

Lifespan development and ToM

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27 September 2012

• Today

- Recap of theories
- Debate the importance of ToM
- Let's consider the evidence
- Parallels in development in other areas
- Influence of executive functioning & Language
- Cross cultural development of ToM

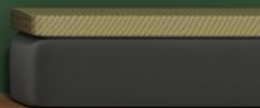
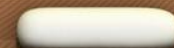
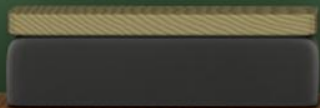


Theory of mind:

“...Area of cognitive development research that investigates the nature and development of our understanding of the **mental world**- the inner world inhabited by beliefs, desires, emotions, thoughts, perceptions, intentions and other mental states.”

Flavell, 2004. p. 274

**What makes the study of Theory of Mind
so interesting and valuable that it has
almost dominated child development
research in the last 20 years?**

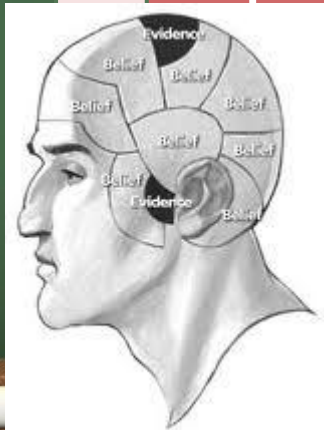


Mentalising



• Need to distinguish between:

Attribution of
desires,
perceptions &
emotions



Behavioural
sensitivity to the
associated
physical cues
(body motion,
eye gaze etc.)

Mental states that are propositional attitudes (Leslie, 1987)

Agent----- informational relation --- object --- proposition

Representation of propositional attitude must mark:

- Who has the mental state
- What sort of attitude

Be



- Theory- Theory (Gopnik & Meltzoff, 1997; Gopnik & Wellman, 1994, Perner, 1991)
- Modularity Theory (Baron-Cohen, 1995; Leslie, 1994; Scholl & Leslie, 1999)
- Simulation Theory (Harris, 1992)- primary process= empathy

• Traditional view of ToM

Jean Piaget, 1896 –1980

- Concept of ‘egocentrism’
- ToM development develops with stage-like qualitative changes



META COGNITION

Cognition about cognition

Knowledge or cognitive activity that takes as its object, or regulates, any aspect of any cognitive activity

(Flavell, Miller & Miller, 2002)



- **Why is it called a theory?**

Such mental states cannot be OBSERVED, and a mental system can instead be used to make predictions about the behaviours of others

