

LIFESPAN DEVELOPMENT AND TOM

DR PENNY TOK

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

Mentalising

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

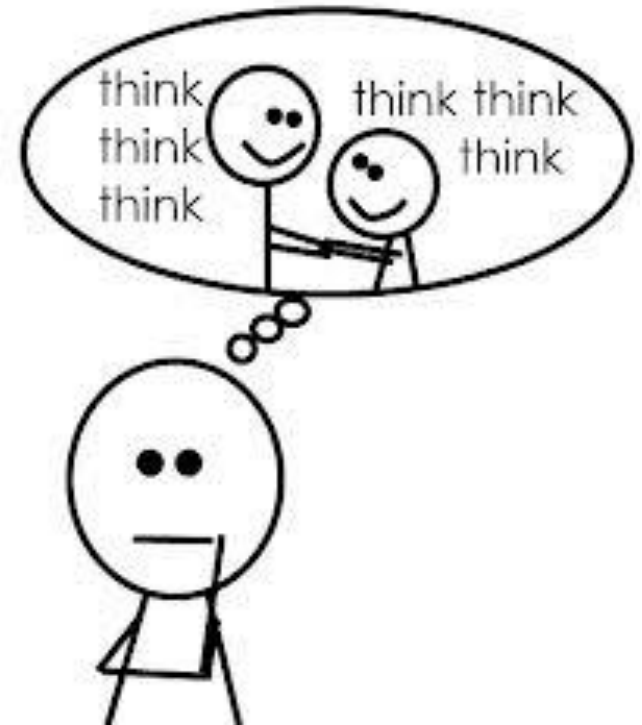
- Theory- Theory (Gopnik & Meltzoff, 1997; Gopnik & Wellman, 1994, Perner, 1991)
- Modularity Theory/ Theory of Mind Mechanism (Baron-Cohen, 1995; Leslie, 1994; Scholl & Leslie, 1999)
- Simulation Theory (Harris, 1992)- primary process= empathy

META COGNITION

Cognition about cognition

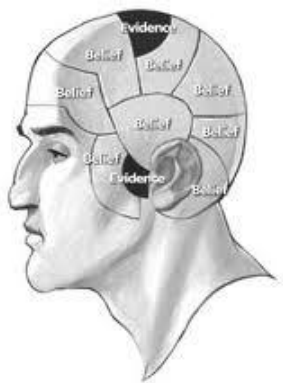
Knowledge or cognitive activity that takes as its object, or regulates, any aspect of any cognitive activity

(Flavell, Miller & Miller, 2002)



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

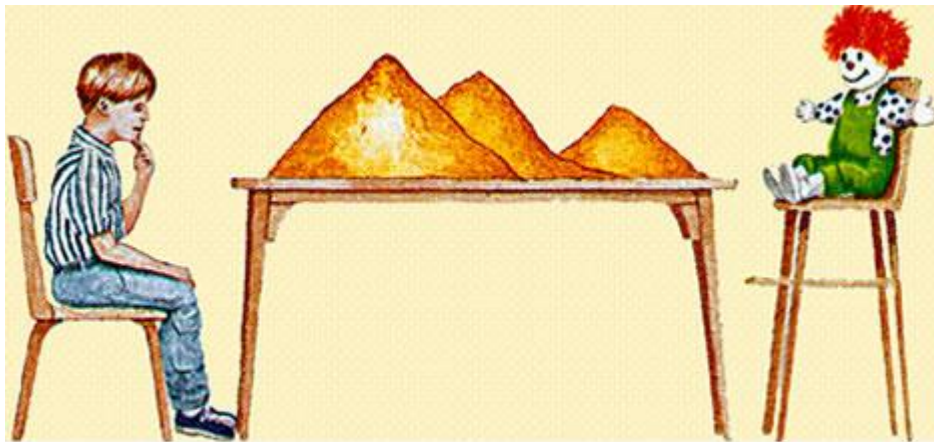
TRADITIONAL VIEW OF TOM

Jean Piaget, 1896 –1980

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

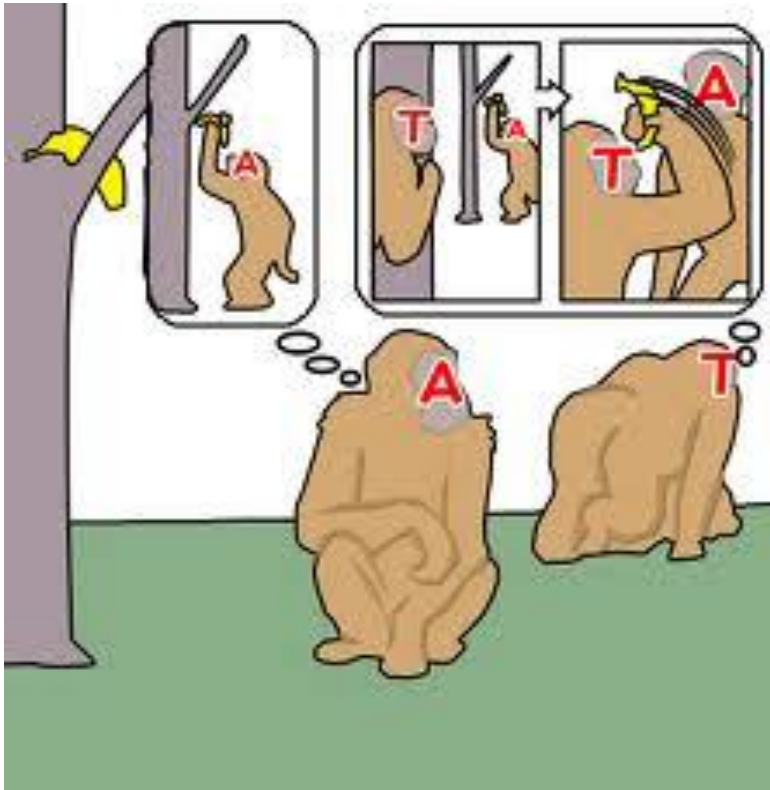


Pre-operational stage of development



Piaget's "3 mountains" egocentrism test:
"Draw how the mountains would look from the doll's point of view."

PREMACK & WOODRUFF (1978)



- Wanted to find out if chimpanzees understood human goals.

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?

BENEFITS OF TOM...

- Increases range of social behaviours
- Possibly allows building of cultural knowledge that is transmitted by teaching
- Representations that can be ***decoupled*** from the world: cannot be validated by reference to the real world:

It is raining

Versus

Peter believes it is raining

TESTS OF TOM

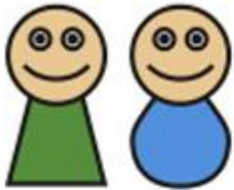
False belief task

- 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

first-order



Mental states

Content/ context

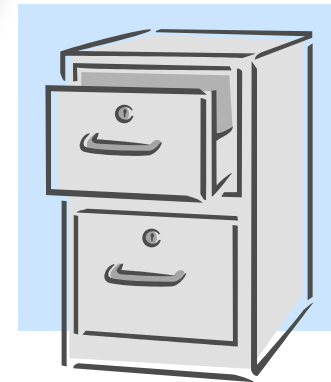
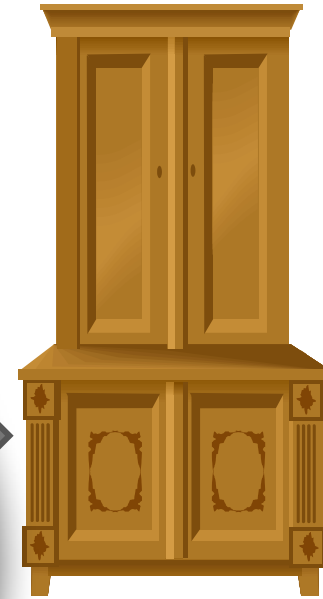


FIRST ORDER THEORY OF MIND

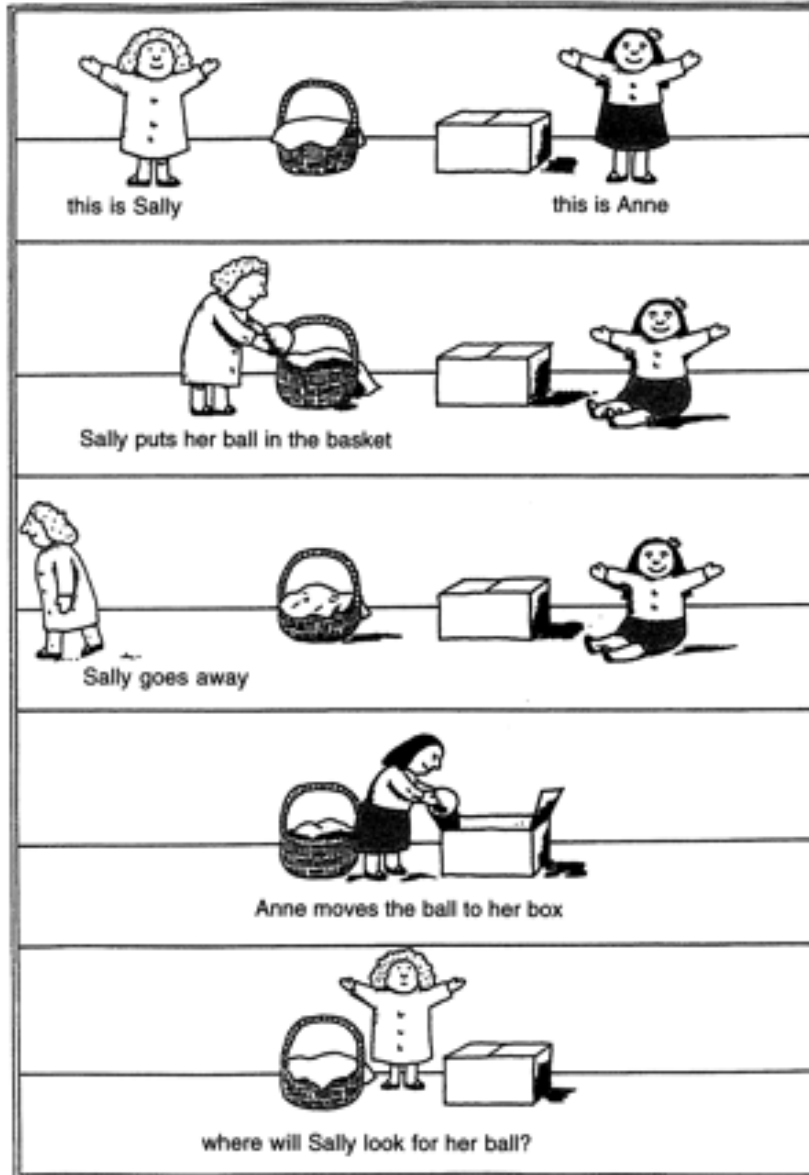
UNEXPECTED TRANSFER TASK/ LOCATION CHANGE

