Autistic spectrum disorders and the interbrain

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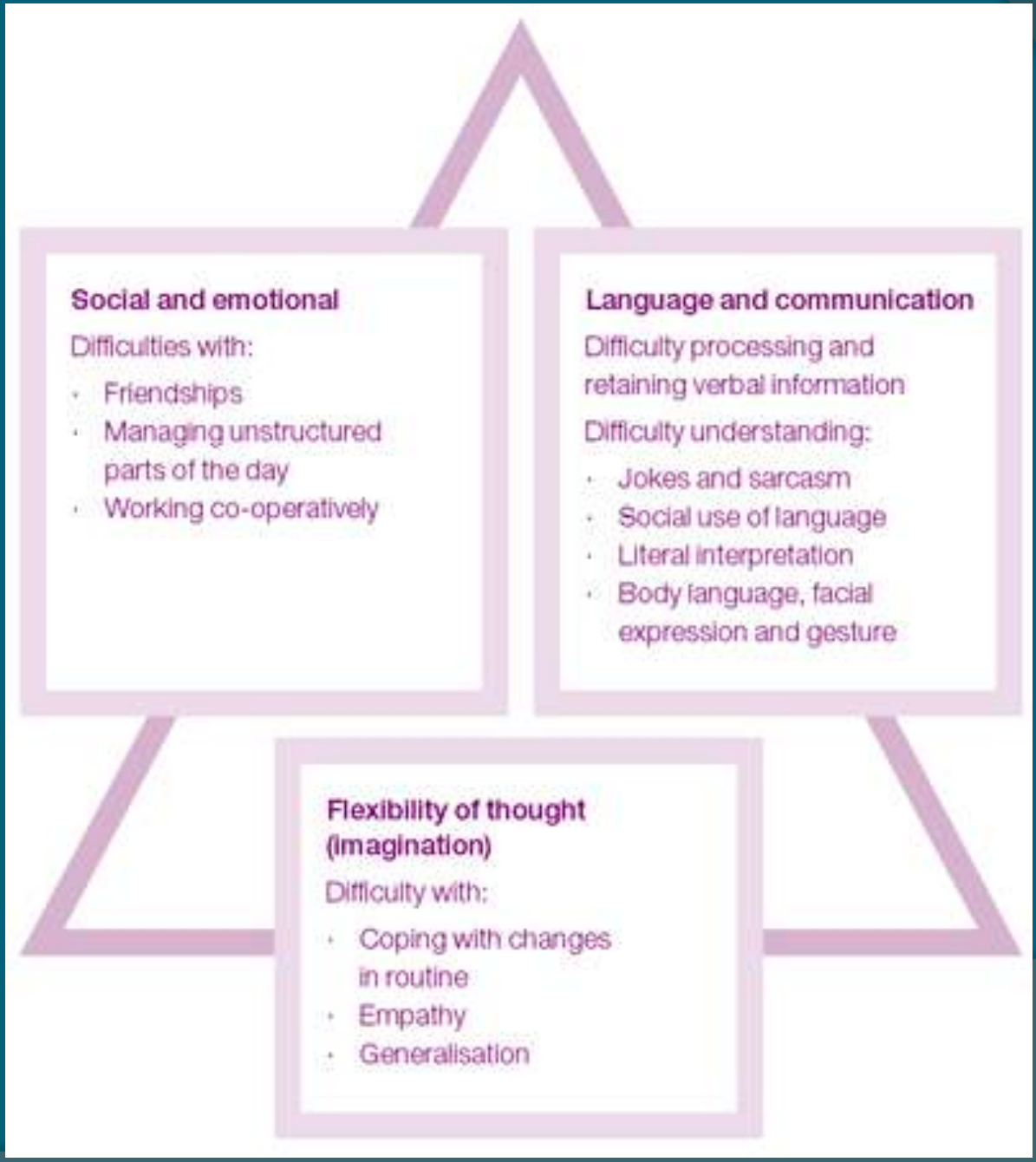
Slides available at www.aspergersyndrome.info

Courses on AS from www.dilemmatraining.com


Social and emotional
Difficulties with:
· Friendships
· Managing unstructured parts of the day
· Working co-operatively
Language and communication
Difficulty processing and retaining verbal information
Difficulty understanding:
· Jokes and sarcasm
· Social use of language
· Literal interpretation
· Body language, facial expression and gesture
Flexibility of thought (imagination)
Difficulty with:
· Coping with changes in routine
· Empathy
· Generalisation

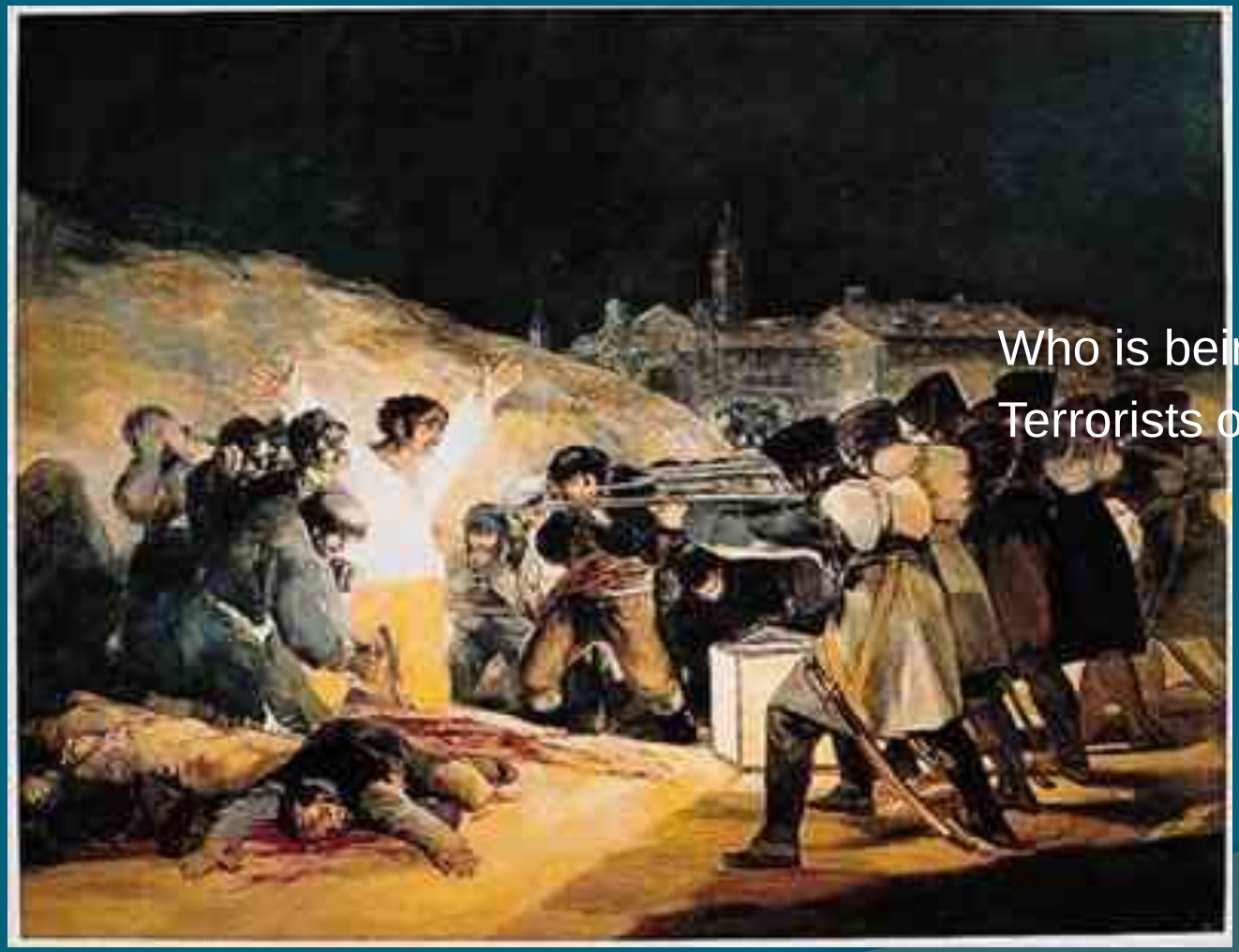
What is Asperger syndrome?

- A pervasive developmental disorder/ autistic spectrum disorder
  - Tantam D. Lifelong eccentricity and social isolation. II: Asperger's syndrome or schizoid personality disorder? [see comments]. British Journal of Psychiatry 1988; 153:783-791
- With substantial personal and social impact
  - Tantam D. Lifelong eccentricity and social isolation. I. Psychiatric, social, and forensic aspects. British Journal of Psychiatry 1988; 153(6):777-782
- 20 years on the importance of nonverbal communication increases

Feature of nonverbal inexpressiveness

- Reduction of expression or occasionally idiosyncratic expressions such as unusual prosody, facial mannerisms
- Affects all channels
- Voluntary signals e.g. social smiles unaffected

Knowing about the world using non-verbal cues



Who is being shot?

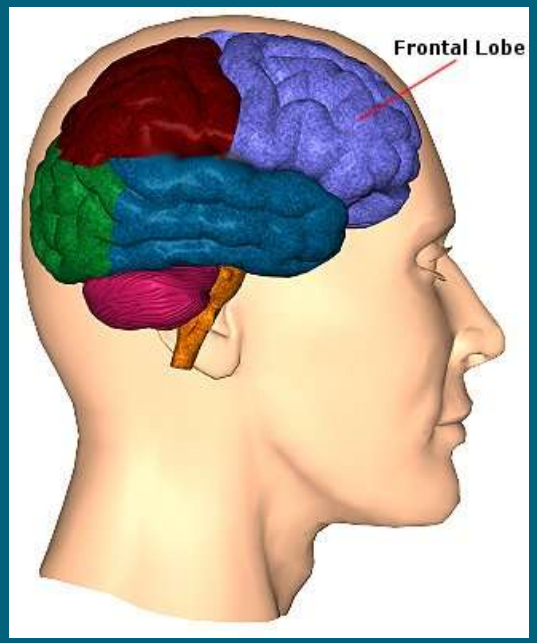
Terrorists or partisans?