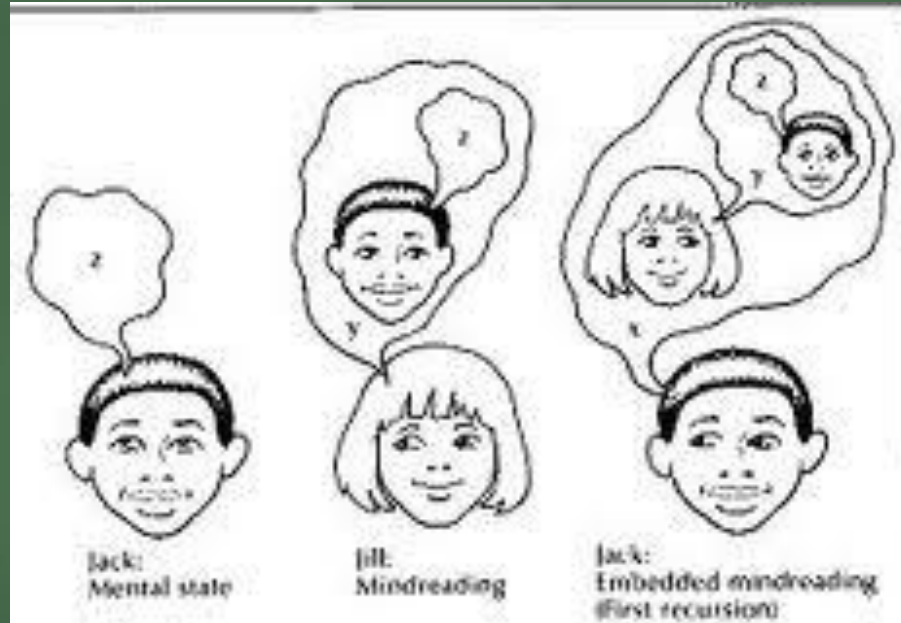
Tests of ToM

False belief task

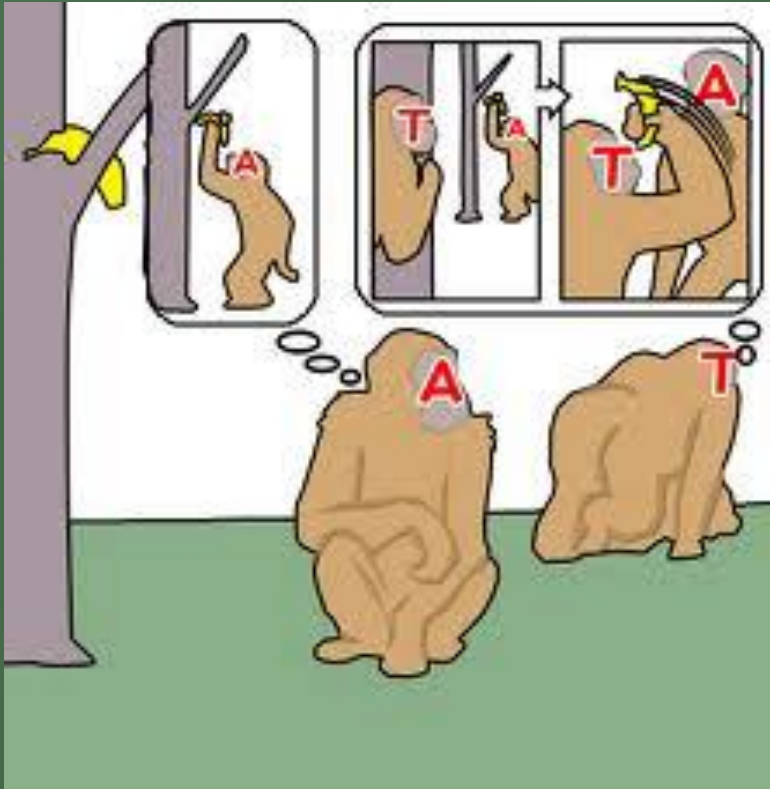
- Comprehension of false belief indicates the clearest sign of understanding a critical aspect of the mind:
- Its subjectivity and susceptibility to manipulation by information

Understanding that mental states (as are beliefs) are *not* direct reflections of *reality* which must always be accurate but instead are *representations* which *may or may not* be accurate.

- First order versus second order FB tasks



• Premack & Woodruff (1978)

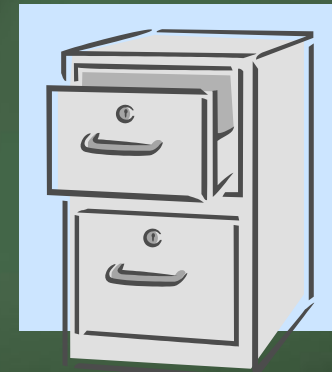


- Wanted to find out if chimpanzees understood human goals.

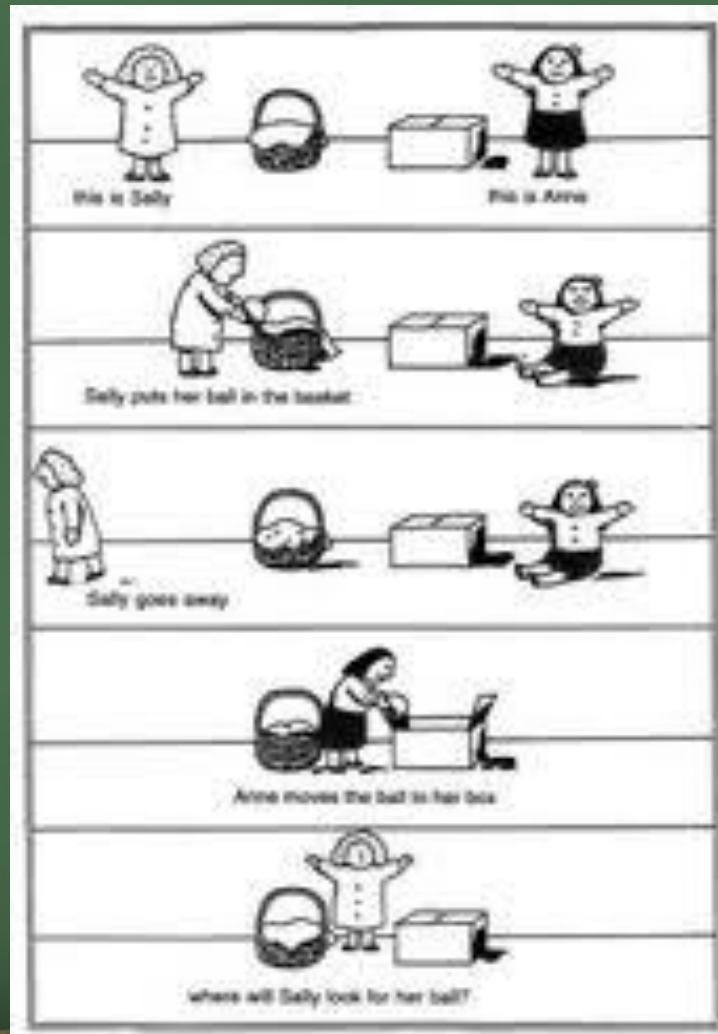
Unexpected transfer task/ location change

Wimmer & Perner (1983)

- Maxi task

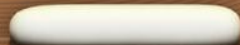
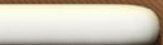
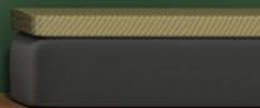
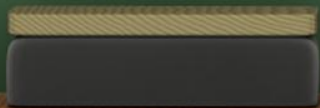


Sally-Ann task (Baron-Cohen)