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

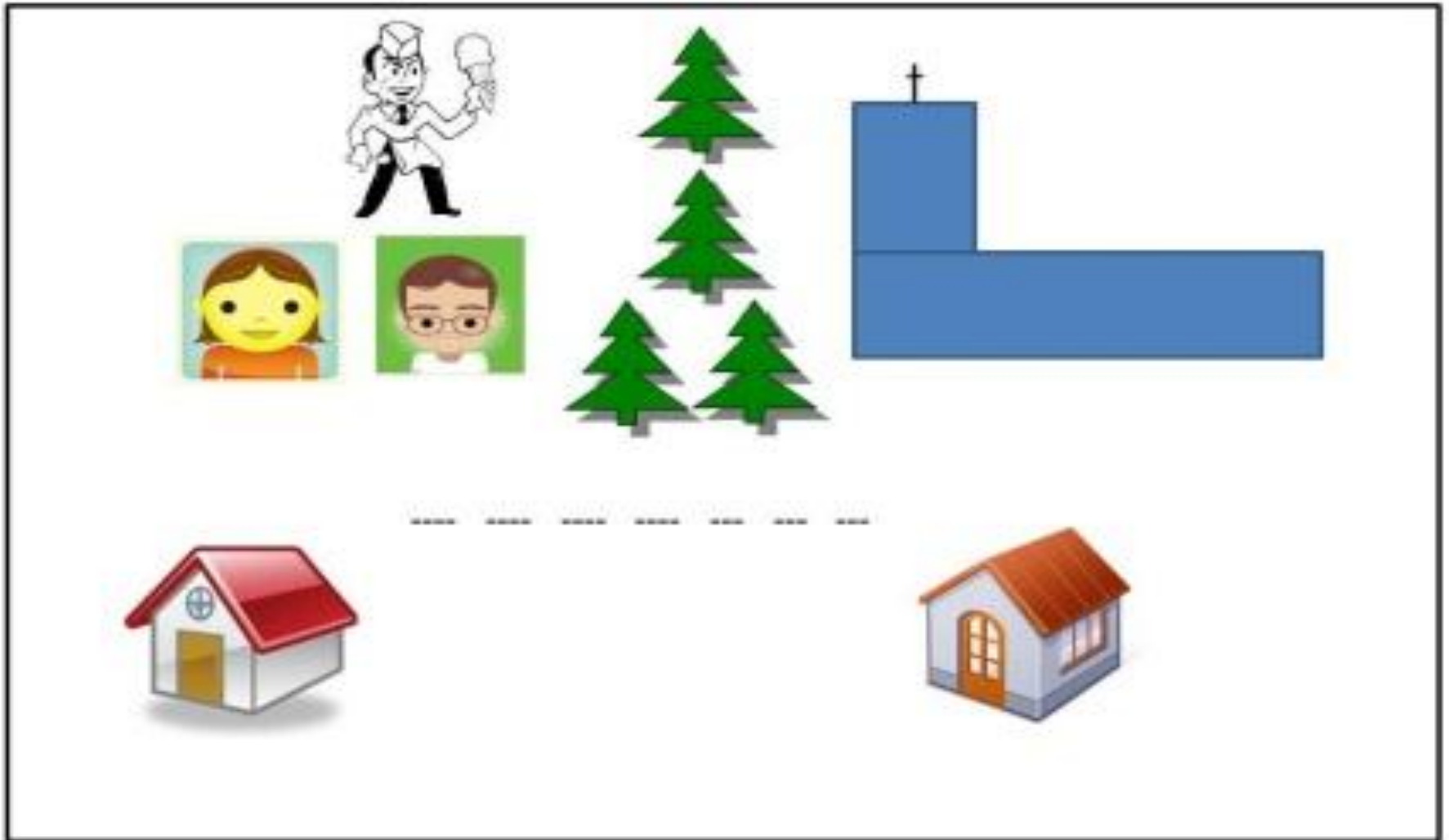


APPEARANCE-REALITY TASK



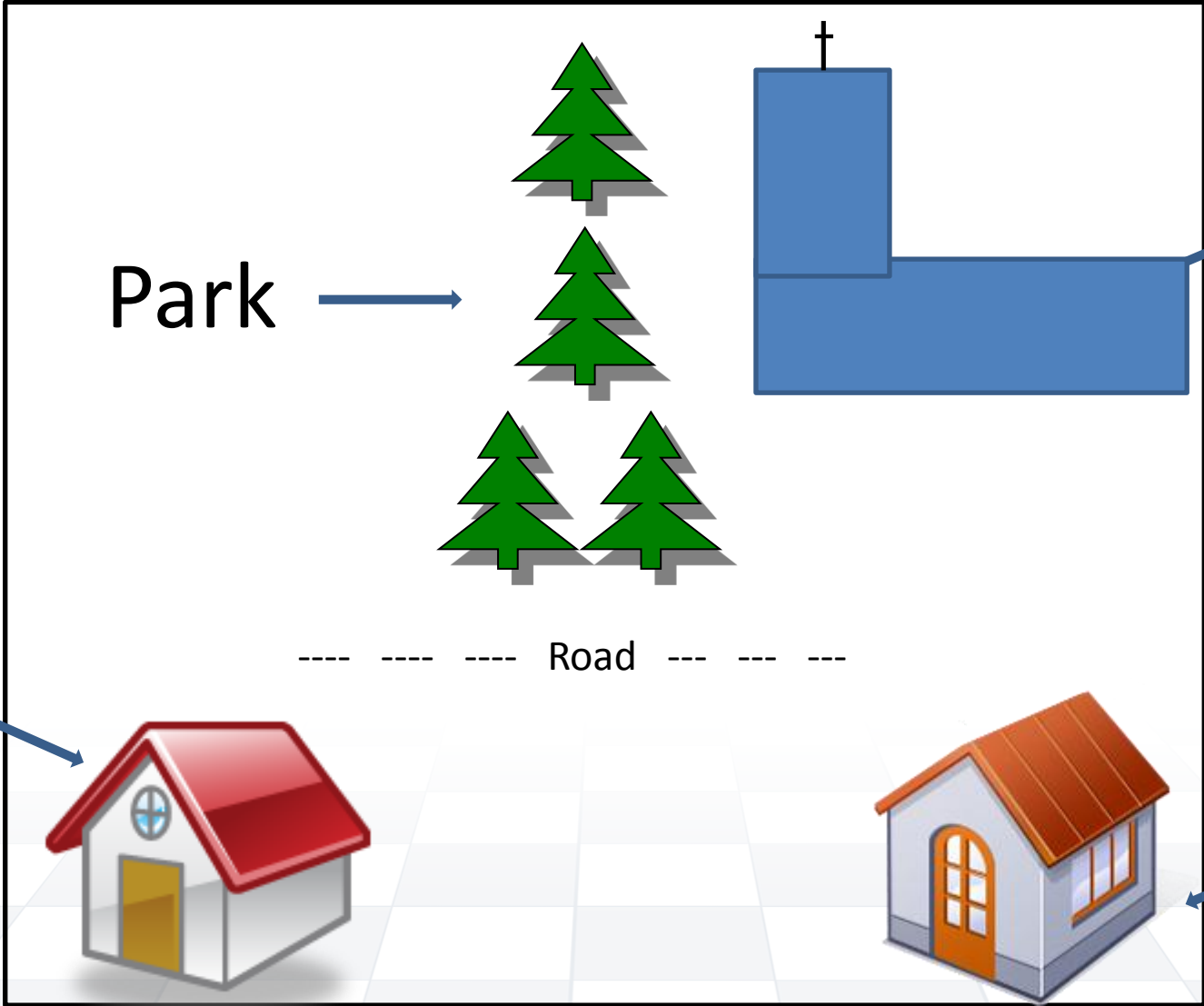
SECOND ORDER THEORY OF MIND

SECOND ORDER TEST OF FB



The story

The Village



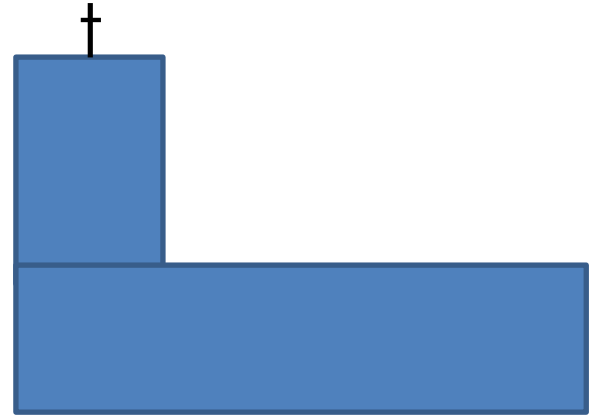
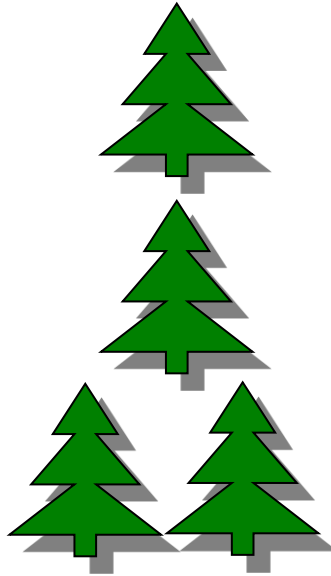
Church

