only visible to subordinate)

Procedure

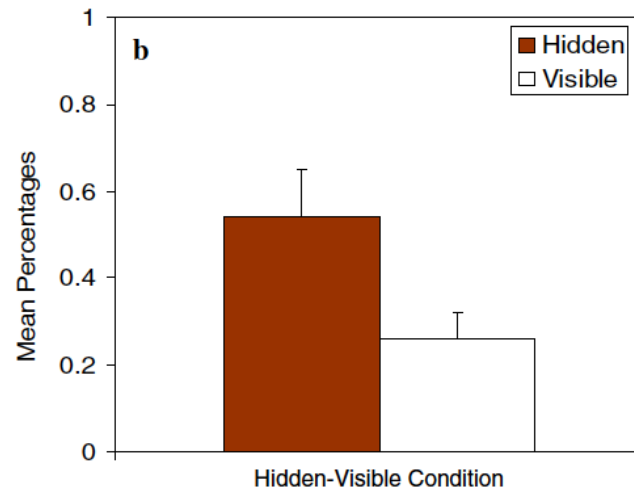
- Training
- Experiment: subordinate allowed out first

Food competition

Brauer et al. (2007)



Here we can see that the subordinate chimp gets more food when only he/she can see where it is



Here we can see when only one piece of food is visible, the subordinate chimp selects the hidden piece much more often

Fig. 3 **a** Mean percentage of food pieces (+SE) that subordinate chimpanzees reached for in the between-trial conditions (one piece available per condition) in Experiment 2. **b** Mean percentage of food pieces (+SE) that subordinate chimpanzees reached for in the Hidden-Visible condition (two pieces available per condition) in Experiment 2

Food competition

Call and Tomasello, 2008, p. 190

Again, we believe that there is only one reasonable conclusion to be drawn from the totality of the studies reviewed here: chimpanzees, like humans, understand that others see, hear and know things. We have many different methodologies involving several different experimental paradigms and response measures all leading to the same conclusion. Again, behavioral rules might be concocted to explain the results of each of the various studies individually, but again this will require creating a variety of post hoc explanations on the basis of no direct evidence of the requisite past experiences. And again, if one were to use the behavioral rules critique rigorously and fairly across the board, one would have to conclude that human infants and young children also have no understanding of the perception or knowledge of others because many of the studies correspond rather closely to studies conducted with infants.

An aside: primate research

- Appropriate task
- Testing environment
- Different motivation
- Human exposure
- Personality
- Dominance hierarchies
- Rewarding paradigms
- No language (same problem until children are about 2 ½ years old)

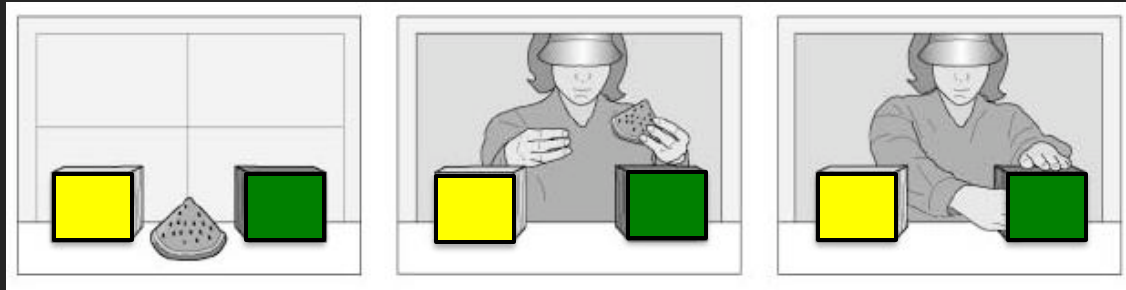
Basics

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- Empathy
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- False belief understanding

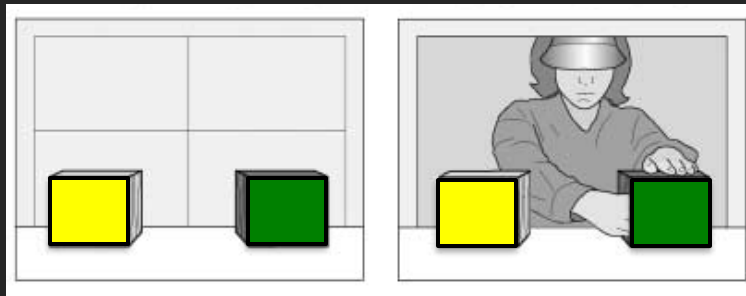
Onishi & Baillargeon (2005): Familiarization phase