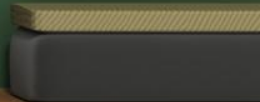
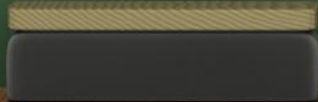


First order False belief task- Smarties task

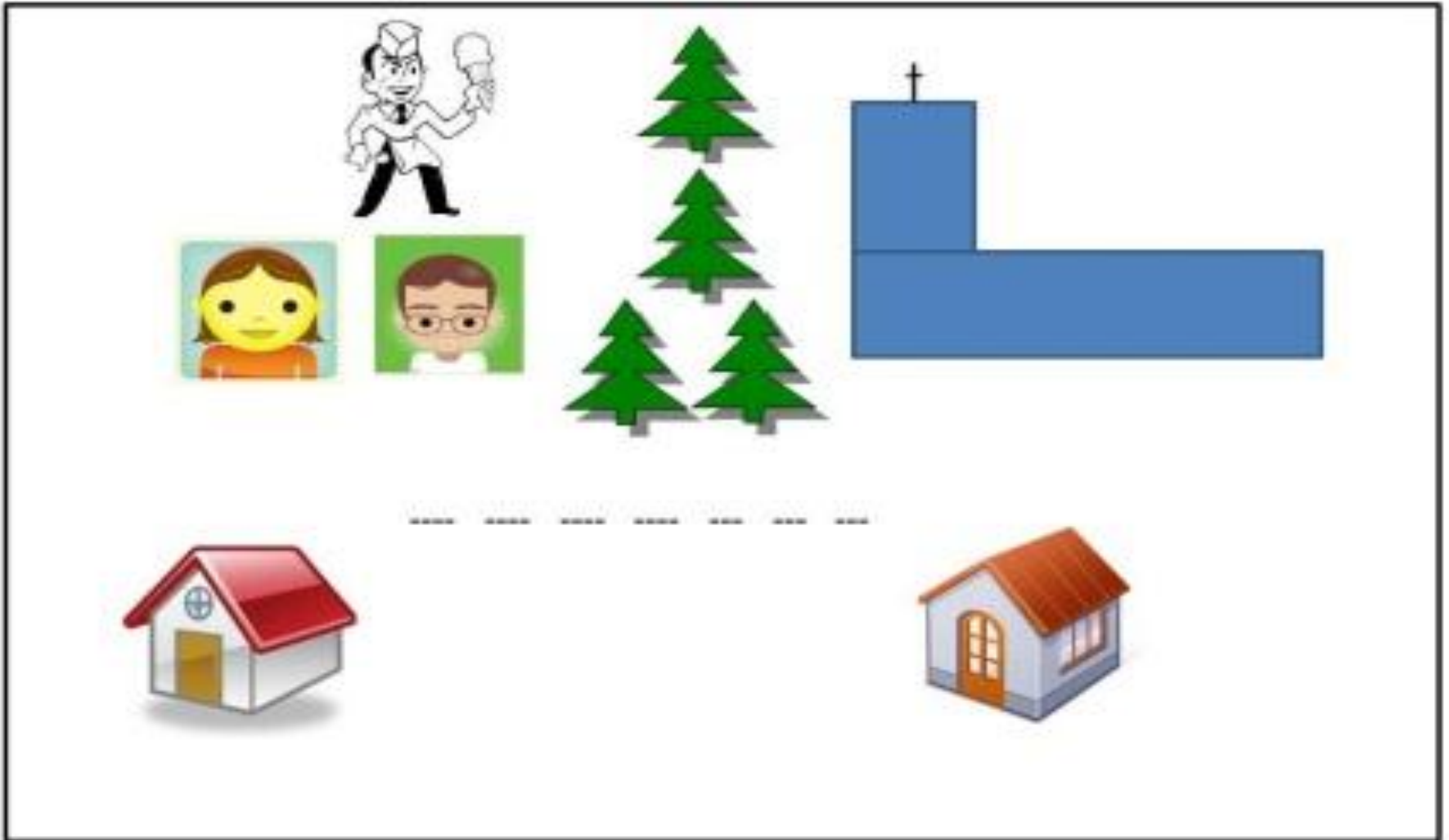
e.g. Perner et al., 1987, Gopnik & Astington, 1988



Appearance-reality task



• Second order test of FB



• What are some criticisms to these tests?

- Too heavily dependent on language
- Requires other skills apart from pure ToM understanding- false belief tasks are not PURE tests of ToM



So, where do we go from here?



Let's go back in time...

Do infants have ToM?

- What are some behaviours present from birth that indicate the even infants have some rudimentary form of ToM understanding?

Fledgling ToM skills:

- Imitation
- Shared attention



- Babies seem impelled to interact with others and impel others to interact with it.