Atypical Asperger syndrome

- Primary abnormality is lack of empathy, partly due to failure of non-verbal interpretation (‘face blindness’)
- Ability to make relationships but not to keep them
- Lack of empathy may lead to antisocial behaviour, but greater problem is lack of persuasiveness and ‘social influencing power’

Picture from the film, “Ripley’s game” starring Matt Damon as Ripley

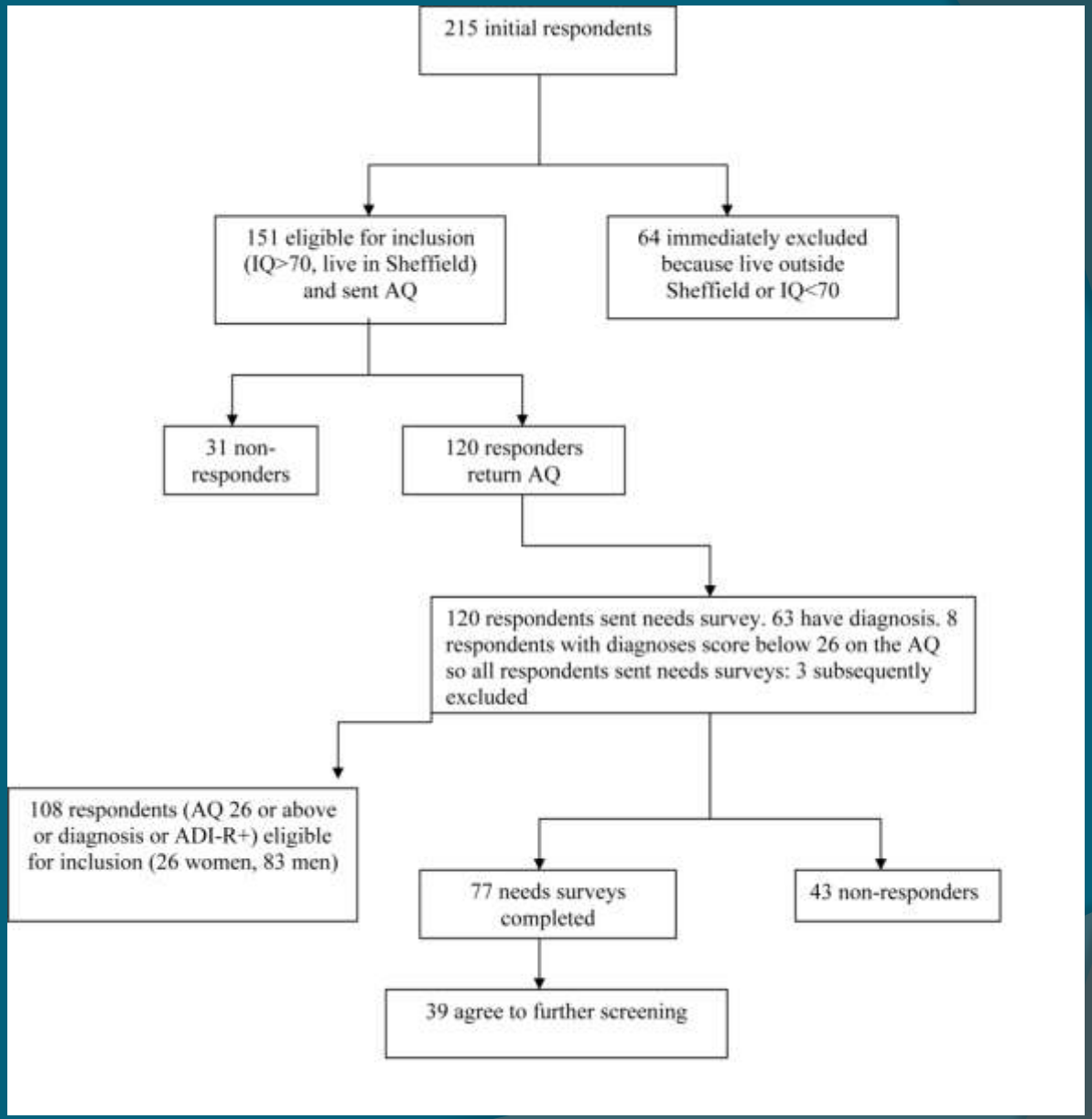
Associated developmental disorders
Predominantly fronto-striatal or fronto-cerebellar

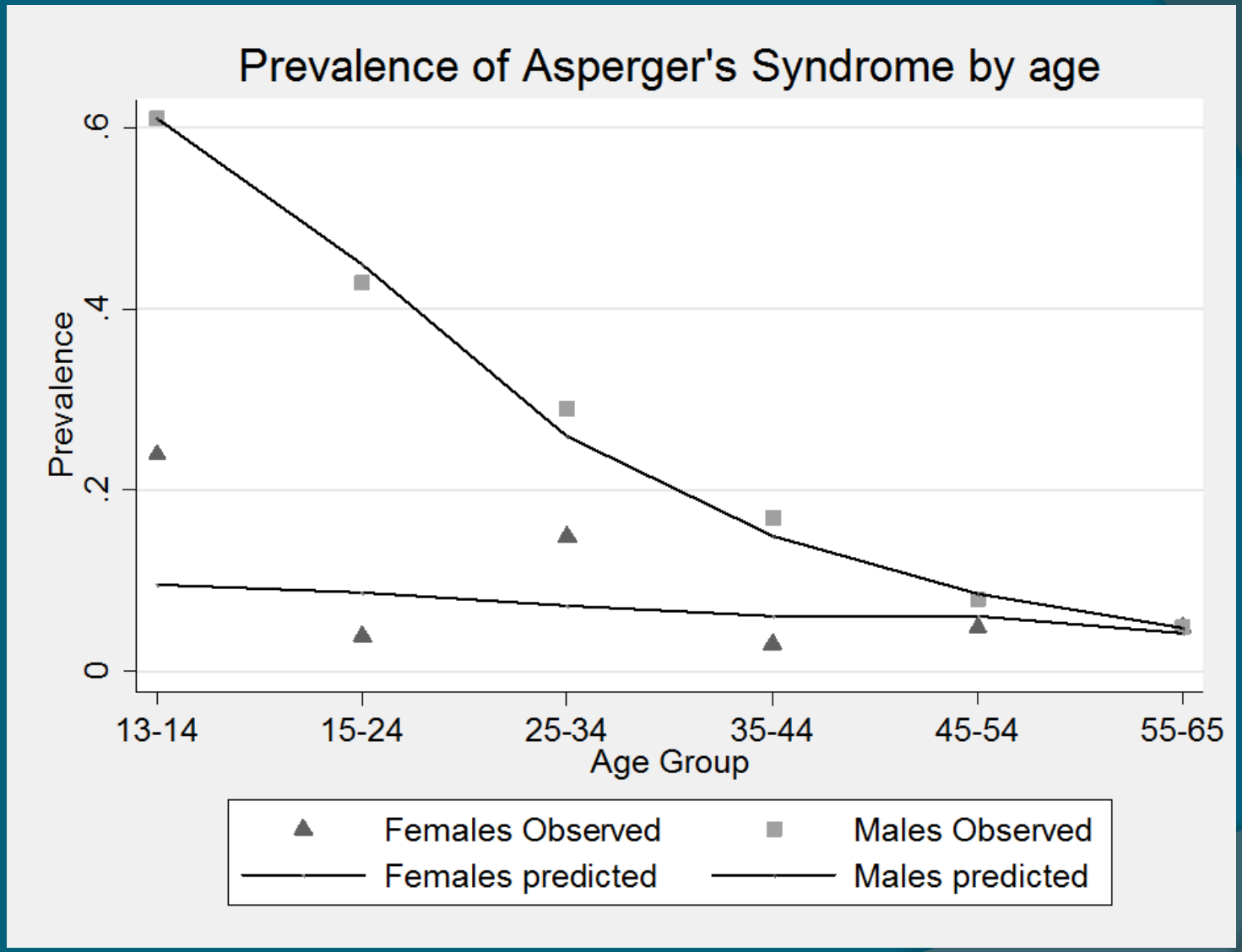


- Dysexecutive syndrome (planning)
- Dyslexia (writing and spelling)
- Dyspraxia (coordination) with typical AS
- Attention deficit/ hyperactivity disorder (impulsivity, executive functions, task persistence)
- Also links with
  - Tourette syndrome
  - Expressive dysphasia (may lead to elective mutism)
  - Dysgraphia
  - Dyscalculia
  - Topographical disorientation

	Impaired NVE ++	Peer friends	Unusual interests ++	Self-aware
Typical autism	Y	N	Y/lack	N
Asperger syndrome	Y	N/few	Y	Y
Atypical AS	N	N/brief	Y/hidden	Y

Sheffield survey of Sheffield residents aged 13 and above (Balfe, Tantam & Campbell, Autism, in press




Prevalence of Asperger's Syndrome by age
Prevalence
0
.2
.4
.6
13-14
15-24
25-34
35-44
45-54
55-65
Age Group
Females Observed
Males Observed
Females predicted
Males predicted

Prevalence

- Rate of Asperger syndrome/ high functioning autism in children is currently put at 1 in 300-500 (one half total ASD rate)
- No good adult epidemiology
  - Of 437, 800 Sheffield residents aged 13 or over, we identified 112 high scorers on screening questionnaire: rate of 1 in 4000
- An adult rate, 8-10 times less than the childhood rate

Possible explanations

- Spurious
  - Selection bias
  - Reduced life expectancy
- Recovery
  - Maturation of brain
  - Reduction of social stress
- AS may be an episodically manifested illness, like sickle cell trait
- Schooling may be unusually social demanding

"Reality to an autistic person is a confusing, interacting mass of events, people, places,

sounds and sights. There seems to be no clear boundaries, order or meaning to anything. A

large part of my life is spent just trying to work out the pattern behind everything."

A person with Autism: quoted in *Better Services for People with an Autistic Spectrum Disorder, Nov 2006, DoH*

anxiety

Anxiety: a neglected condition

- Types
  - Generalized anxiety
  - Social phobia
  - OCD
  - ‘Catastrophic reactions’
  - Anger
- Presentation
  - Exacerbation of ‘autistic’ symptoms e.g. rituals or routines
  - ‘Mood swings’
  - Irritability
  - Regression
- Complications
  - Secondary depression
  - Aggression
  - Brief psychosis
  - Comfort behaviours

Associated psychiatric disorders (213 adults with HFA/ AS in personal clinic series)

Schizophrenia	0.5%
Cycloid psychoses	
Depression	17.8%
Mania	1.4%
Anxiety	43.2%
OCD	7.8%
Substance abuse	6.6%

Where were people with AS in Sheffield?