Science, vol. 308, pp 255-258

Time



1. All infants (15 months) see C put watermelon in green box



2/3. All infants see C put hand in green box as if reaching for watermelon

Infants divided
into four groups

True belief
green

True belief
yellow

False belief
green

False belief
yellow

Onishi & Baillargeon (2005): True belief conditions and predictions

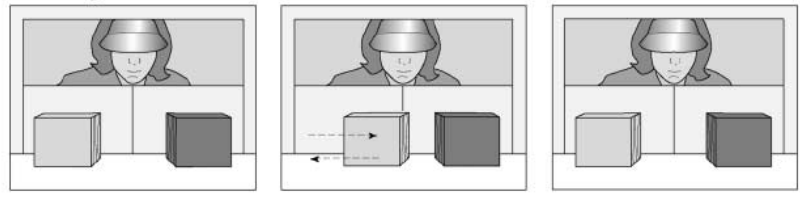
Science, vol. 308, pp 255-258

Time

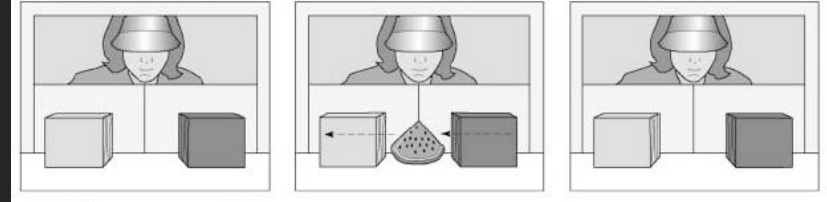
True belief
green

True belief
yellow

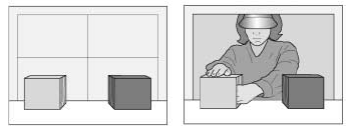
A TB-green condition



B TB-yellow condition

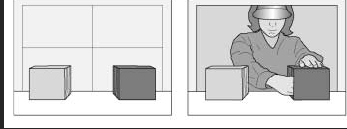


Yellow-box condition

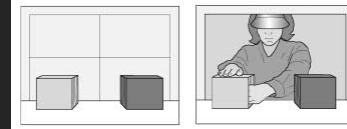


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Green-box condition

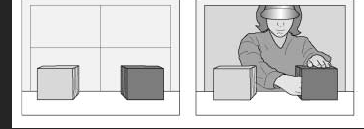


Yellow-box condition



<

Green-box condition



Looking time predictions

Onishi & Baillargeon (2005): False belief conditions & predictions

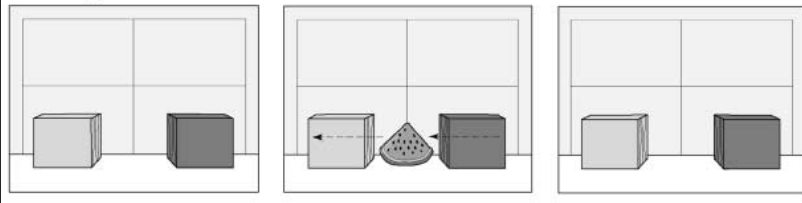
Science, vol. 308, pp 255-258

Time

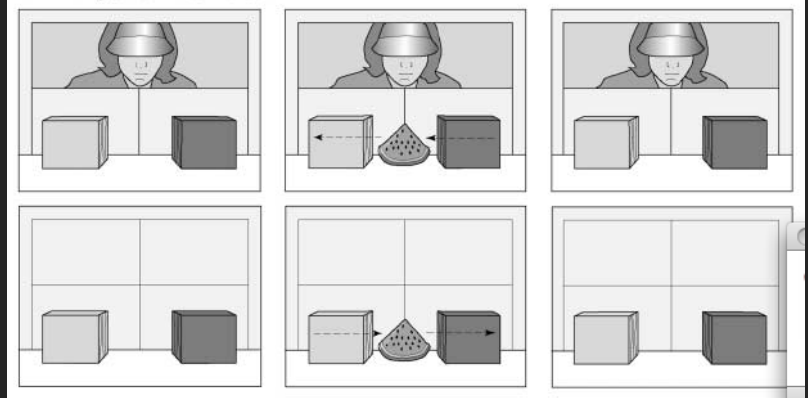
False belief
green

False belief
yellow

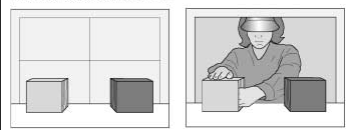
C FB-green condition



D FB-yellow condition

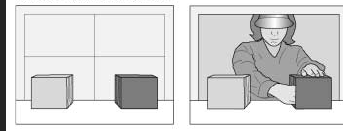


Yellow-box condition

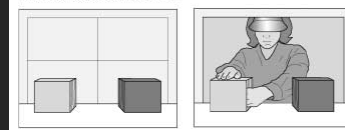


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Green-box condition

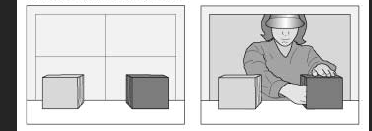


Yellow-box condition



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Green-box condition



Looking time predictions

Onishi & Baillargeon (2005): Results

Science, vol. 308, pp 255-258

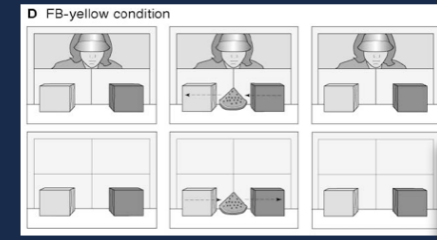
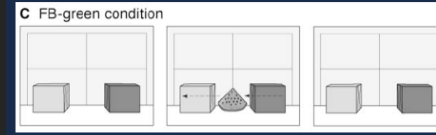
True belief
green

True belief
yellow

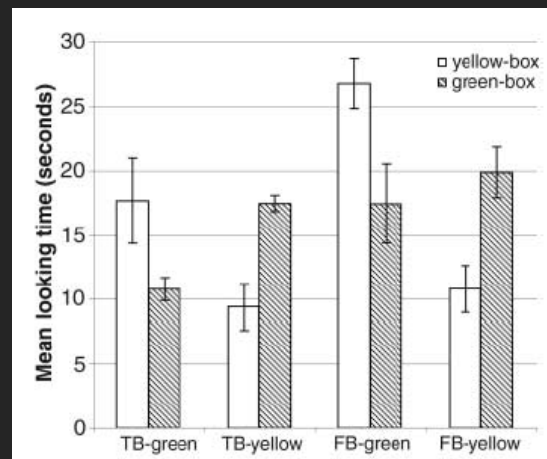


False belief
green

False belief
yellow



Results of infant
looking times
confirm predictions



Do apes track FB?

- How would you test this?
 - 2 chimps in competition
 - Evidence to show that they can understand whether another chimp is informed or uninformed (e.g. hidden food)
 - What about if the other chimp is misinformed (e.g. one piece of food is moved without the dominant's knowledge).