• Development after infancy

- Attention
- *Beliefs*
- Protodeclarative pointing (before 12 months)
- By 12 months: expect agents to act in the most
recognising intentionality
- Social referencing: between 9 -10 months



Toddlerhood

- Pretense: after 2 years of age
- Mental state term use: by 3 years
- Desires
- Emotions

Consequences of ToM

Affects **HOW** they
interact with others

but also

WHO they

interact with





- Better emotional
Understanding leads to:
- Empathy
 - Positive social relationships
 - Use of socially prescribed rules for showing emotion

Can attribute false beliefs to self, use lies, jokes and deception



They learn



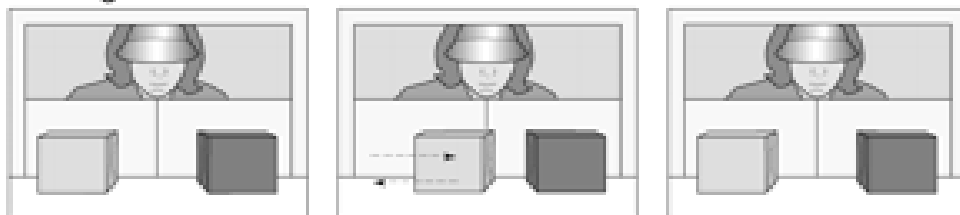
- about the role of pre-existing biases and expectations
- Moral dilemmas
- Subtle forms of social deception (bluff, white lies)

So, when does ToM start to develop? Can the rudimentary skills observed from infancy count as ToM possession?

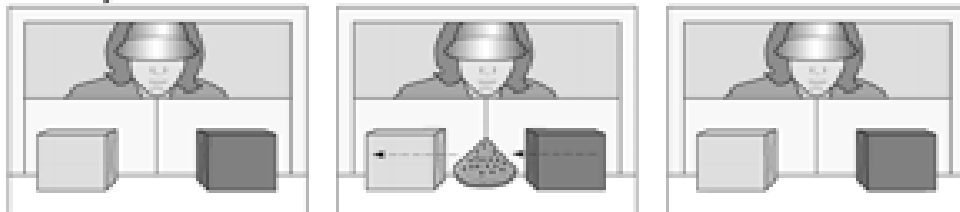


Belief-induction trial

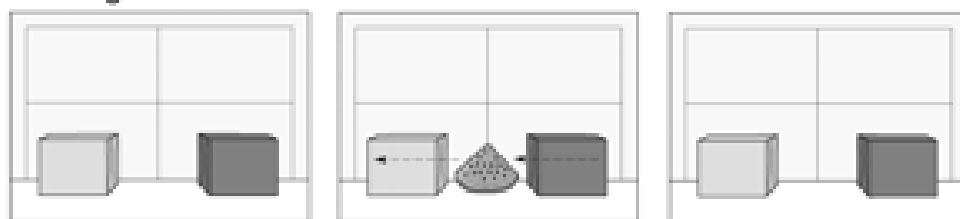
A TB-green condition



B TB-yellow condition



C FB-green condition



D FB-yellow condition



• Onishi & Baillargeon, 2005

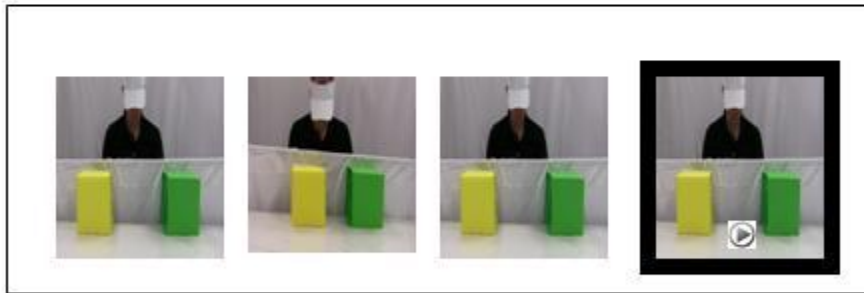
• “Violation of Expectation”
method

Condition 1.1: TB GREEN, test GREEN

Familiarisation (8 sec and pause)



Belief Induction (8 sec and pause)