- Most living at home, even above 30.
- Most had difficulties coping with changes in everyday environments
- Difficulties moving between places (for example using public transport)
- Most common places frequented were libraries and cinemas

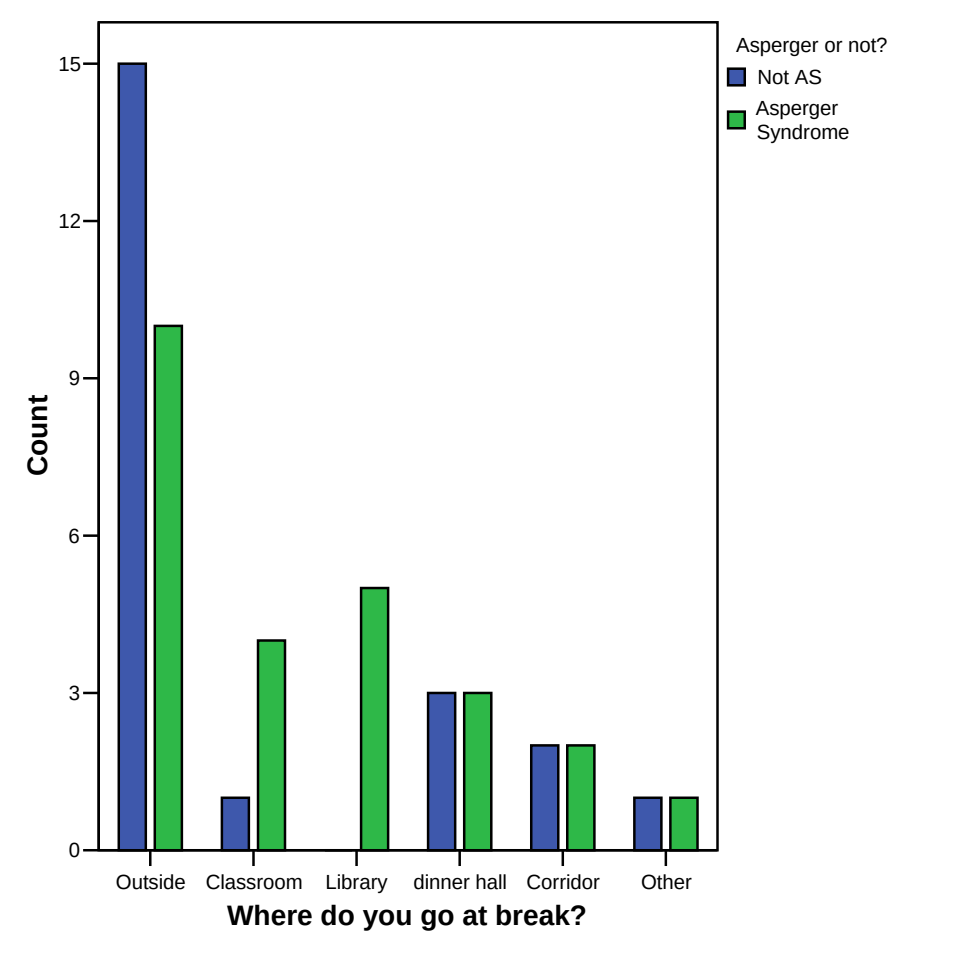
Social situation of people with AS in Sheffield

- Only 1 in 5 was in paid work
- 1 in 5 was doing nothing during the day
- Difficulties getting on with people
- Respondents wanted more help with interview skills, using public transport and being on time

Wainscot, J., Naylor, P., Sutcliffe, P., Tantam, D., & Williams, J. Relationships with peers and use of the school environment of mainstream secondary school pupils with Asperger Syndrome (High-Functioning Autism): A case-control study. International Journal of Psychology and Psychological Therapy, 8, 181, 2008

Year Group (Age range in years)	*n*	Percent
Total pupil sample ($N = 47$)		
7 (11-12)	15	31.9
8 (12-13)	18	38.3
9 (13-14)	4	8.5
10 (14-15)	5	10.6
11(15-16)	3	6.4
12 (16-17)	0	0
13 (17-18)	2	4.3
Gender		
Male	45	95.7
Female	2	4.3

Social exclusion and bullying



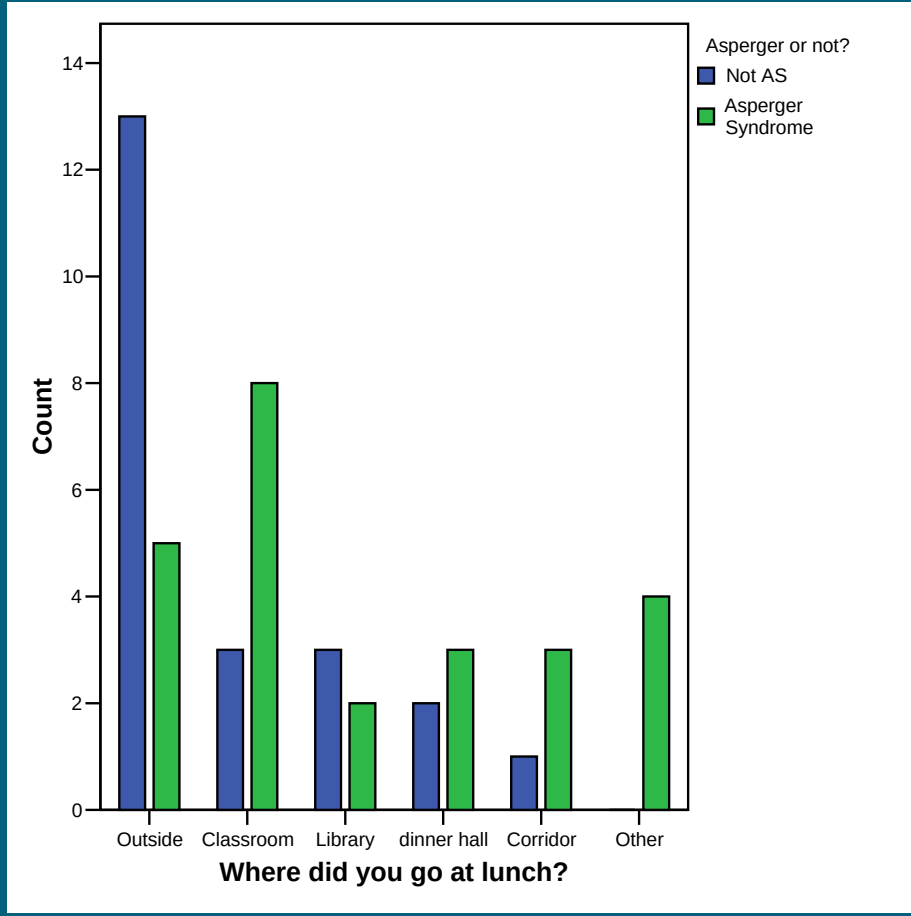


Table 2

How many people in your class do you: speak to, not like, and think not like you? (AS/HFA *n* = 25; /HFA *n* = 22)

	How many people do you speak to in your class?			
	Everyone	Most People	Few People	None
AS/HFA	2	6	15	2
No AS/HFA	6	12	4	0
	How many people do you not like in your class?			
	Everyone	Most People	Few People	None
AS/HFA	0	6	13	6
No AS/HFA	0	3	12	7
	Do you think there are any people in your class who do not like you?			
	Everyone	Most People	Few People	None
AS/HFA	1	5	16	1
No AS/HFA	0	2	11	9

Bullying

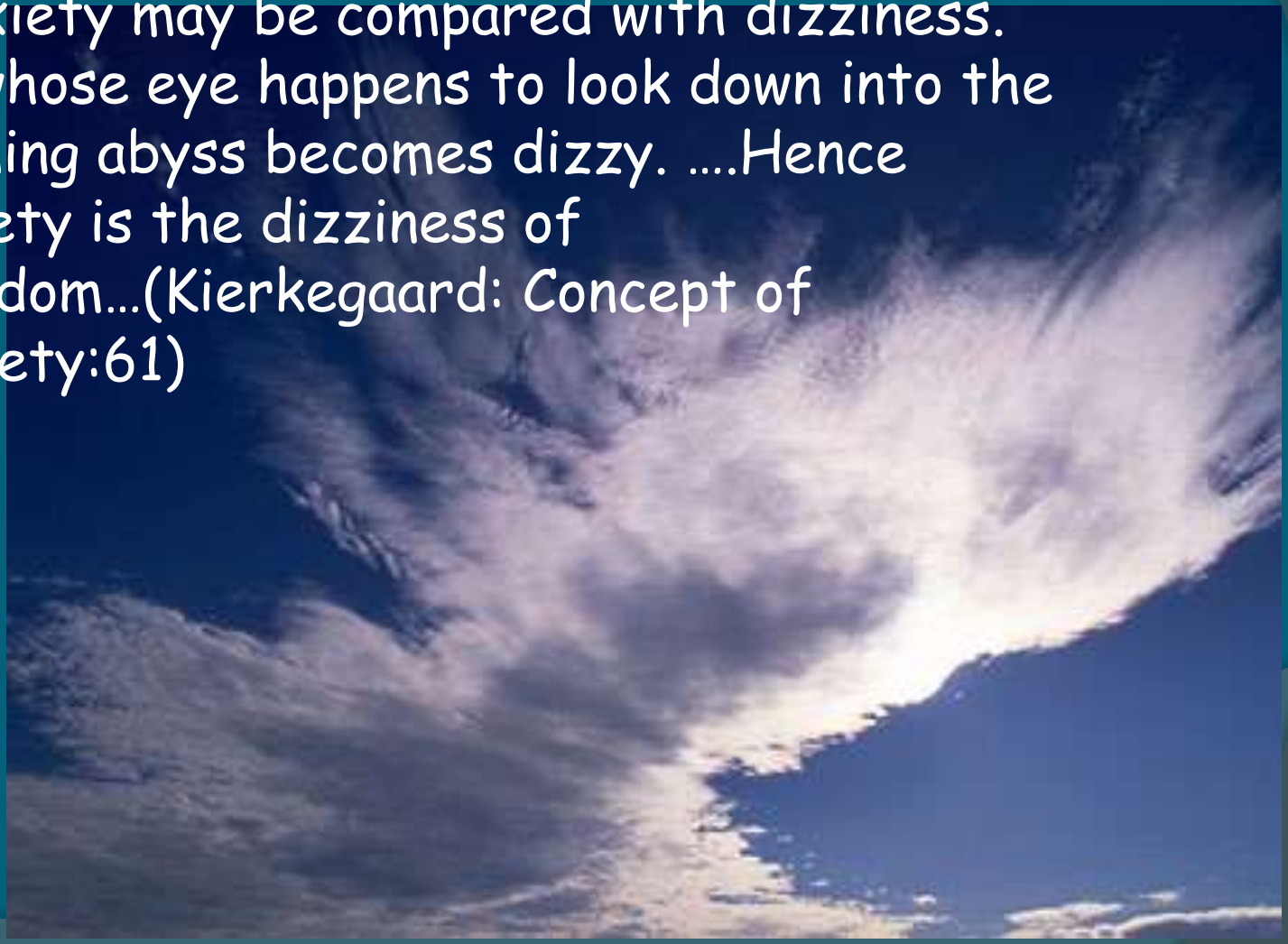
- May be cause of long-term shame/ humiliation proneness
- May be reason that some people with AS go through a period of withdrawal and distrust of others
- May cause covert social exclusion