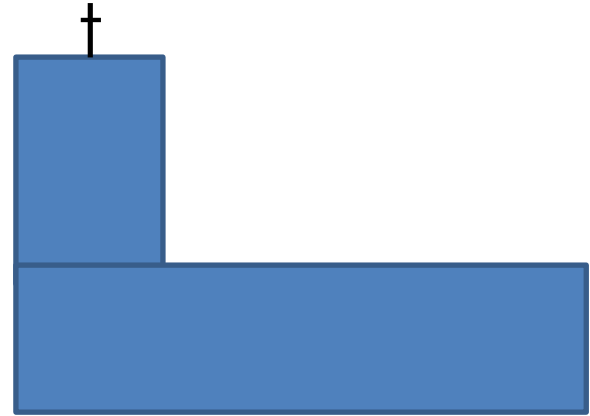
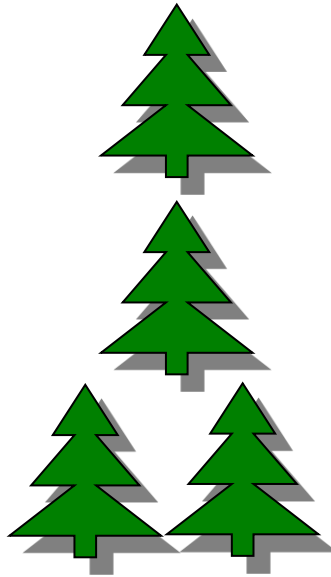
Park

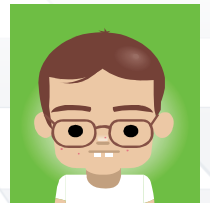
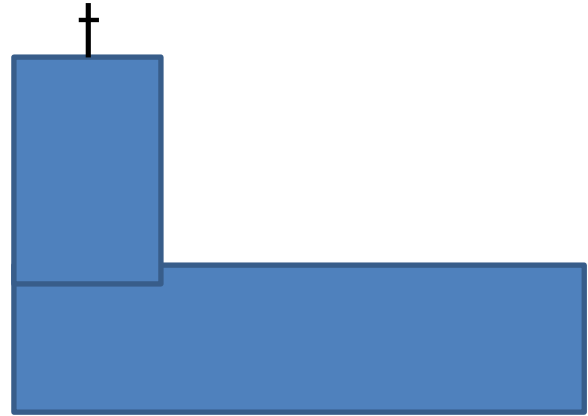
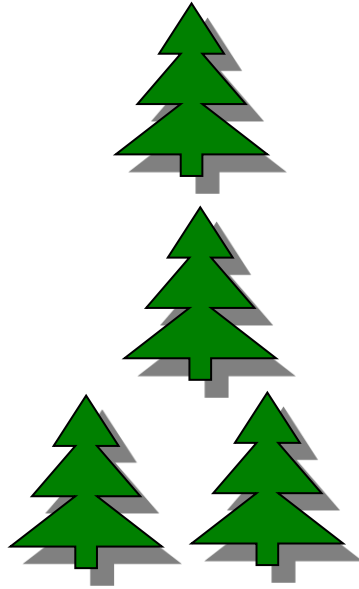
Road

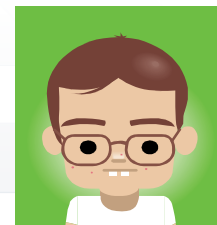
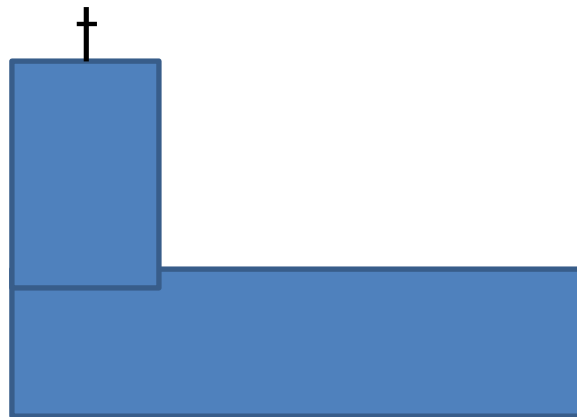
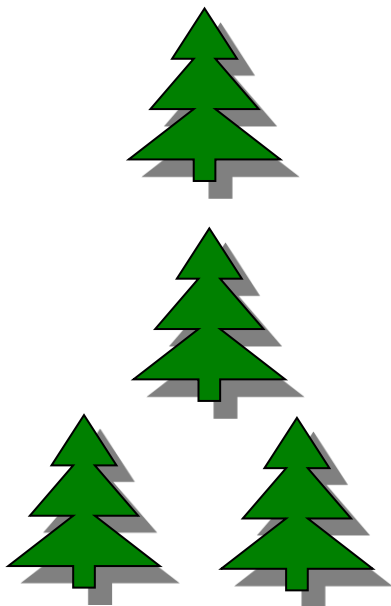
Mary's house

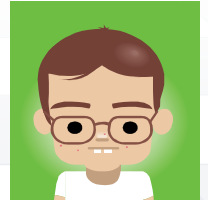
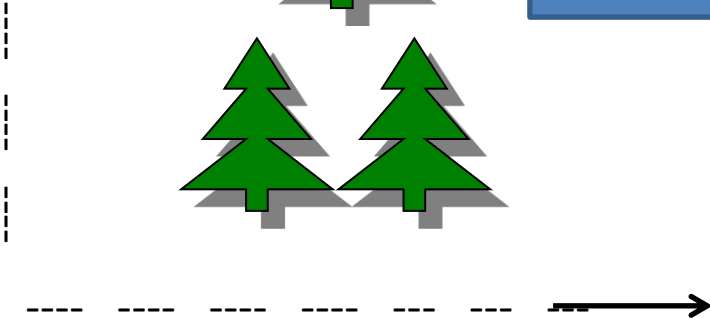
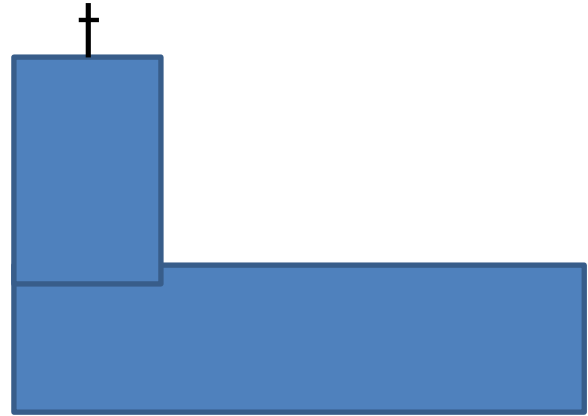
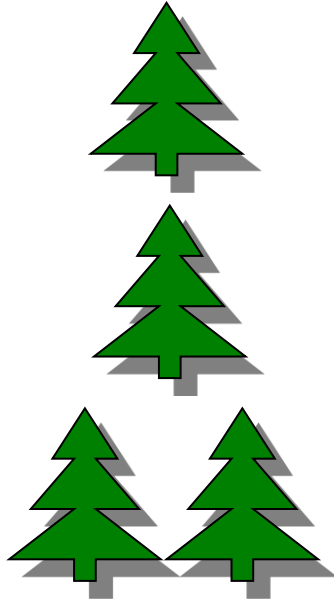
John's house

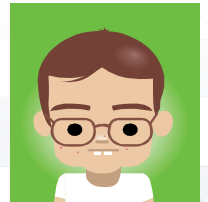
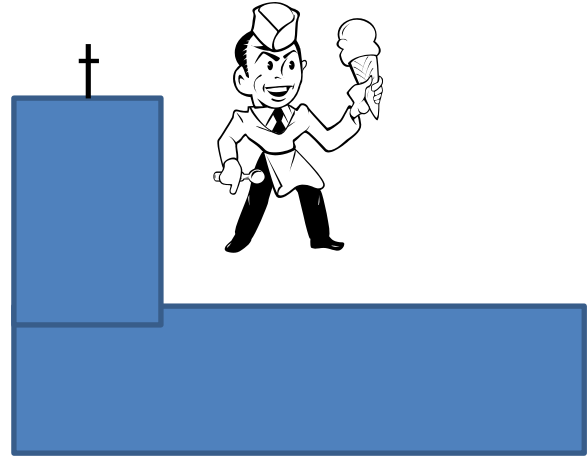
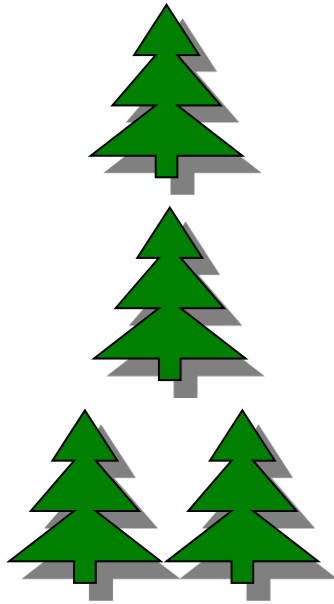


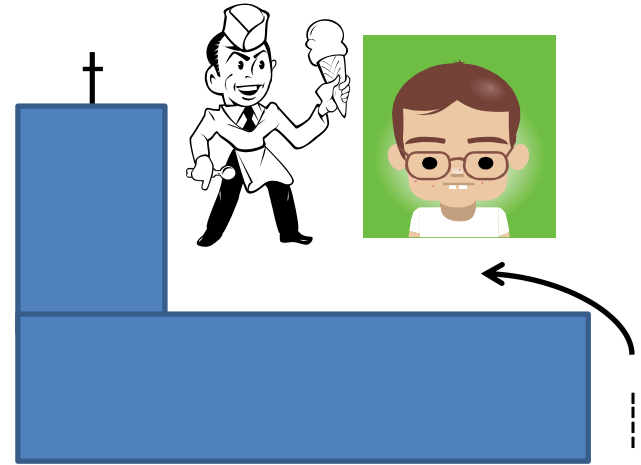
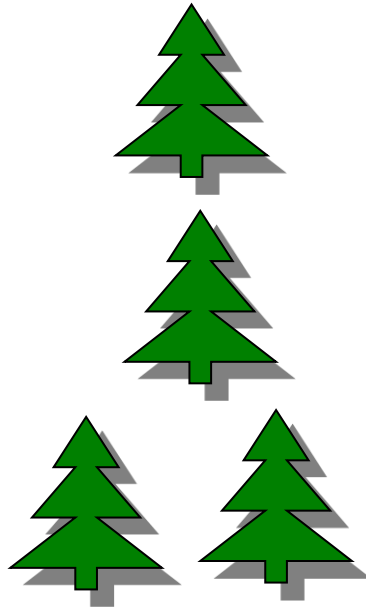