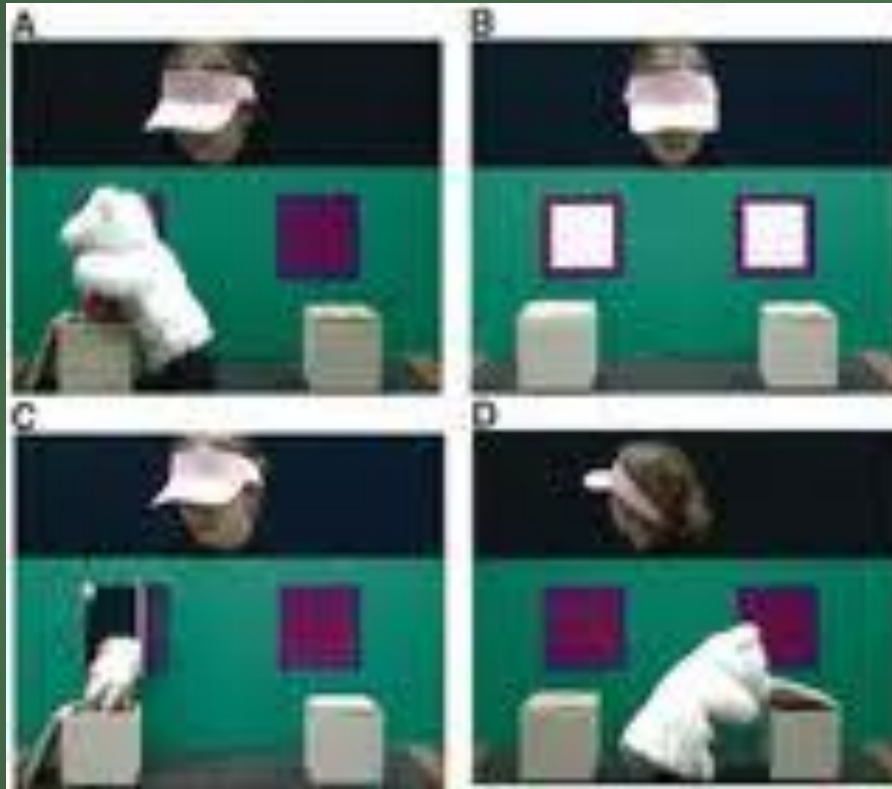


Test- Green



• Action Anticipation- anticipatory looking

Southgate, Senju, Csibra, 2007



• BUT...

(read: Perner, J., & Ruffman, T. (2005). Infants' Insight into the Mind : *Science*, 308(5719), 214-216)

- 3-way actor-object- location association
- behavioural rules- people look for an object where they last saw it
- Changes in latent activation in nonfrontal regions

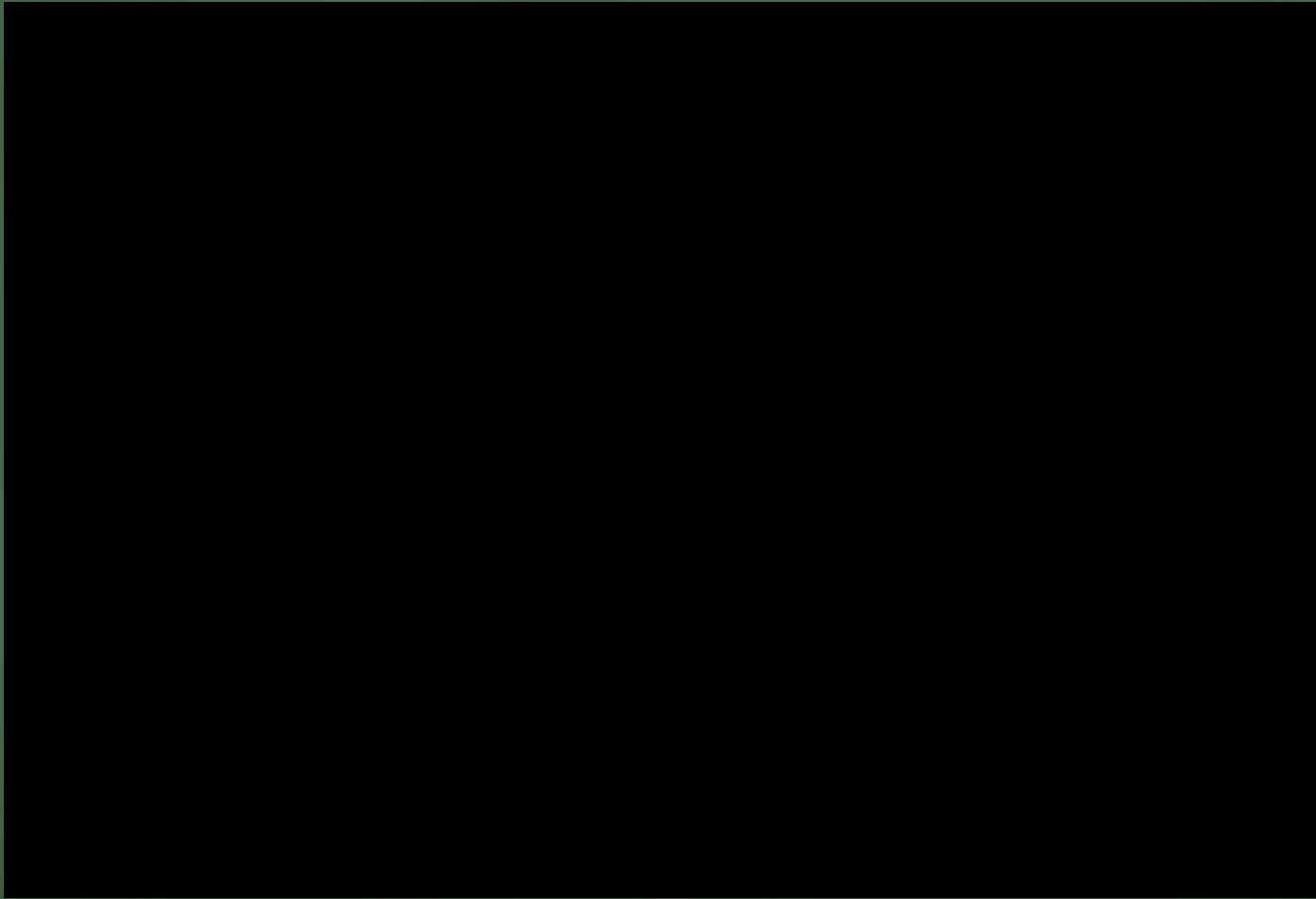
**Knowing about BEHAVIOUR versus knowing
about mental states MEDIATING BEHAVIOUR**

What can do to overcome these challenges?