Reactions to marginalization

- Social withdrawal
- Rituals
- Denial
  - Seeking adoption in a deviant sub-group
  - Taking on a powerful social identity e.g. ‘gay’-dom
- Domineering victim-hood, often with family as target

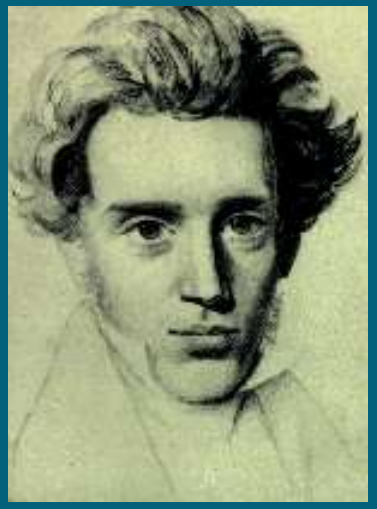
Storm is gathering: the experience of anxiety

Anxiety may be compared with dizziness. He whose eye happens to look down into the yawning abyss becomes dizzy. ….Hence anxiety is the dizziness of freedom…(Kierkegaard: Concept of Anxiety:61)



Sören Kierkegaard 1813-1855

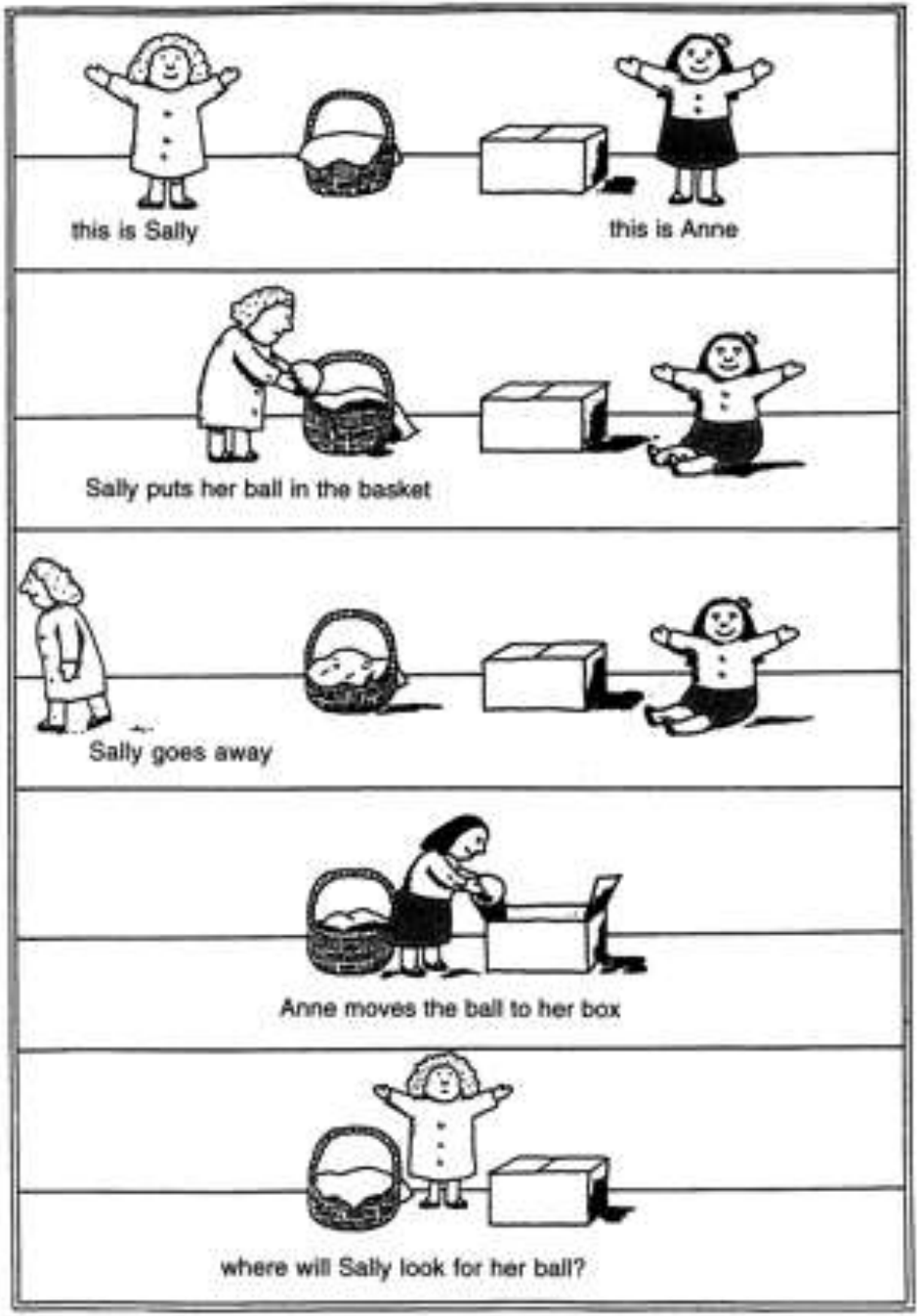
Prof Emmy van Deurzen



Regina Olson

- Affective empathy
  - Failure of contagion
- Cognitive empathy
  - Theory theory of mind
  - Simulation theory of mind

Sally Anne test



recognition of the self: the mirror test

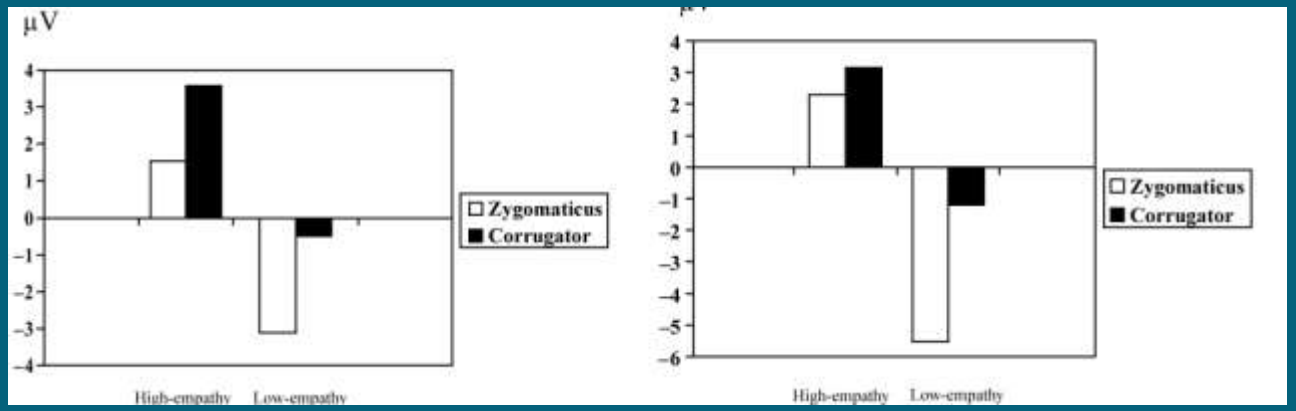
- The mirror test of self recognition involves putting a mark such as lipstick on the child's face and looking for signs of self recognition (e.g. touching the nose more in the 'mark' case than when there is no mark).

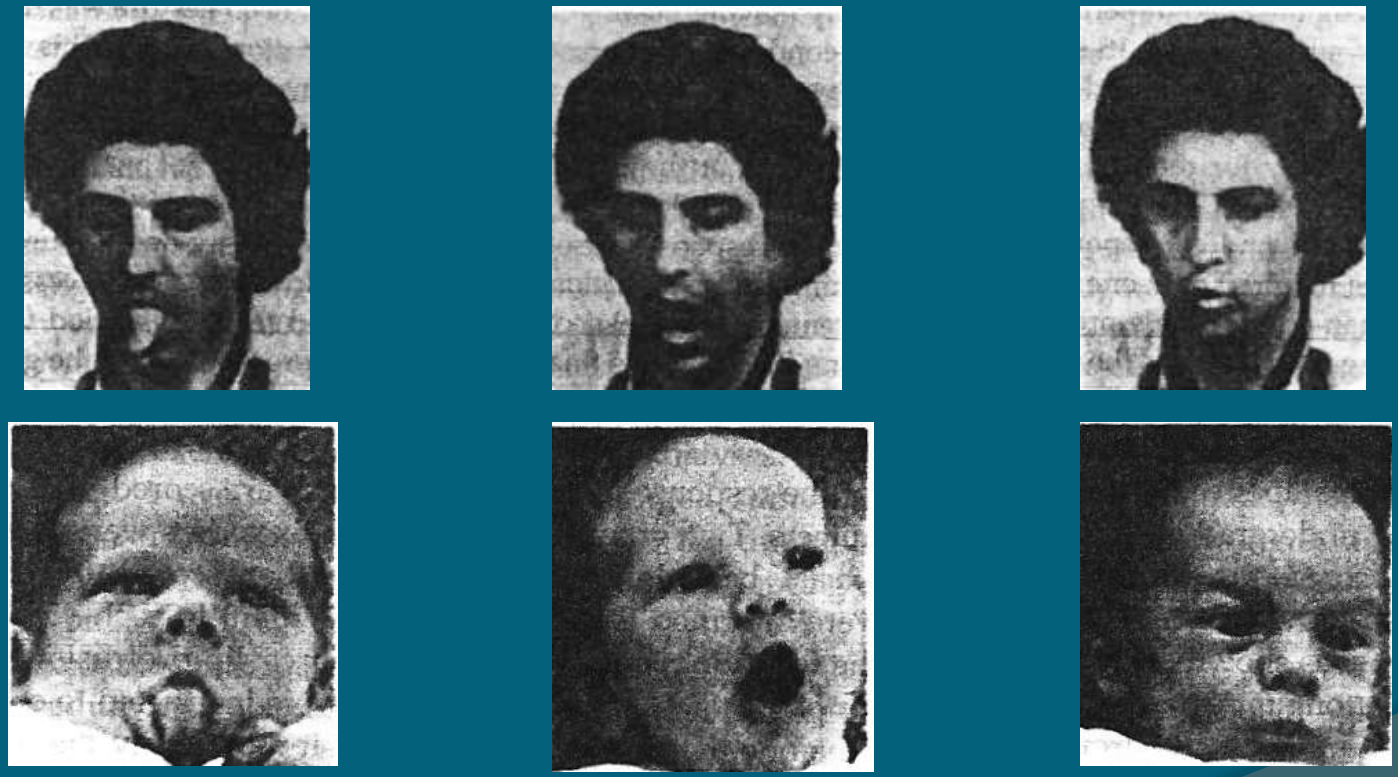
Failings of theory of mind

- Theory of mind has become collection of heterogeneous tasks
  - Self awareness ToM tasks passed by:
    - Some great apes
    - Some dolphins
    - African elephants
- Theory of mind tasks passed by people with AS
- ‘Second order’ theory of mind tasks are grammatically complex
- Theory of mind is delayed in children with language delay due to hearing impairment