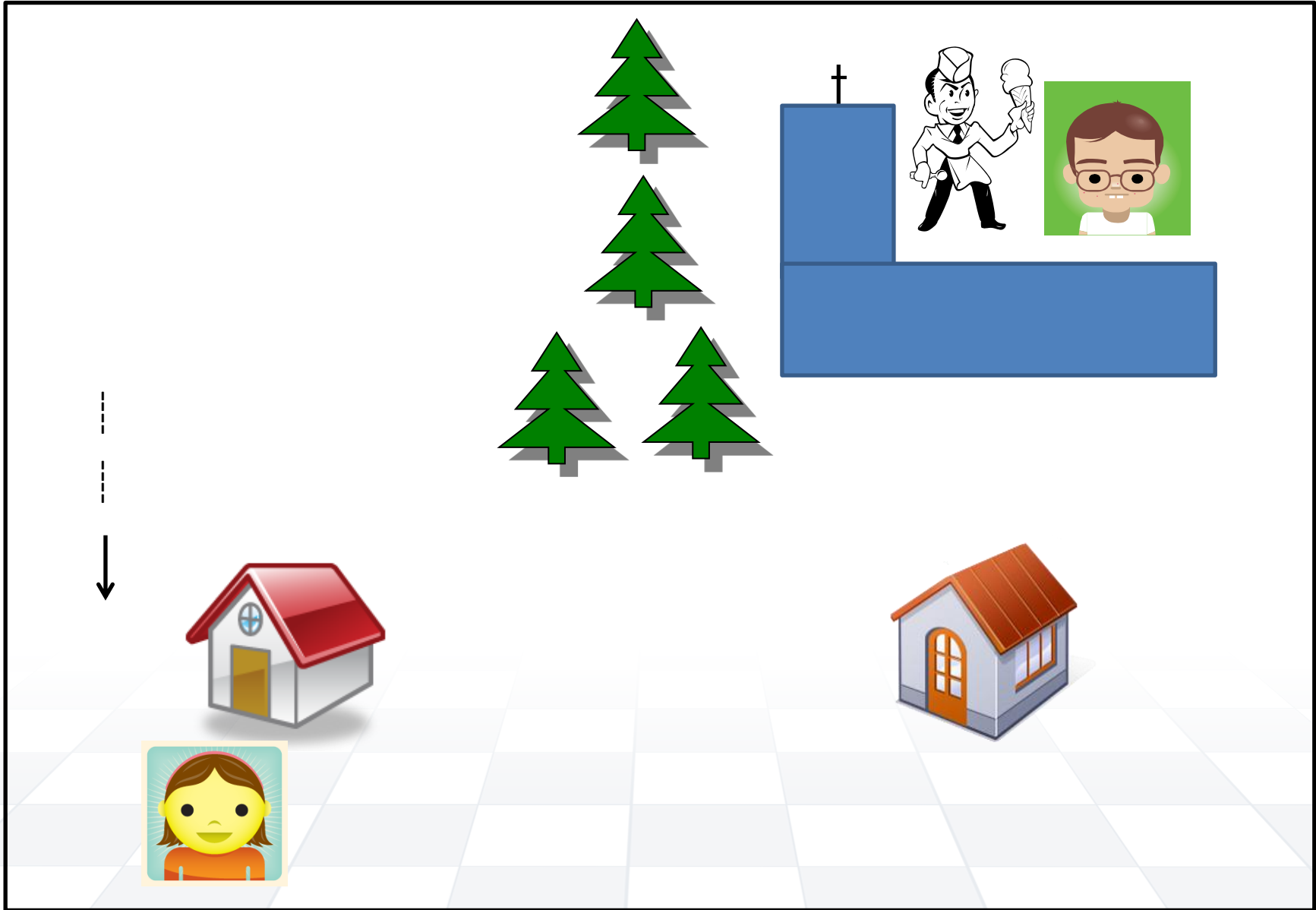


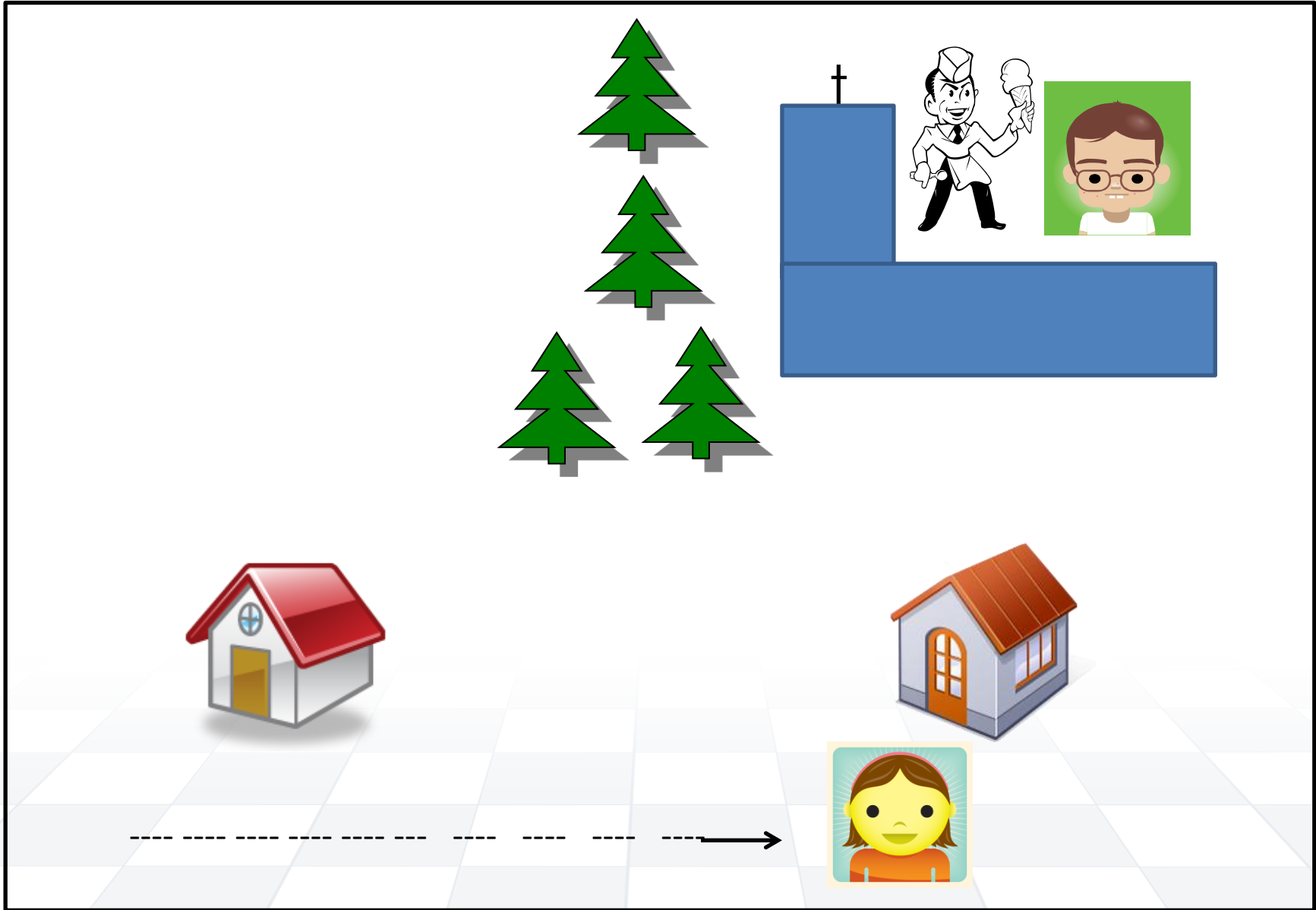


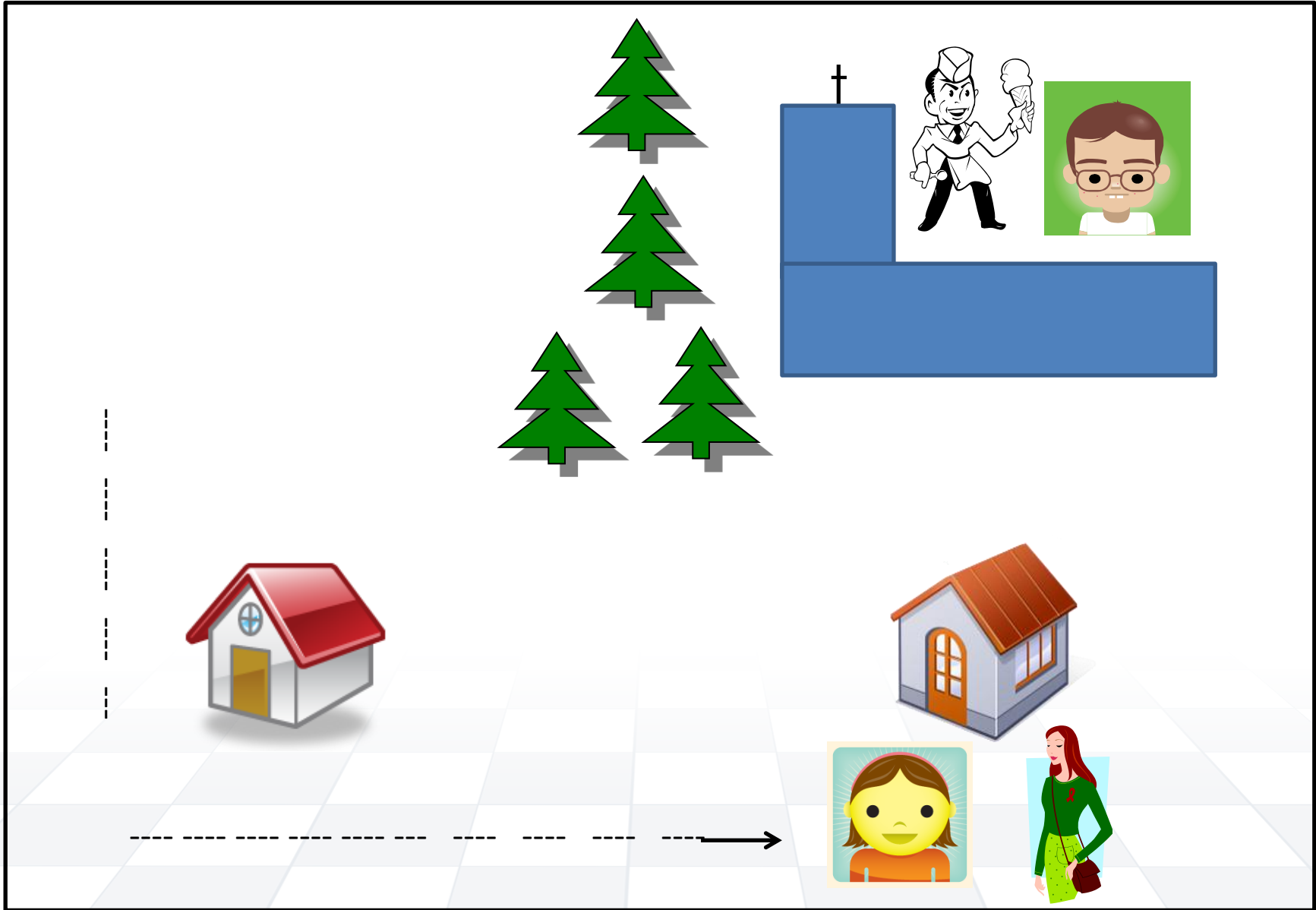


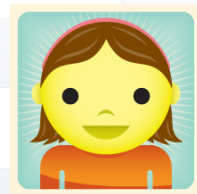
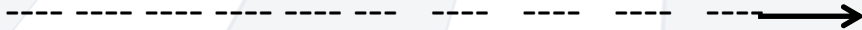
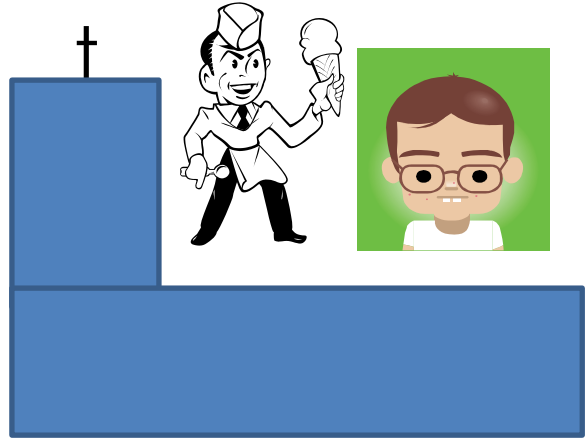
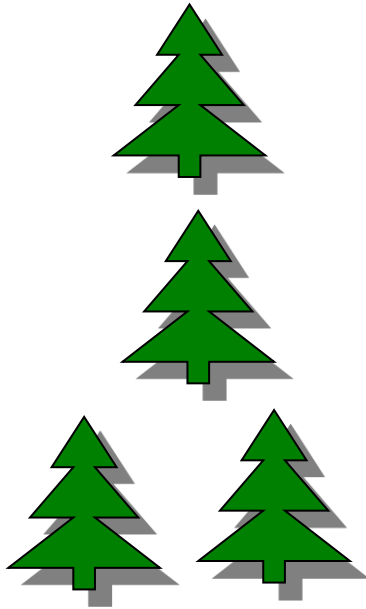
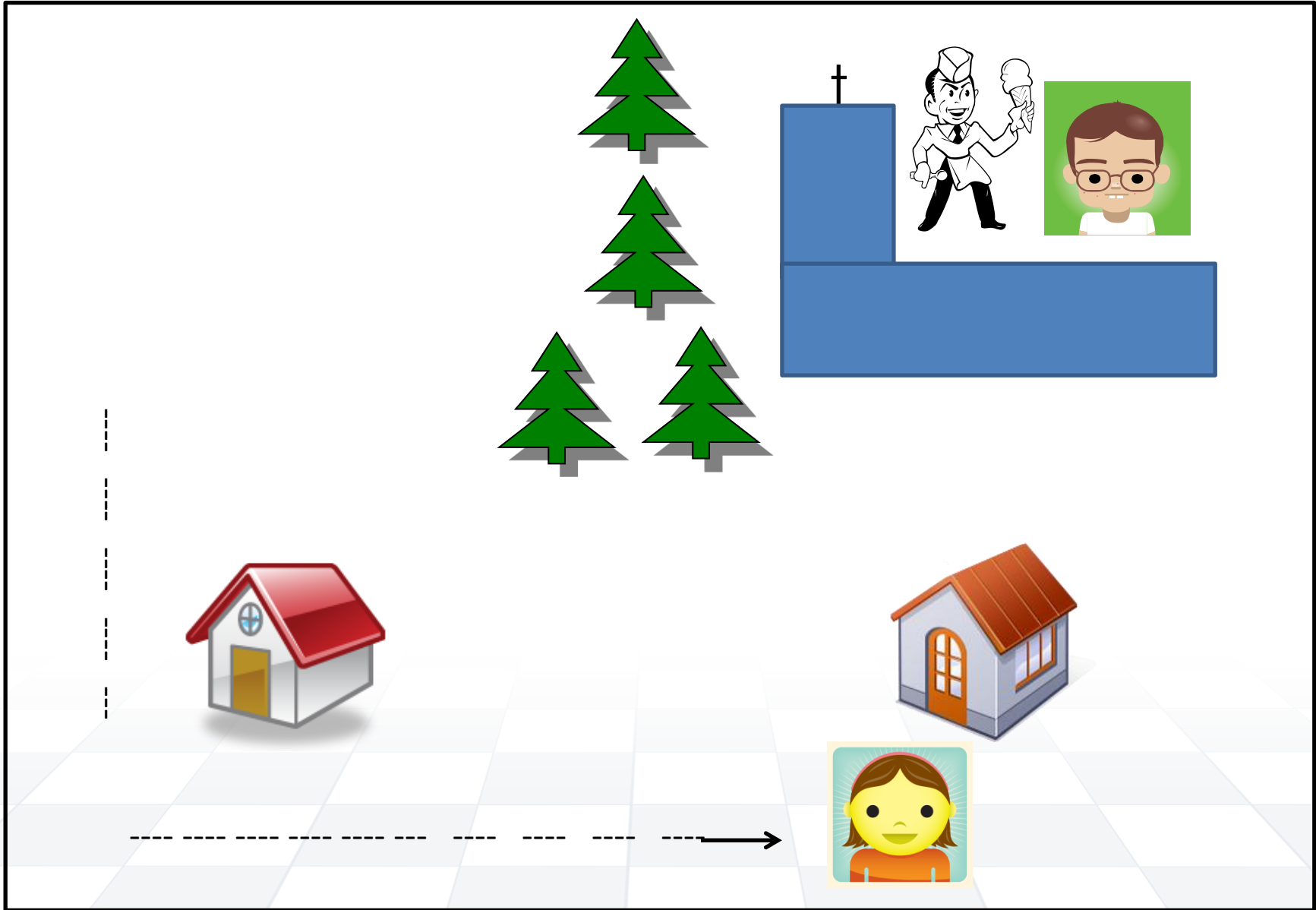












THE END

THIRD ORDER THEORY OF MIND

STORY 1:



During the war, red army captured a member of the blue army. They want him to tell them where his army tanks are; they know they are either by the sea or in the mountains. They know that the prisoner will not want to tell them, he will want to save his army, so he will certainly lie to them. The prisoner is very brave and very clever, he will not let them find his tanks. The tanks are really in the mountains. Now when the other side asks him where his tanks are, he says, “they are in the mountains”.