- Range of belief tasks
- Testing predictions and explanations
- Longitudinal studies

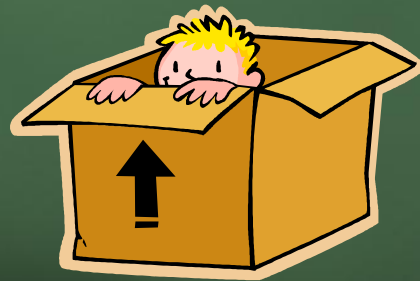
- **14 versus 18 month olds**

Repacholi & Gopnik, 1997)



• Real life scenarios...

1. Hide and seek
2. Understanding fairy tales and stories
3. Pretend play: tea party
4. Protodeclarative pointing
5. Social referencing
6. Eye gaze: will follow eye gaze of adult IF joint attention was established prior to the adult looking away



What other skills are necessary?

Executive function- mental capacity

Language



**Acquisition of false belief understanding
coincides with significant changes in
EXECUTIVE FUNCTIONING**



WHY?



LANGUAGE



What are the social implications of ToM change across development?



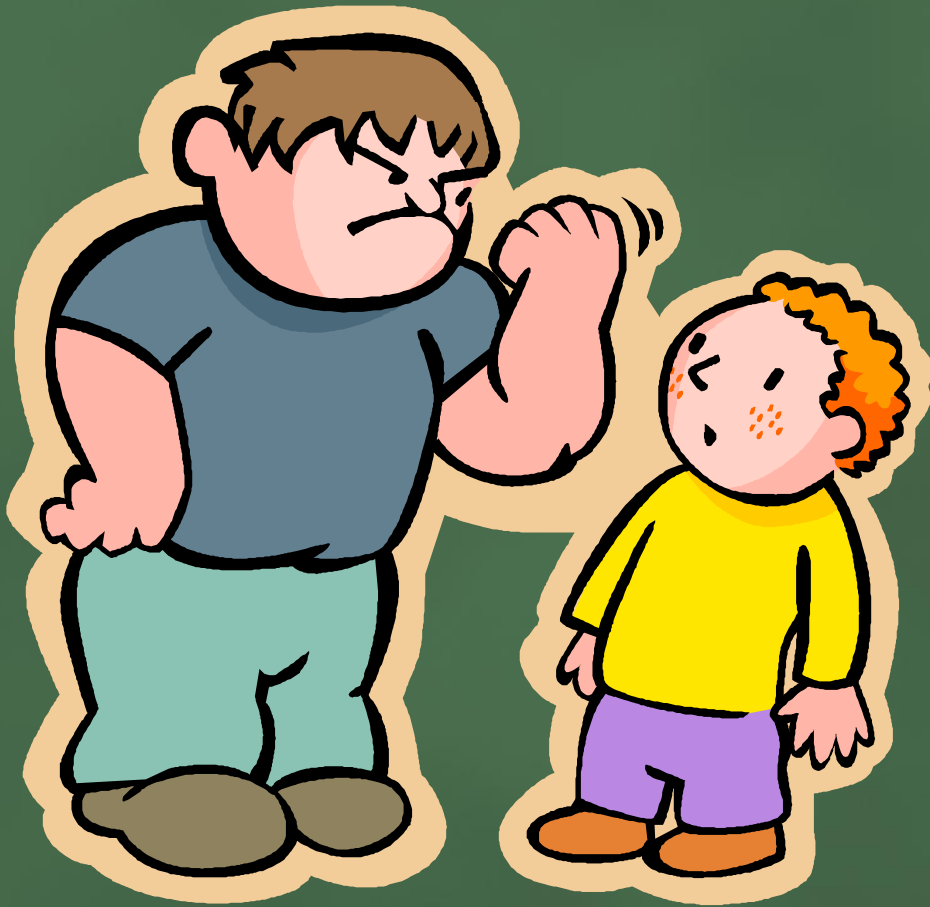
Consequences of ToM

- Social relationships: prosocial and anti-social



Emotional
Regulation:
links with problems
in peer relationships





Ring leader bullies have
been found to have
exceptional ToM!

Preschool development in ToM may increase sensitivity to criticism and lead to later:

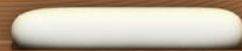
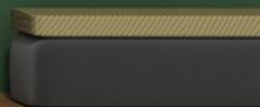
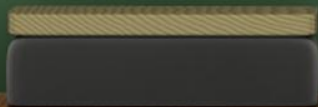


Anxiety

- **Low self esteem**



SEMINAR



Important note:



Test 1 in week 5: will cover Lectures 1 – 4

Formed your groups yet?