Contagion of emotion

Sonnby-bergstrom, M. (2002) Automatic mimicry reactions as related to differences in emotional empathy. Scandinavian Journal of Psychology, 43, 433-443

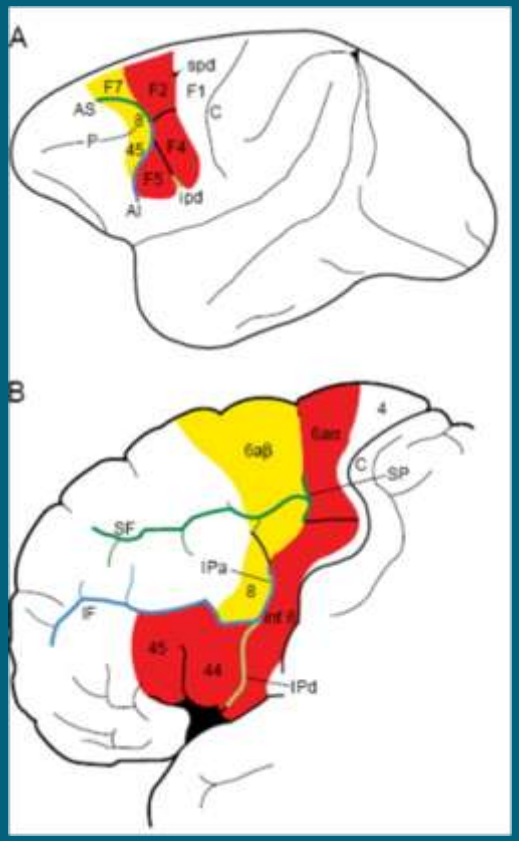


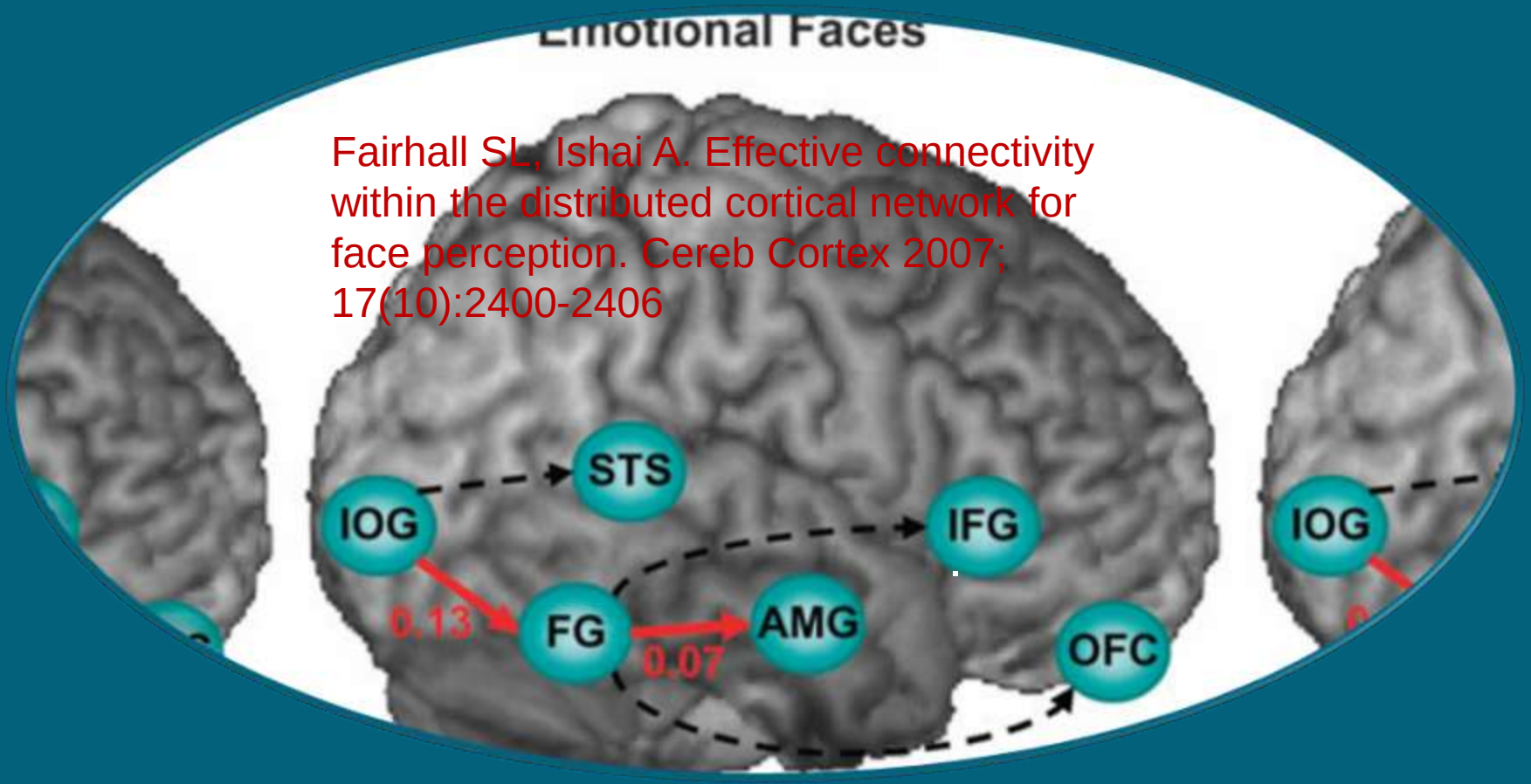


- Meltzoff suggested that newborn infants were capable of producing a range of responses to gestures modeled by an actor.

Lack of mirroring

- Reduction of mirror neurones firing on perception of a movement and on generation of a movement
- Fits with simultaneity of NVE
- Intention movements being produced even if suppressed





Face perception elicits activation within a distributed cortical network. Axial sections, taken from a representative subject, illustrate activation within the core (IOG-inferior occipital gyrus, FG-fusiform gyrus, STS - superior temporal sulcus) and extended (AMG-amygdala, IFG-inferior frontal gyrus, OFC-orbitofrontal cortex) systems.

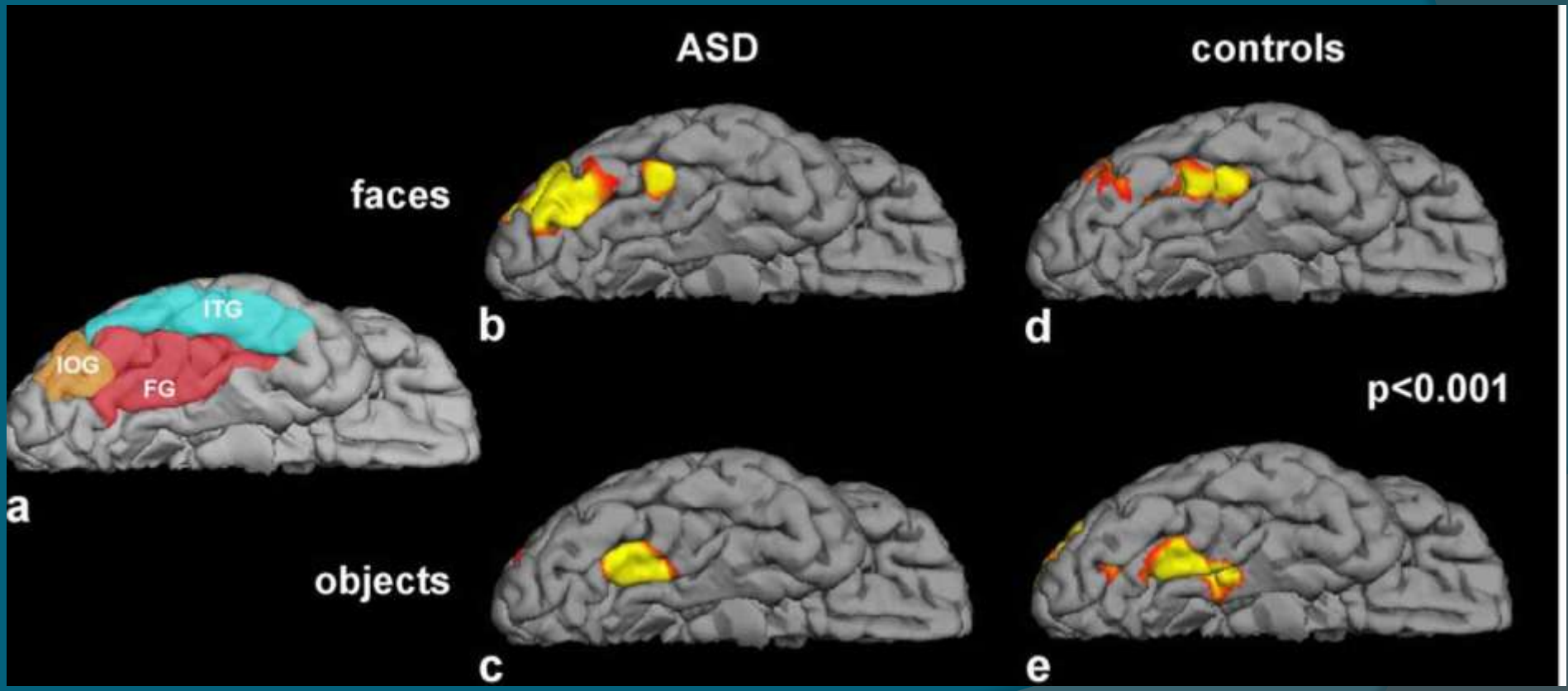
Right way up faces processed more accurately by neurotypicals, but upside faces processed with more errors by both neurotypicals and people with an ASD

Langdell, 1978; Tantam D, Monaghan L, Nicholson H, Stirling J. Autistic children's ability to interpret faces: a research note. J Child Psychol Psychiatry 1989; 30(4):623-630.