- 2 pieces of hidden food. Both apes see the two pieces of food put in one location. BUT only the subordinate chimp sees one of those pieces of food being moved to a new location.
- Does the subordinate choose the piece of food that the dominant saw or does it choose the piece that was moved when the dominant couldn't see it?

Do apes track FB?

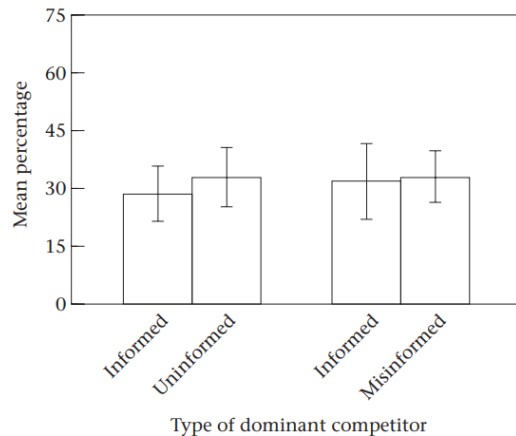


Figure 4. Mean percentage \pm SE of pieces of food obtained by subordinate subjects in experiment 3 as a function of whether the dominant was informed, uninformed, or misinformed about the location of the two pieces of food. In informed trials dominant individuals witnessed the experimenter placing one piece of food behind each occluder whereas in uninformed trials they witnessed the placement of only one of the pieces, the other being introduced when she was unable to see the baiting. In misinformed trials, dominants witnessed the experimenter placing two pieces of food behind one of the occluders, and once the dominant's visual access was blocked, the experimenter moved one of the two pieces from its original location to the other occluder.

Finally, chimpanzees' behaviour in this experiment may reflect an inability to keep track of what others have seen with respect to two significant events; this may simply be an information overload that reflects a genuine cognitive limitation but not a limitation in judging what others have and have not seen. In this regard, note that in the traditional 'change location' false belief tests commonly used with human children (Wimmer & Perner 1983), subjects need only track another person's belief about a single object, the same as in experiments 1 and 2. Chimpanzees may track what their competitor has seen when two objects are hidden, but simply cannot organize this amount of information in a way that enables them to integrate it into their behavioural strategy.

Do apes track FB?

- They distinguish between an informed and uninformed competitor at a basic level (what the other knows by what they have seen)
- But not between an informed and a misinformed competitor when complexity increases (Hare et al., 2001).
- Inability to keep track of other's mental state