Baron-Cohen’s ‘Mindreading’

4 components of the ‘mind-reading’ system:

1) Intentionality Detector (ID)
   - Interprets actions in terms of goals & desires
   - “A large solid circle enters a rectangular space. A solid triangle turns in the direction of the rectangular space. The triangle enters the rectangular space. The circle moves to a corner of the space at a rapid pace. The triangle and the circle move about in circular motion…”
   - “The triangle is chasing the circle. The circle wants to get away and tries to hide in a room, but the triangle follows.”
   - (note: the ID must first pick out the relevant entities (social ones)
   - In order to then attribute goals to them

2) Eye-Direction Detector (EDD)
3) Shared-Attention Mechanism (SAM)
4) Theory of Mind Mechanism (ToMM)

• Do infants have these? (from previous lectures)
• Do non-human animals?
• Can these be damaged?
Baron-Cohen’s ‘Mindreading’

1) Intentionality Detector (ID)
Interprets actions in terms of goals & desires

- Meltzoff studies: imitation of goals (not just actions) by 18 months
- Woodward studies: goal attribution by 5 months

Baron-Cohen’s ‘Mindreading’

2) Eye-Direction Detector (EDD)
- Pays attention to eyes
- Interprets eyes as “seeing” stuff

18-24 months by 6 months

Baron-Cohen’s ‘Mindreading’

2) Eye-Direction Detector (EDD)
- Pays attention to eyes
- Interprets eyes as “seeing” stuff

Baron-Cohen’s ‘Mindreading’

3) Shared Attention Mechanism (SAM)
- Formation of triadic relations

Baldwin’s studies on gaze following to learn meaning of a new word (> 12 months)
Baron-Cohen’s ‘Mindreading’

3) Shared Attention Mechanism (SAM)
- Formation of triadic relations

Social referencing on the visual cliff
(10 months)

3) Shared Attention Mechanism (SAM) combined with
Intentionality Detector (ID) and Eye Detection Detector (EDD):

Attribution of goals/ desires depending on someone’s
behavior or direction of gaze

Vs.

“I love broccoli!”
(3 years)

Baron-Cohen’s ‘Mindreading’

4) Theory of Mind Mechanism (ToMM)
Other 3 components, plus understanding that others can have
different knowledge/beliefs about the world (different from
the child’s, or different from reality)

It is raining outside. (FALSE)
John thinks it is raining outside. (TRUE)

Oedipus thought he was sleeping with
Jocasta. (TRUE)

Oedipus thought he was sleeping with
his mother. (FALSE)

Pass at 3.5 - 4 years
Baron-Cohen’s ‘Mindreading’

4 components of the ‘mind-reading’ system:

1) Intentionality Detector (ID)
2) Eye-Direction Detector (EDD)
3) Shared-Attention Mechanism (SAM)
4) Theory of Mind Mechanism (ToMM)

Could be Innate (open for debate)
It might be possible to learn these associatively.
False beliefs etc. don’t correlate with actual states of the world
Therefore, much harder to learn these associatively.

Autism & Theory of Mind

Baron-Cohen’s hypothesis:
Autistics lack a Theory of Mind; subsequent failure to interact
normally with others produces overstimulation, language problems…

What is Autism?

- Approx. 1/1500 children
- Diagnosed at age 2-3
- Deficits in language, interaction with others, imagination,
  Often involves repetitive behaviors

A Typical Life History

- Much loved, adorable, apparently normal until about age 2
- Doesn’t start talking, doesn’t respond to own name, doesn’t
  engage in social interaction (pointing, getting parents’ attention)
- Increasingly absorbed in external objects;
  Obsessed with building blocks
- Atypical interaction with people: Will sit in anyone’s lap (as if a
  soft piece of furniture), or sits in no one’s lap
- Does not seek out contact (e.g. ask to be picked up, hugs, etc)

When Older:

- 1/3 never develop language, others develop good language skills
- But understanding is very literal
  (e.g., “She was crying her eyes out”)
- Some develop sophisticated cognitive skills (e.g., London autistic
  who memorized entire London tube & bus system)
- Don’t properly analyze social interactions
  (e.g., thought checkout girl was his girlfriend because she
  smiled at him)
Autism & Theory of Mind

Origins of Autism?
• Once thought to be result of cold parenting
• Now: biological basis

Autism & Theory of Mind

Findings with Autistics:
• Don’t seem to use eye gaze
• Autistic Participants seriously impaired on false belief tasks, relative to mental age matched controls, even retarded mental aged matched controls
• Often only 20-30 % adult, high functioning autistic participants pass test majority of normal 3- to 4-year-olds pass

But is it a problem with a Theory of Mind module, or with language?

Autism & Theory of Mind

Test highest language functioning autistics, see if they pass

Severe autism (retardation)  Mild autism (can function with help, but many social & cog. problems)  Asperger’s Syndrome (very smart, but specific deficits)

Temple Grandin

Temple Grandin: Sheer force of brain power to understand others’ beliefs (what comes naturally to a normal 4-yr old)
Autism & Theory of Mind

4 components of the ‘mind-reading’ system:
1) Intentionality Detector (ID) Can pick out other agents, goals
2) Eye-Direction Detector (EDD)
3) Shared-Attention Mechanism (SAM)
4) Theory of Mind Mechanism (ToMM)

Autistics
Can sometimes follow gaze

Suggestion: It may be SAM and ToMM that autistics lack
- No social referencing
- No declarative pointing
- No gaze following to learn new words

“How will he feel if he gets the one he wants?”
Understand goals, understand emotional states

Autism & Theory of Mind