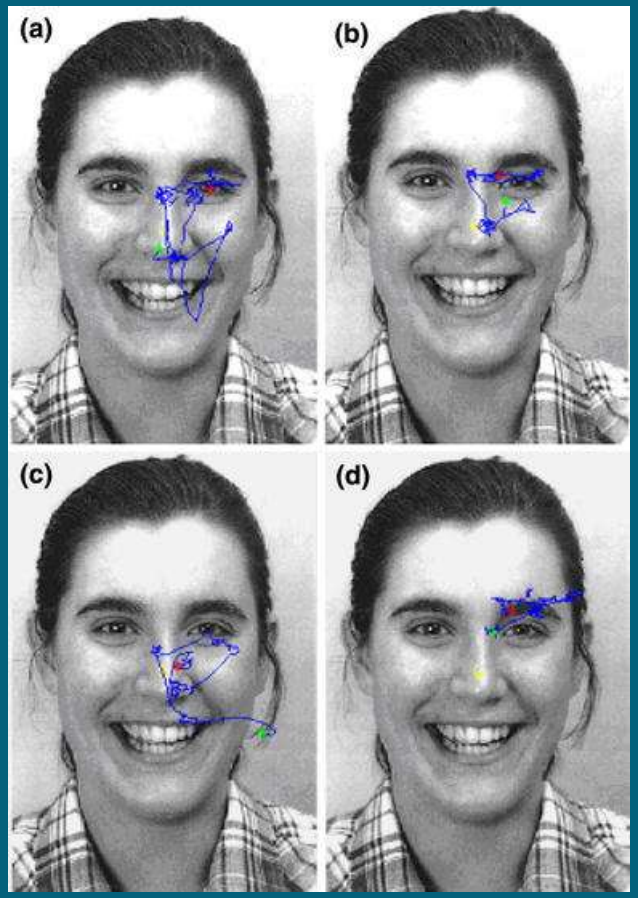
?Failure to develop privileged processing in fusiform cortex

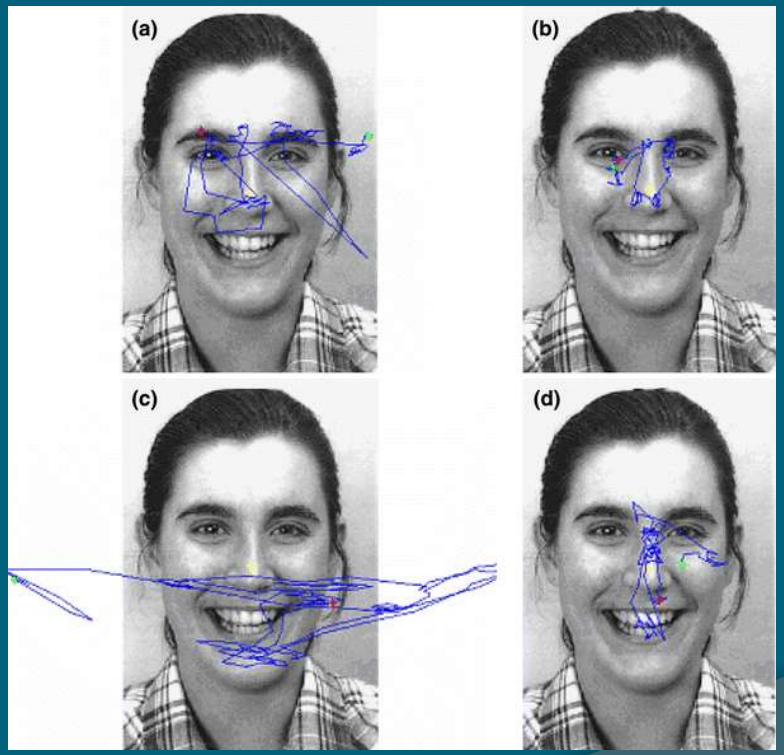
Professor Emmy van Deurzen,
Professor of Psychotherapy

Hadjikhani N, Joseph RM, Snyder J, Chabris CF, Clark J, Steele S et al. Activation of the fusiform gyrus when individuals with autism spectrum disorder view faces. Neuroimage 2004; 22(3):1141-1150.

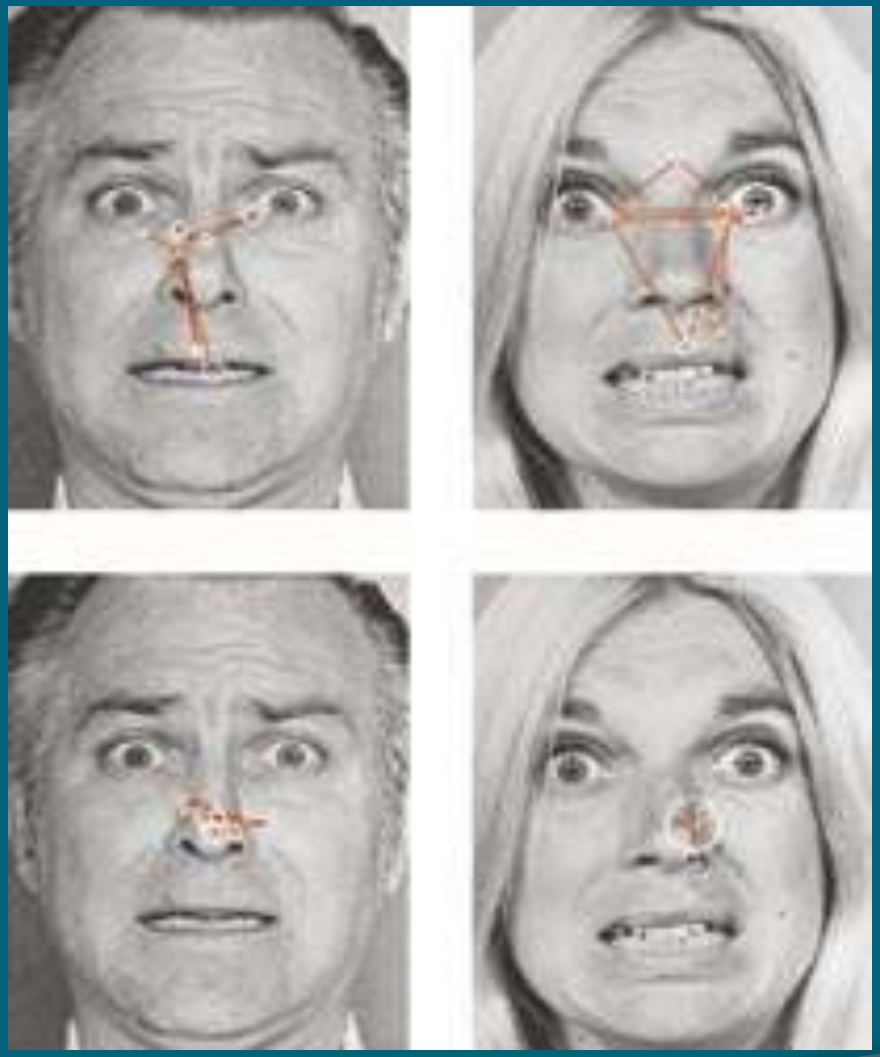


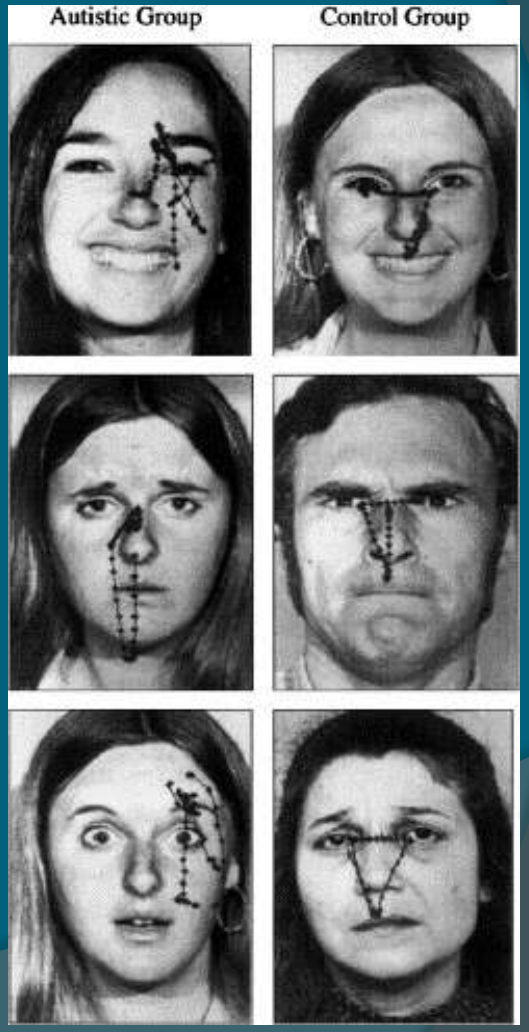
Rutherford M, Towns A. Scan Path Differences and Similarities During Emotion Perception in those With and Without Autism Spectrum Disorders. Journal Of Autism And Developmental Disorders
(left: normal controls; right: AS subjects)





Visual scanpaths of normal control (top) and person with amygdala lesion From Adolphs 'Social brain'