EXPERIMENTS:

Available NOW:

1. Only GUYS: Social Influence on Music Memory

psychologicky.experiment@gmail.com

2. Only RIGHT handed: It is like looking in a mirror (30-45 mins)

daniel.shaw@ceitec.muni.cz

Available mid-Oct – Early Nov:

3. **Attentional guidance on scene perception** (max 1 hour)

misel99@gmail.com

Theory of Mind course assignment:

Name of student: _____ ID number: _____

Name of experimenter: _____ Date completed: _____



Signature of experimenter: _____

500 word summary of Research Participation Experience

You have to include:

- Name of the experiment you participated in.
- Describe your thoughts AND emotions about the experiment BEFORE you took part in it.
- Also include how the experimental room contributed to how you felt.
- Distinguish between behavioural sensitivity toward physical cues and deeper attribution of mental states.
- For example, the examiner had his arms crossed which made me think that he felt....
- Self-reflection is also acceptable. For example, my hands were sweaty and cold which made me realise that I was feeling...

Differences in development

- *Intra-cultural*
- *Inter-cultural*
- Inter-species



Substantial evidence showing that the development of a social understanding of 'other minds' follows a clear developmental pathway.

Early appearance of a system of reasoning about other people's goals, perceptions and emotions and later development of a system for representing the contents of other people's beliefs. Saxe et al, 2004 (i.e. judgement versus explanations of FB)

Let's discuss:

ToM's claim of universality

What's
different
between
cultures?



Folk psychology

Societal expectations

Parental practices

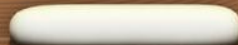
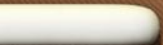
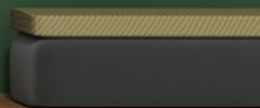
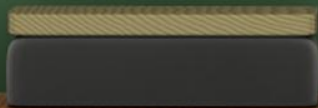
Language

How can we check?



*BRAIN
STUDIES!!!!*

CHILDREN



Cultural influences

8 – 12 year olds
English
Japanese
Cartoons

Kobayashi, Glover & Temple, 2007

a

1

Anne, Bob and Cathy play a hiding game.

2

Bob and Cathy watch while Anne hides a marble inside a red can.

3

When Cathy is not watching,

4

Anne takes the marble out of the red can.

5

Then Anne hides the marble in a green can.

Bob thinks that Cathy thinks that the marble is ...

- A. in the red can.
- B. in the green can.

b

1

アヤとマリとケンタの 三にんで
たからさがしゲームを
しました。

2

マリとケンタは アヤが
ビー玉を 赤いカンの中
にかくのを 見ました。

3

ケンタが見ていないとき、

4

アヤが ビー玉を
赤いカンからとりだして、

5

みどりのカンへ うつしました。

マリは ケンタが ビー玉が、...

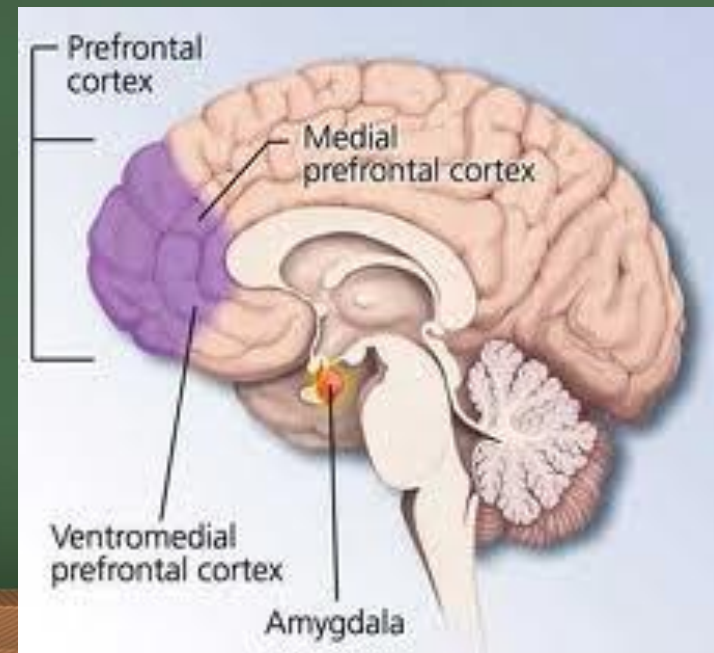
- (ア)赤いカンの中にあると
思っていると 思っています。
- (イ)みどりのカンの中にあると
思っていると 思っています。

c



Found both culture/language dependent and independent factors in ToM development. Differences between groups: Americans used more RTPJ