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?



OTHER TESTS

- <http://glennrowe.net/baroncohen/faces/eyetest.aspx>

See below for revised Mind in the Eyes Test

- Baron-Cohen, S., Wheelwright, S., Hill, J., Raste, Y., & Plumb, I. (2001). The “Reading the Mind in the Eyes” Test revised version: a study with normal adults, and adults with Asperger syndrome or high-functioning autism. *Journal of child psychology and psychiatry, and allied disciplines*, 42(2), 241–51. Retrieved from <http://www.ncbi.nlm.nih.gov/pubmed/11280420>

SO... EXACTLY WHEN DOES TOM DEVELOP?



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

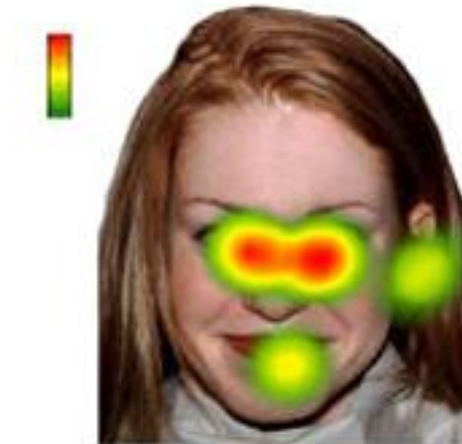


Can the rudimentary skills
observed from infancy count as
ToM possession?



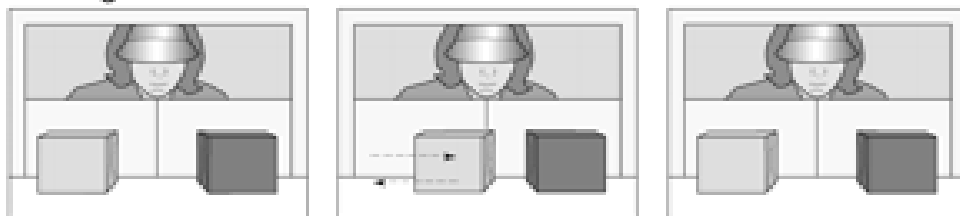
Let's test infants!

- What are some of the challenges and how do we overcome it?