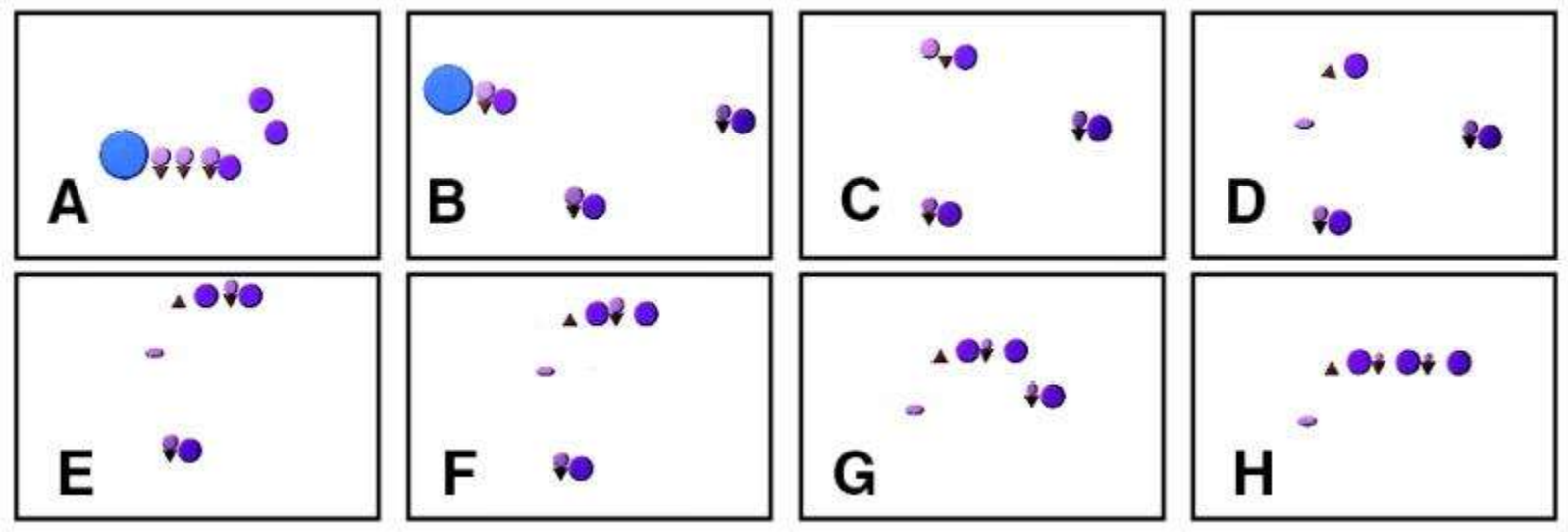
Davies S, Bishop D, Manstead AS, Tantam D. Face perception in children with autism and Asperger's syndrome. J Child Psychol Psychiatry 1994; 35(6):1033-1057

- People with AS remembered sticking plaster better than other facial features e.g. facial expression

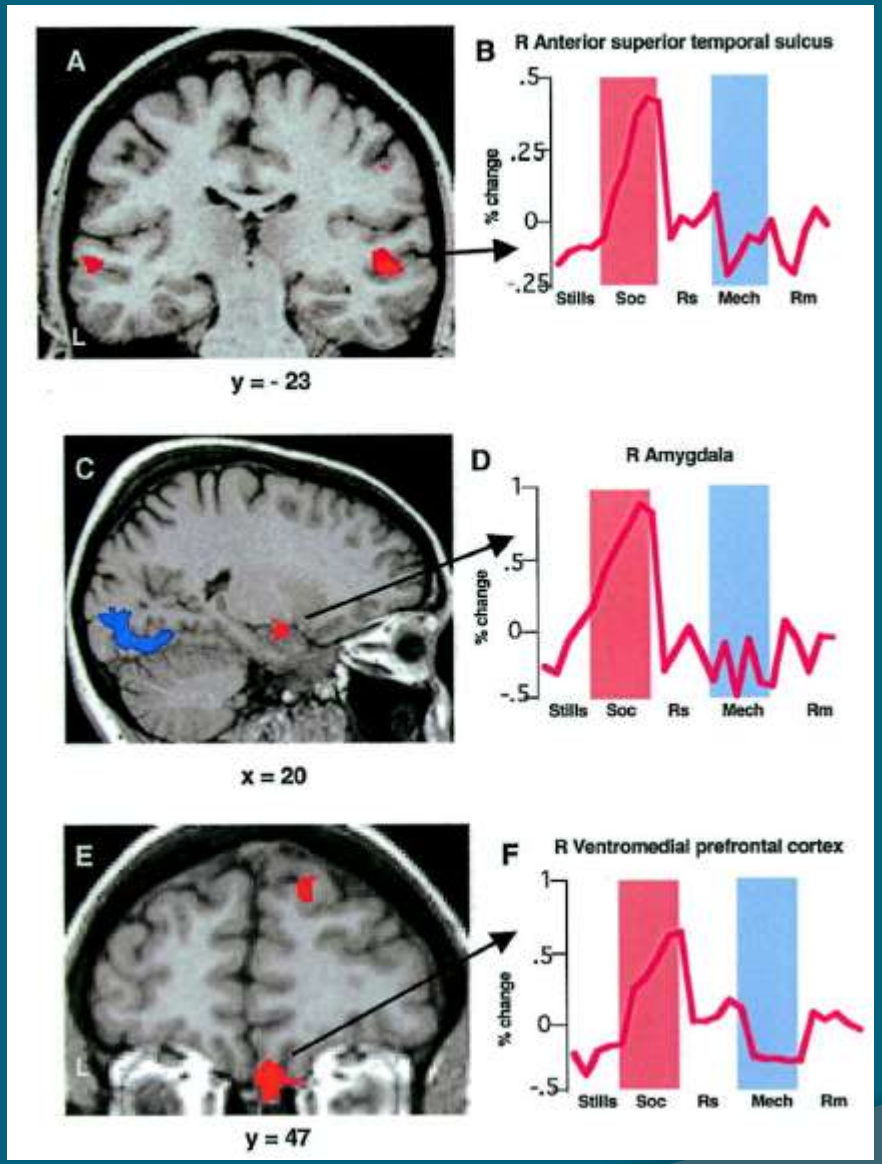
Social brain (Brothers, 1990)

- Location of neurons that respond to social acts by conspecific
- Location of areas activated by another person's gaze
- Location of areas involved in facial expression discrimination
- Common locations for lesions in ASD

Martin A, Weisberg J. Neural foundations for understanding social and mechanical concepts. Cogn Neuropsychol 2003; 20(3-6):575-587.



- Social vignette. Sample frames from a social vignette that elicited the concept of sharing. When viewing this animation, subjects interpreted the small purple circles as children receiving ice cream cones from a parent or adult figure (large blue circle) (panels A and B). In C and D, the first child drops her ice cream. In E and F, another child shares her ice cream with the first child. In G and H, the third child joins the other two and shares her ice cream, as well.


A
L
y = - 23
B
R Anterior superior temporal sulcus
.5
.25
0
-.25
% change
Stills
Soc
Rs
Mech
Rm
C
x = 20
D
R Amygdala
1
.5
0
-.5
% change
Stills
Soc
Rs
Mech
Rm
E
L
y = 47
F
R Ventromedial prefrontal cortex
1
.5
0
-.5
% change
Stills
Soc
Rs
Mech
Rm

Which sweet does Charlie want? (after Wheelwright and Baron-Cohen)

Gaze following 1

- The primary gaze reflex
  - Orientate to other people's eyes (perhaps people with ASD lack this)
  - Not avoid looking directly because of threat
    - (perhaps people with ASD have hypertrophied amygdalae and do this)
    - (perhaps people with ASD cannot combine direct gaze with face signals of friendliness)

Pilot visual evoked potential study (with Richings and Rippon)

- 6/10 adolescents and adults with Asperger syndrome showed no difference in amplitude of P3 on oddball paradigm when looking directly at slide of face with eyes forward
- 5/13 showed no difference in amplitude:
- Weak evidence for a lack of a primary gaze reflex

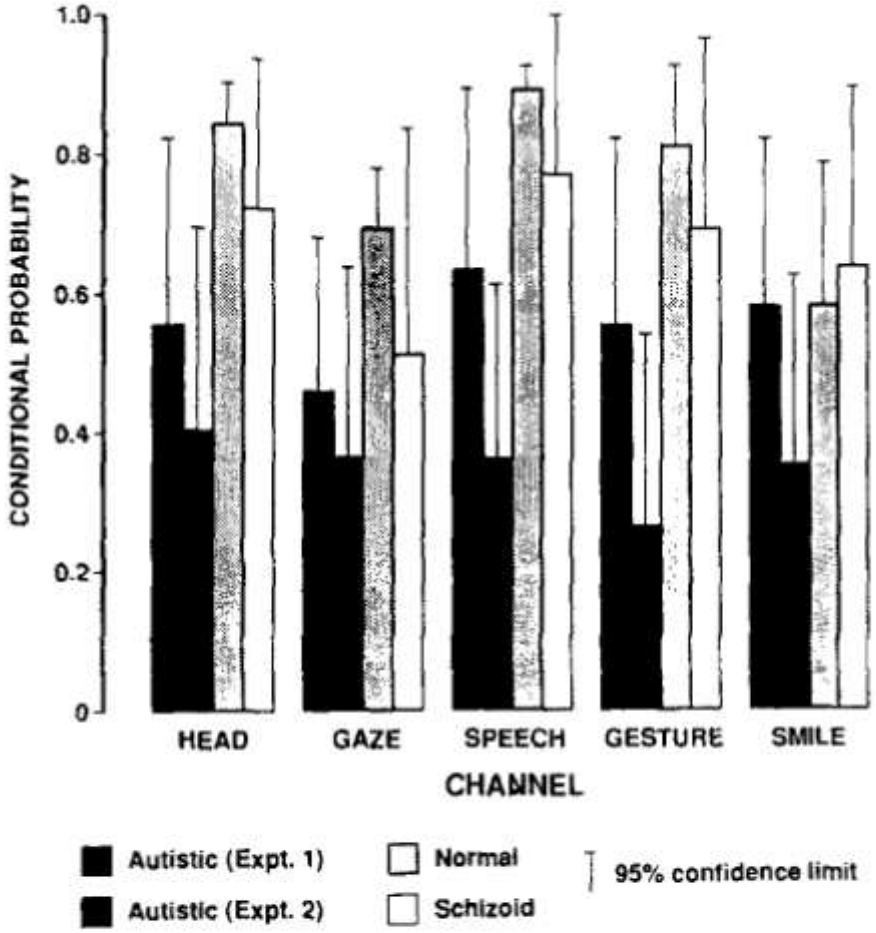


Fig. 1. Mean conditional probability of looking at other's acts (thick bar) with 95% confidence interval (thin bar). In each group, first bar = autistic subjects in Experiment 1, second bar = autistic subjects in Experiment 2, third = normal control, fourth = schizoid control.