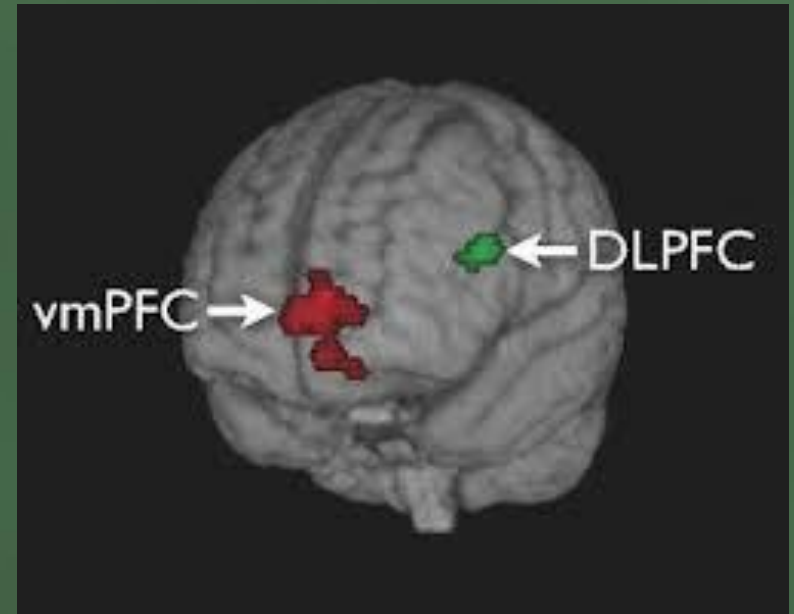
Activation of vmPFC recruited by bilingual children indicate a language/culture specific manner to understand presumably affective aspects of ToM



Brain Structures Involved in Dealing with Fear and Stress

Cultural Influences of ToM development

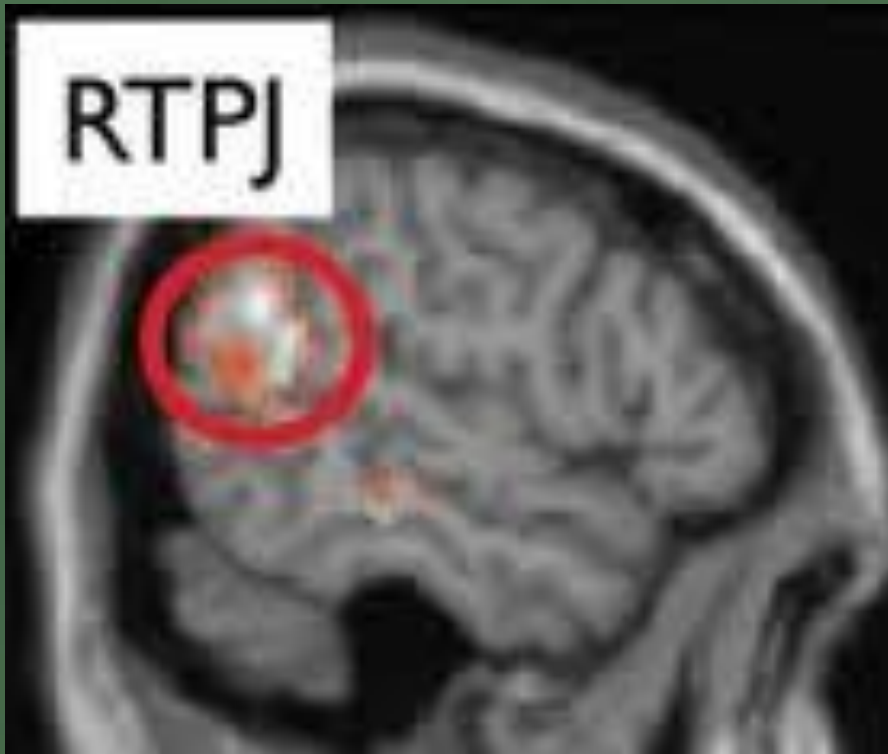
- Areas such as the vmPFC (emotions processing) are more important for ToM in childhood than in later years.



Hughes, Jaffee, Happe, Taylor, Caspi & Moffit, 2005

Kobayashi, Glover & Temple, 2007

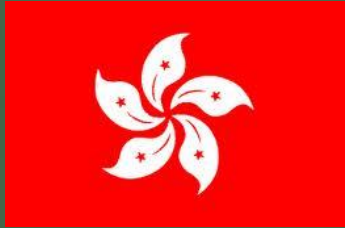
Liu, Wellman, Tardif & Sabbagh, 2008



- Americans recruited more RTPJ than Japanese. This may be culture specific- RTPJ might be involved in general ability in distinguishing self from others.



Liu, Wellman & Tardif & Sabbagh, 2008



想 think

以为

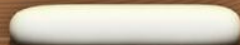
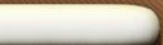
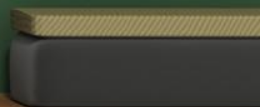
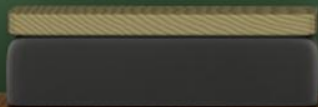


BILINGUALISM

- Bilingual children need to develop an early sociolinguistic sensitivity to the language knowledge of their interlocutors because they must use their language accordingly.



ADULTS



New Bilinguals vs old-time Bilinguals

Rubio-Fernandez & Glucksberg (2012)

Egocentric bias in adults- “the curse of knowledge” (tendency to be biased by their own knowledge)- however this DOES NOT affect performance.

Majority of monolingual participants showed an egocentric bias in gaze direction.



Differences INTER-CULTURALLY may be due to:

Language:

1. use of mental state verbs
2. Syntax: centre-embedded sentences (relative clause is placed between subject and the verb of the sentence)

Other cultural factors:

3. Culture: individualistic (American/European) versus collectivist (Asian)

Referential communication: collectivist cultures suffer less from their own visual perspective than do people from individualistic cultures (perspective taking)

Which theory do these findings support?