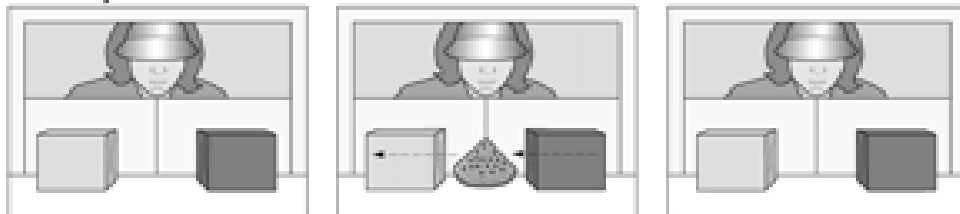


Belief-induction trial

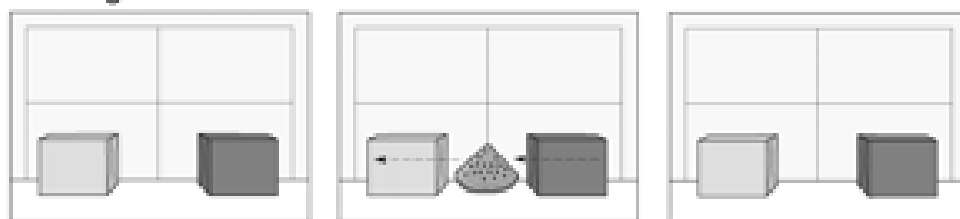
A TB-green condition



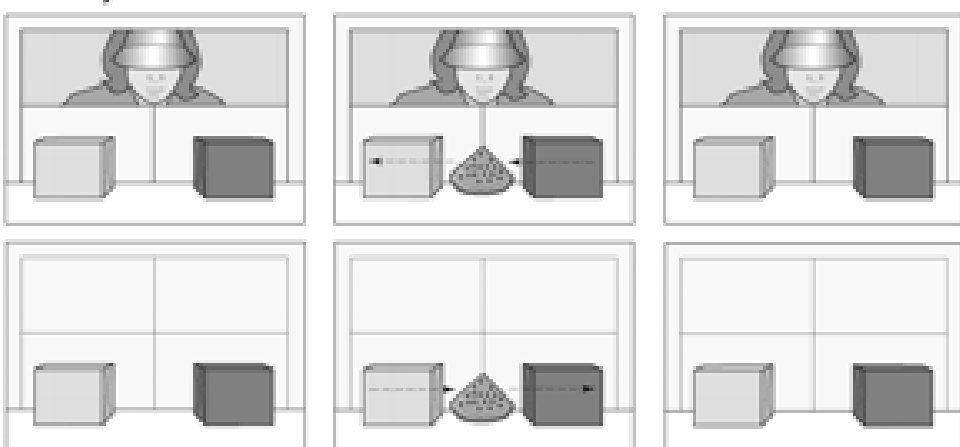
B TB-yellow condition



C FB-green condition



D FB-yellow condition



- Onishi & Baillargeon, 2005

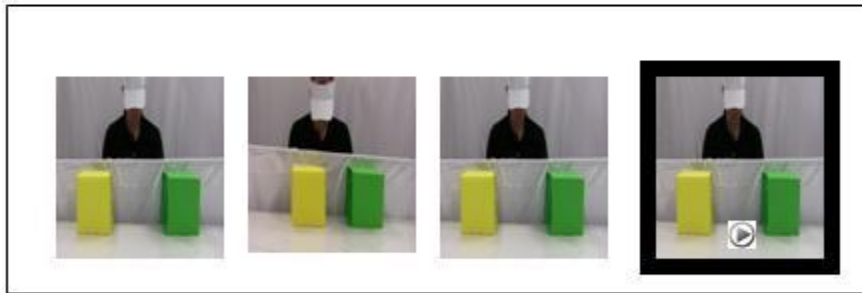
• **“Violation of Expectation”**
method

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

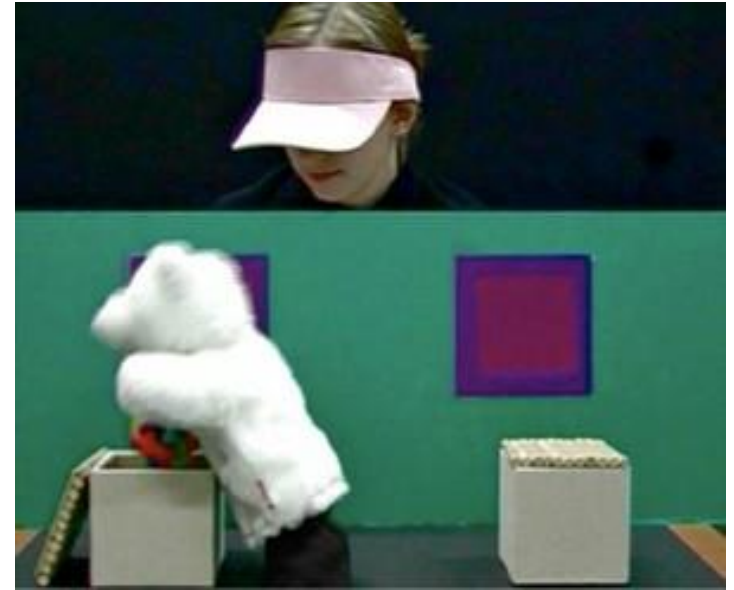
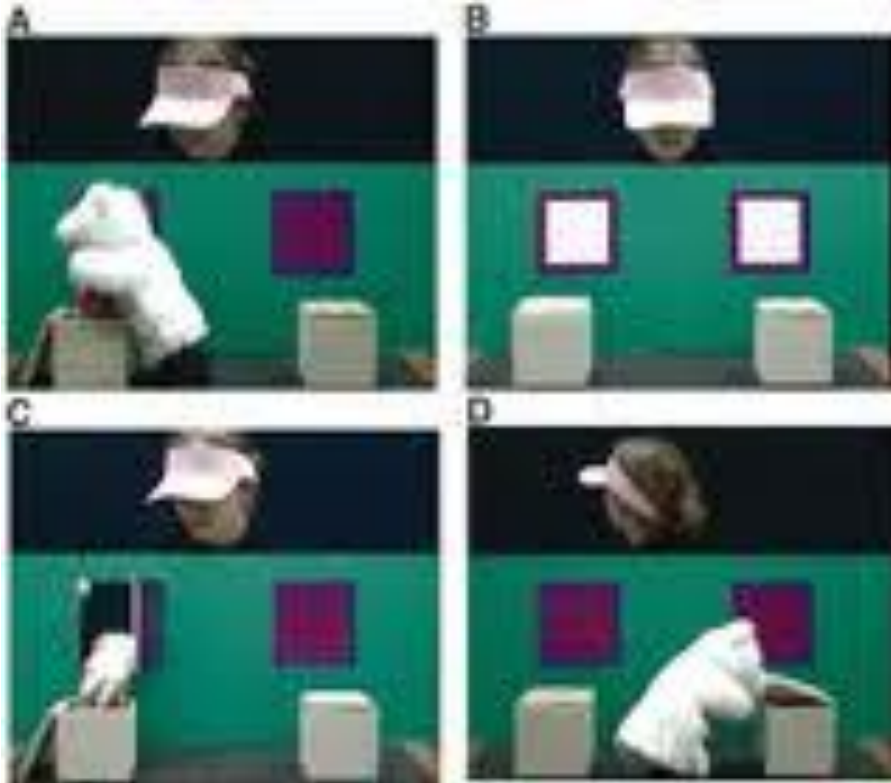
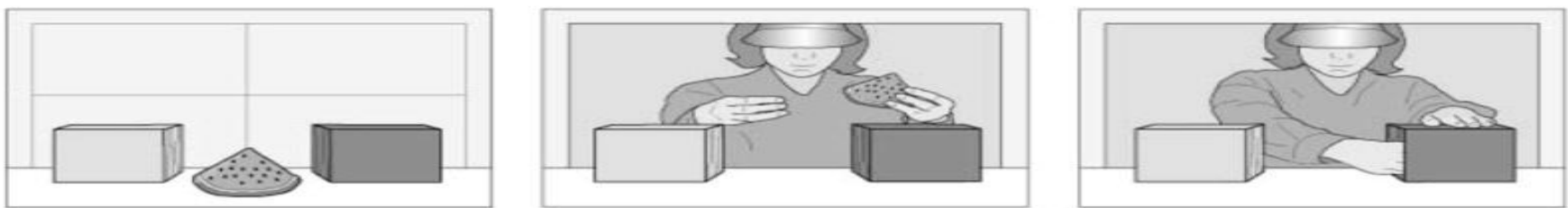
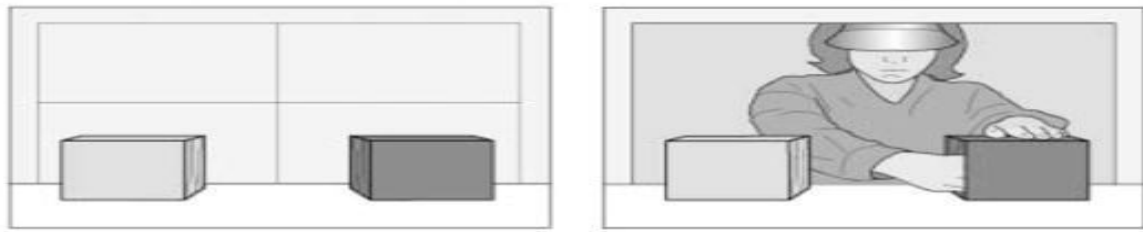


Fig 2

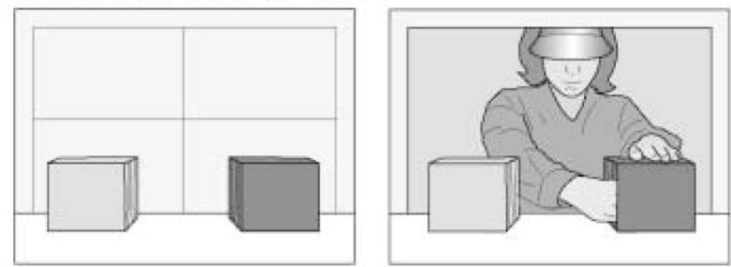
A Familiarization trial 1



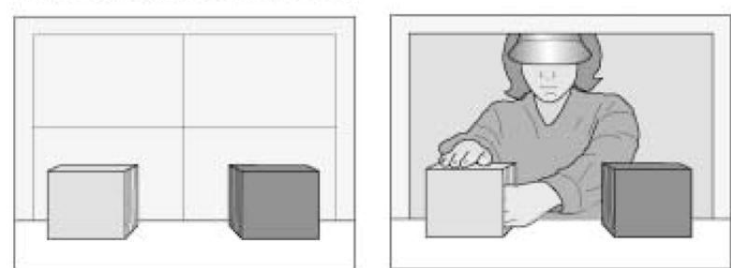
B Familiarization trials 2 and 3



Test trial
Green-box condition



Yellow-box condition



**Knowing
knowing all**

**IR versus
MEDIATING**

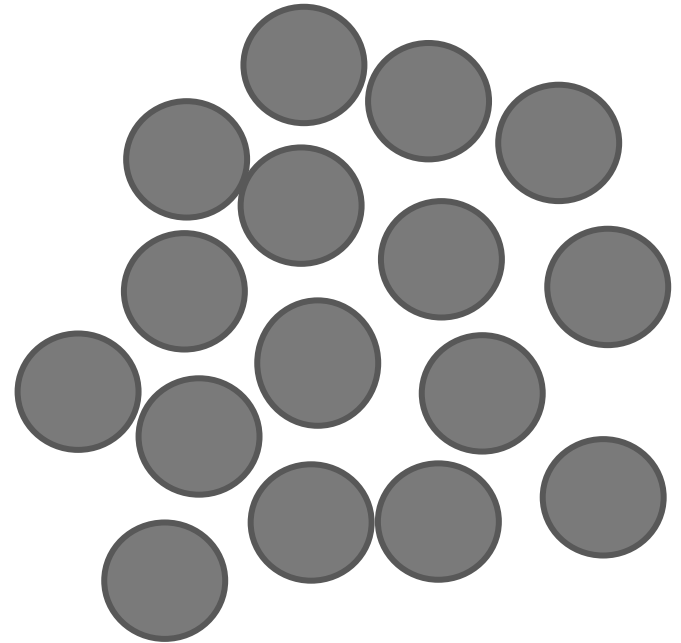
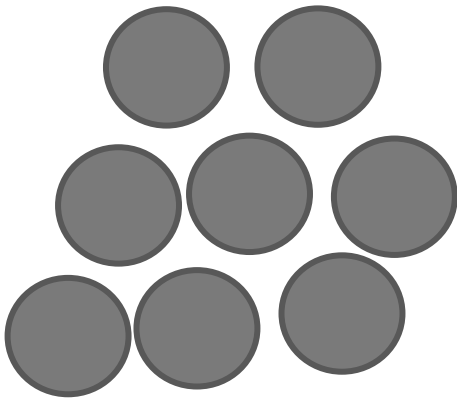
WHAT CAN BE DONE TO OVERCOME THESE CHALLENGES?

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

TWO SYSTEMS FOR BELIEF AND BELIEF-LIKE STATES

Apperly & Butterfill

- Number cognition as a basis



↳
Efficient and inflexible – in infants; do not depend on EF and language

Infants: track attitudes to object locations, purposive interaction with object is required. Limitations in psychological role of beliefs.

Flexible but inefficient – observed in older children

Adults: ToM content is propositional (sentence-like) justified by perceptions which interact with own beliefs and desires together with justifying and causing actions.

THESE SKILLS IN TOM ARE TIED TO DEVELOPMENT OF...

- Executive function
- Language



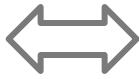
And may be facilitated by: explicit training and environmental influences (i.e. siblings, cultural background)

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

LANGUAGE



Executive functioning



Theory of Mind



Language

What are the social implications of ToM change across development?



DEVELOPMENT AFTER INFANCY

- Attention
- **Beliefs**
- Protodeclarative pointing (before 12 months)
- By 12 months: expect agents to act in the most economical way- 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



WHY?

Video- lying

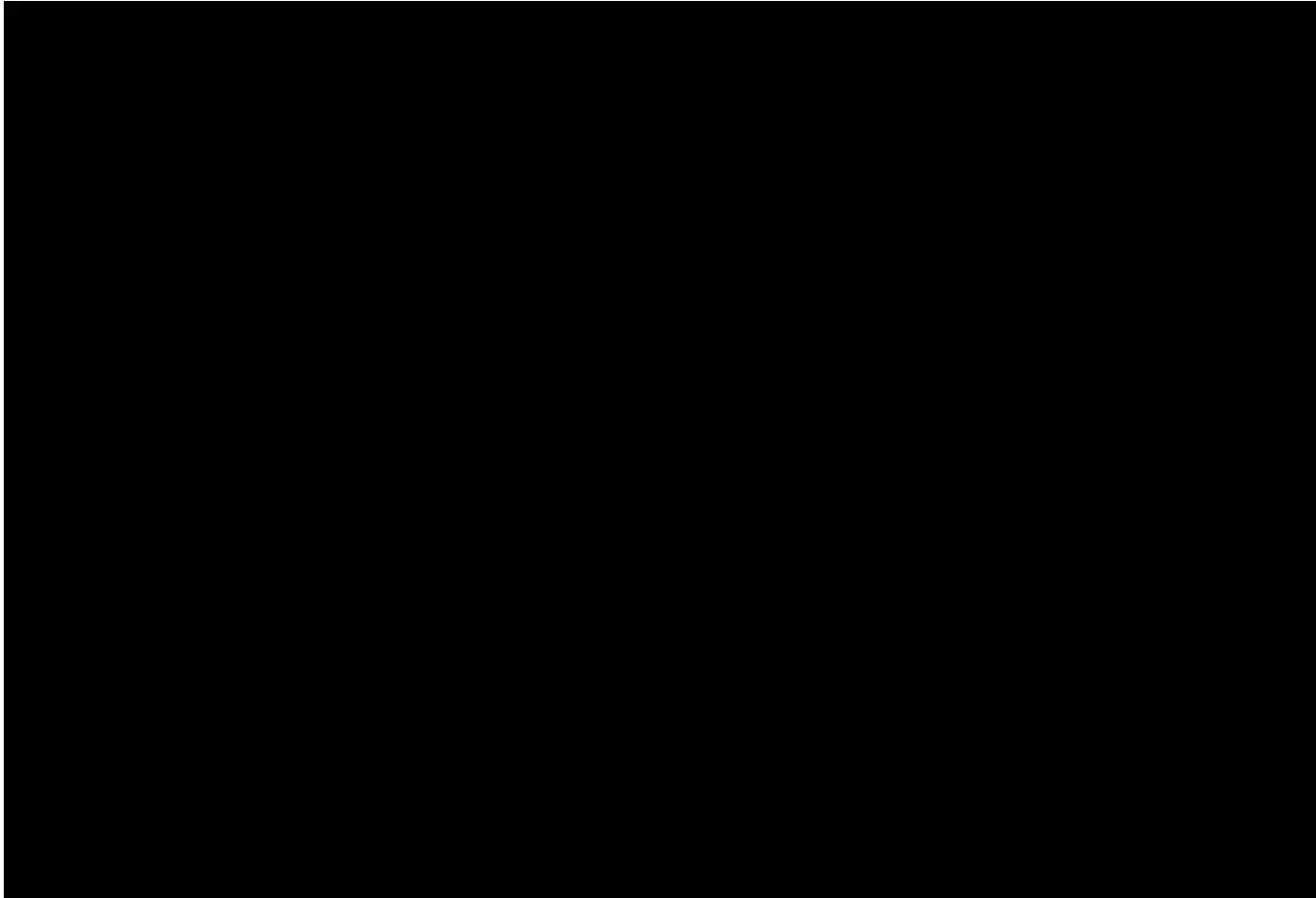
They learn

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



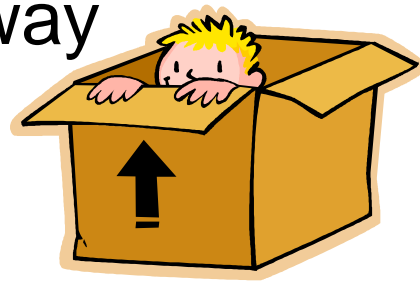
14 VERSUS 18 MONTH OLDS

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

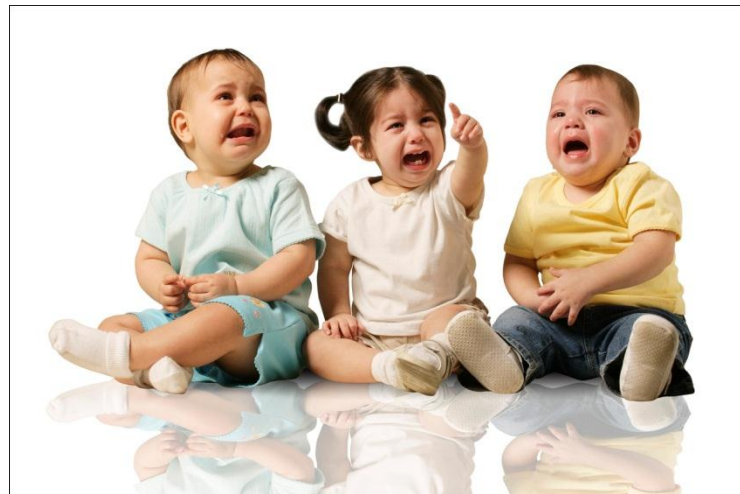


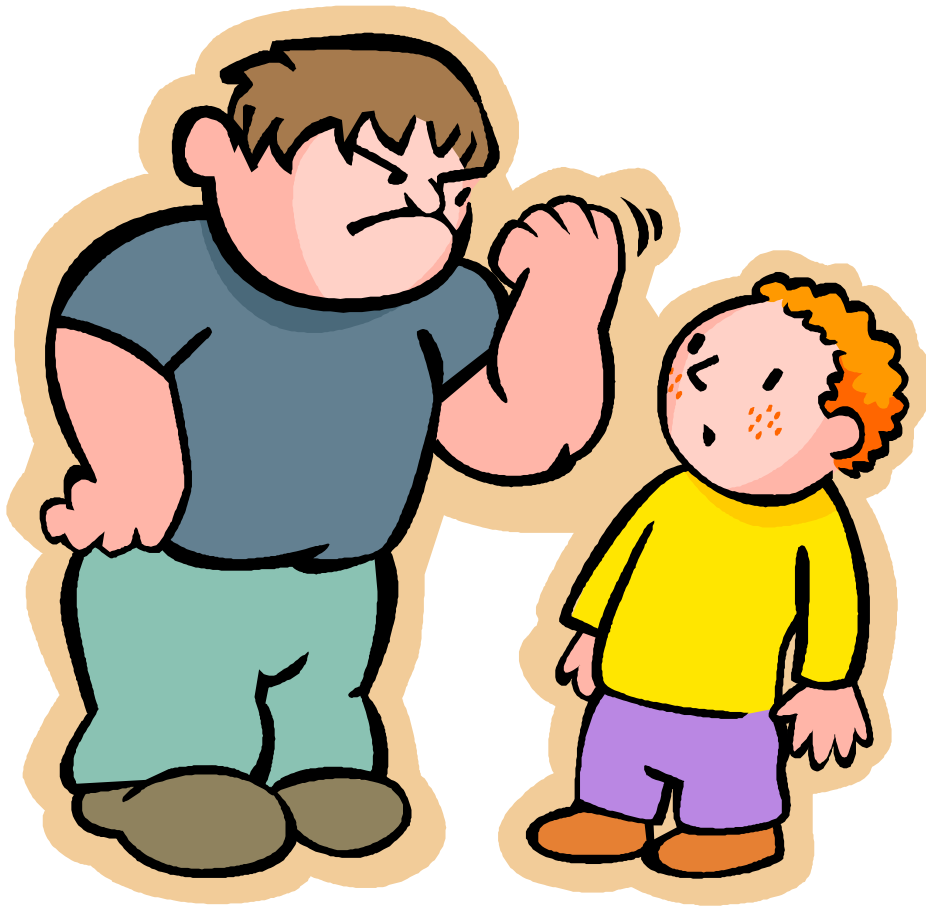
CONSEQUENCES OF TOM

- 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?**

DIFFERENCES IN DEVELOPMENT

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



Let's discuss:

ToM's claim of universality

What's
different
between
cultures?



Folk psychology

Societal
expectations

Parental practices

Language

How can we check?



CHILDREN



CULTURAL INFLUENCES

8 – 12 year olds

English

Japanese

Cartoons

Kobayashi, Glover & Temple, 2007



a

<p>1 Anne, Bob and Cathy play a hiding game.</p>	<p>2 Bob and Cathy watch while Anne hides a marble inside a red can.</p>	<p>3 When Cathy is not watching,</p>
<p>4 Anne takes the marble out of the red can.</p>	<p>5 Then Anne hides the marble in a green can.</p>	<p>Bob thinks that Cathy thinks that the marble is ... A. in the red can. B. in the green can.</p>

b

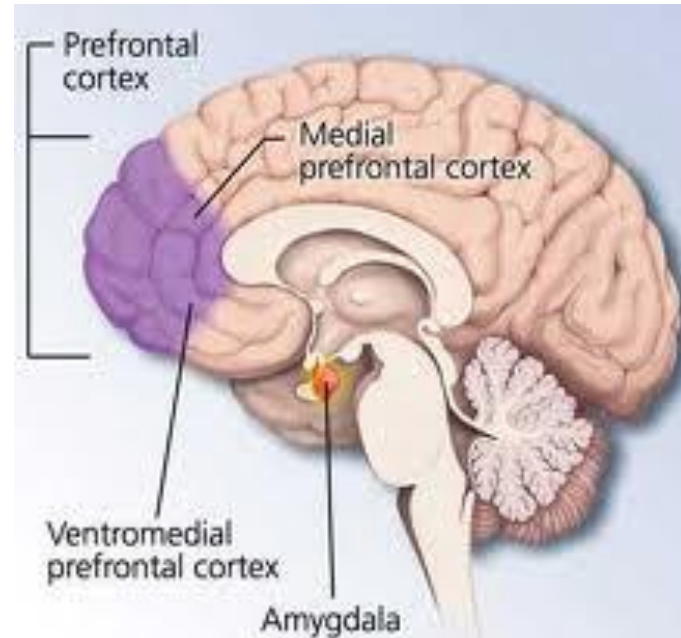
<p>1 アヤとマリとケンタの 三にんで たらさがしゲームを しました。</p>	<p>2 マリとケンタは アヤが ビー玉を 赤いカンの中 にかくのを 見ました。</p>	<p>3 ケンタが見ていないとき、</p>
<p>4 アヤが ビー玉を 赤いカンからとりだして、</p>	<p>5 みどりのカンへ うつしました。</p>	<p>マリは ケンタが ビー玉が、... (ア)赤いカンの中にあると 思っていると 思っています。 (イ)みどりのカンの中にあると 思っていると 思っています。</p>

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



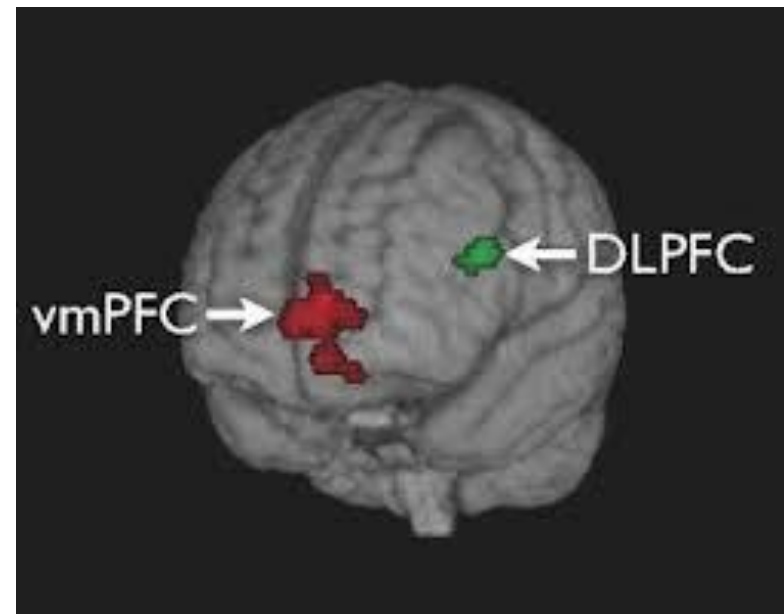
Cultural Influences of ToM development

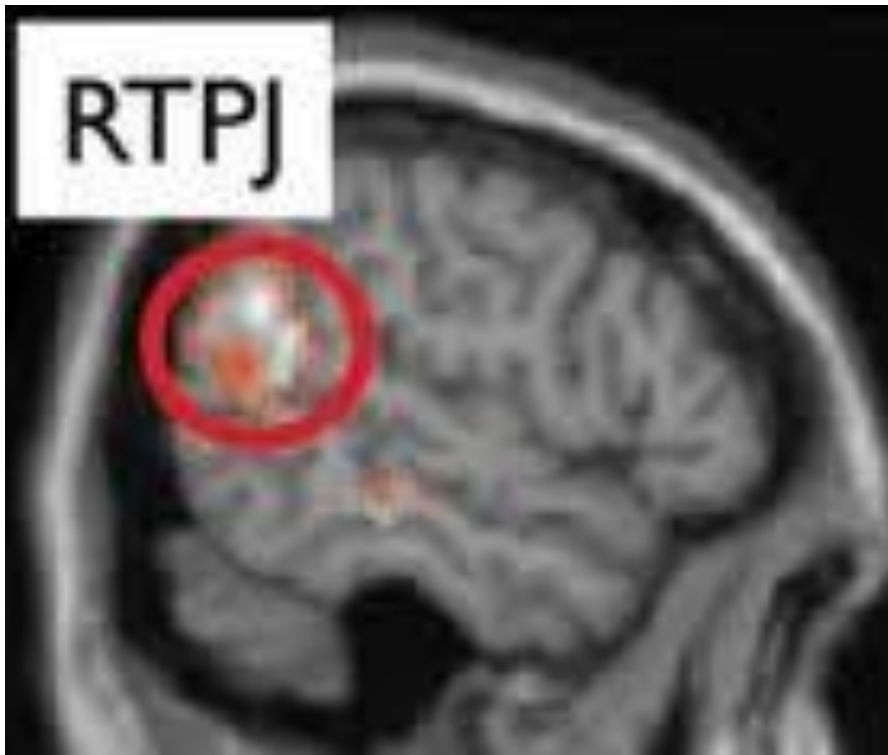
AREAS SUCH AS THE VMPFC (EMOTIONS PROCESSING) ARE MORE IMPORTANT FOR TOM IN CHILDHOOD THAN IN LATER YEARS.

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

Kobayashi,, Glover & Temple, 2007

Liu, Wellman, Tardif & Sabbagh, 2008



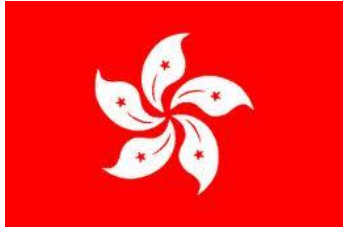
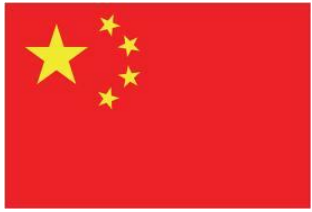


AMERICANS RECRUITED MORE RTPJ THAN JAPANESE. THIS MAY BE CULTURE SPECIFIC- RTPJ MIGHT BE INVOLVED IN GENERAL ABILITY IN DISTINGUISHING SELF FROM OTHERS.



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

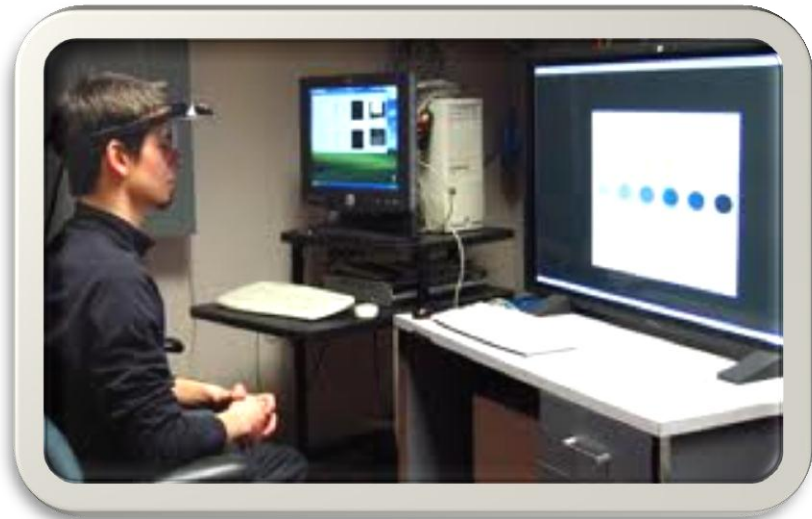


NEW BILINGUALS VS OLD-TIME BILINGUALS

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?