Gaze following 2

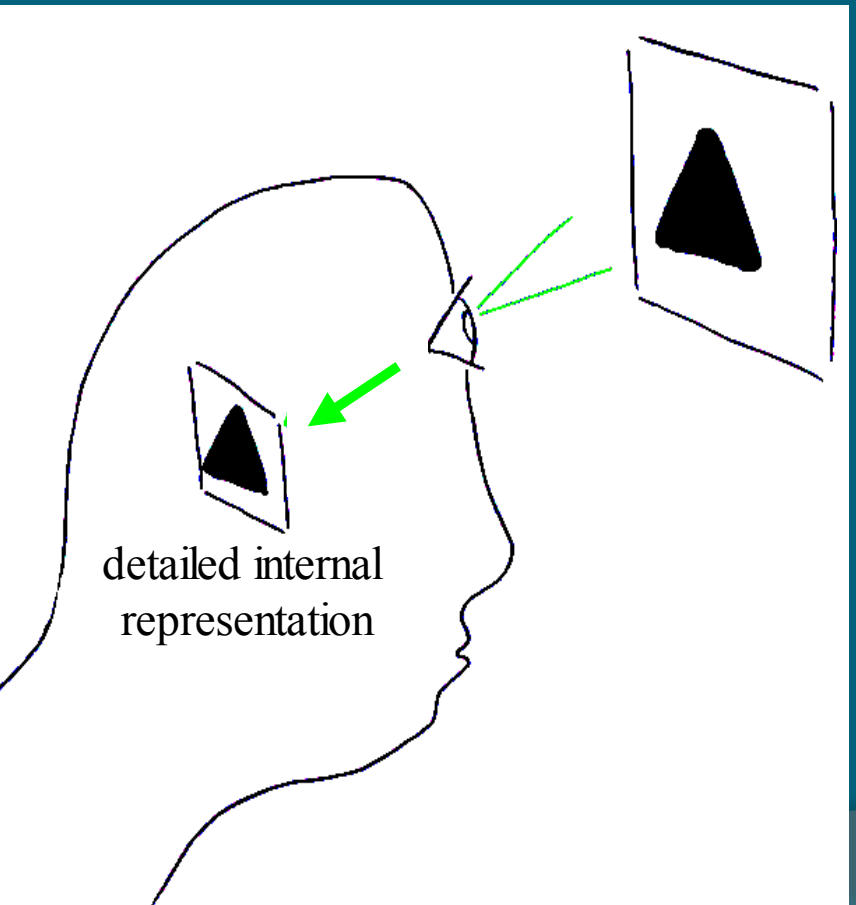
- The secondary gaze reflex
  - Follow the direction of another's gaze
  - Maintain this even if they are not looking at anything salient (non-human primates give up at this point as probably do Corvids who are otherwise good at gaze following)
  - Make the move from sharing the object of their gaze to sharing their thoughts or desires

‘Gaze reflex’

- First: either I look more at another person’s eyes, or I look more when their face is doing something interesting
  - Humans, chimps who have been brought up by humans
  - People with AS do not do this
- Second: I follow their gaze to its conclusion
  - Humans, chimps, parrots, and Corvidae do this too
- Third: backtrack their gaze to their faces to determine what they are making of what they see
  - Only humans known to do this

standard view

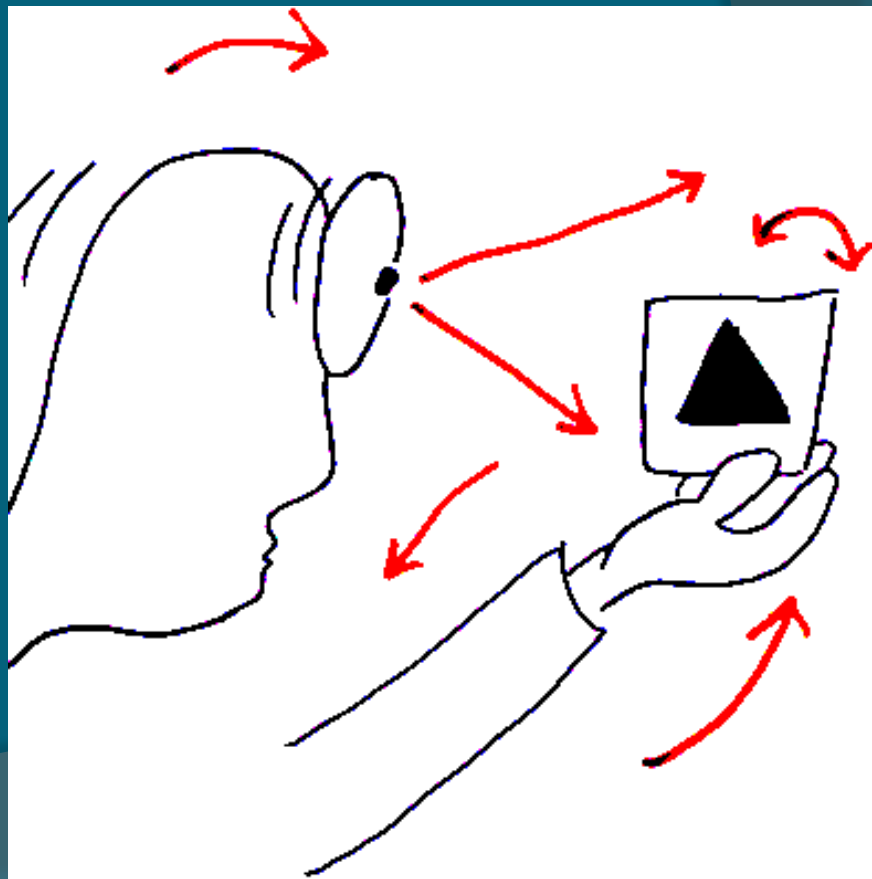
Seeing is making an internal representation



new view (O'Regan, K. and Noe, A.

Laboratoire Psychologie de la Perception
Centre National de la Recherche Scientifique & Université René Descartes - Paris 5)

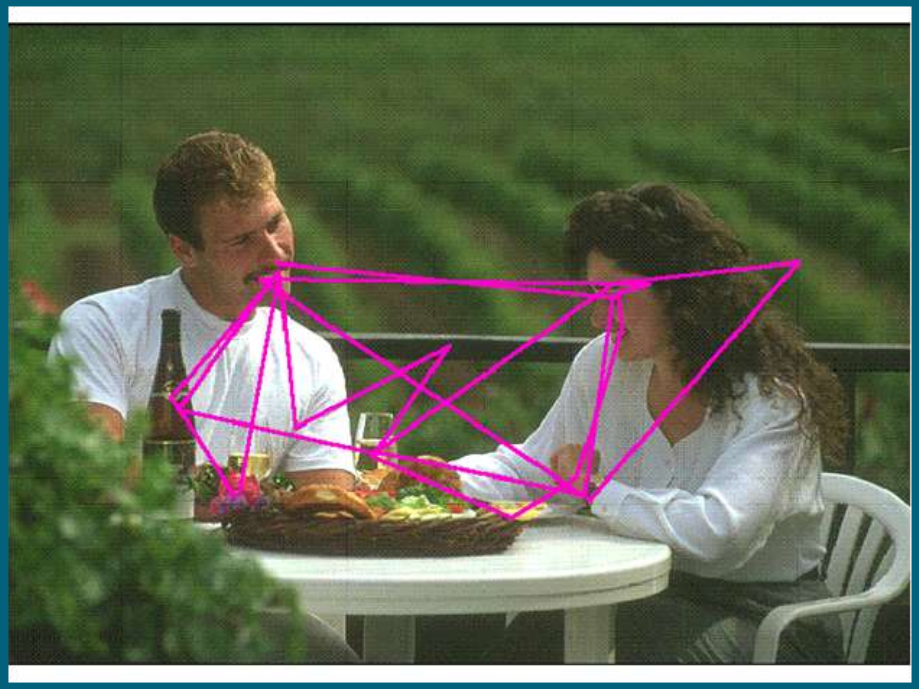
Seeing is visually manipulating

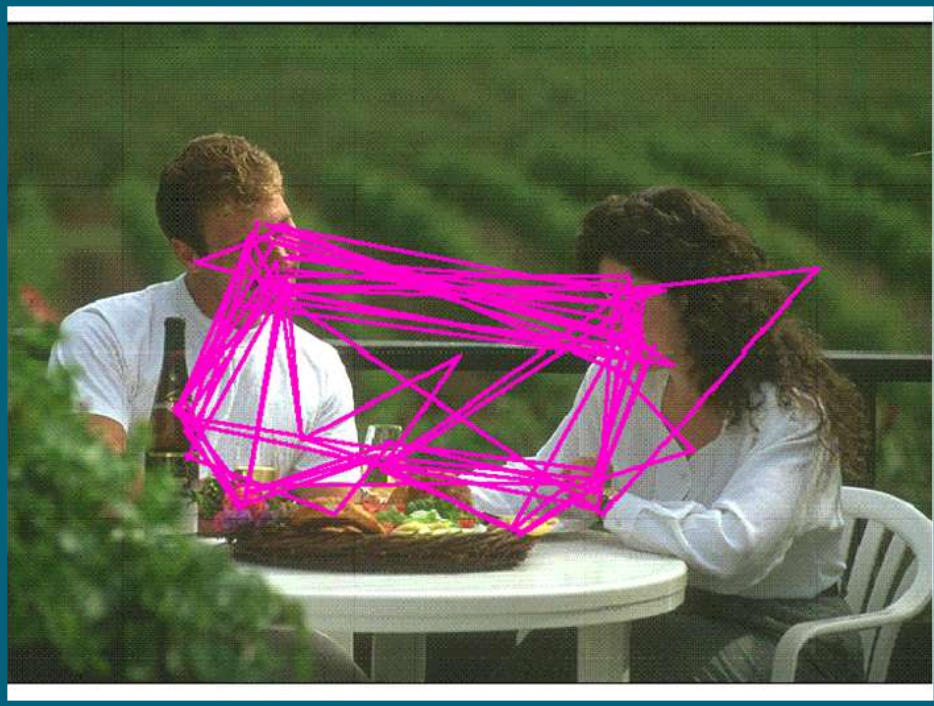


Experience is not something we feel but something we do: a principled way of explaining sensory phenomenology, with Change Blindness and other empirical consequences.

J. Kevin O'Regan , Laboratoire de Psychologie Expérimentale,
Centre National de Recherche Scientifique, Paris, France and Alva Noë , Department of Philosophy ,
University of California, Santa Cruz

Talk given at the ASSC Conference:
THE UNITY OF CONSCIOUSNESS: BINDING, INTEGRATION, AND DISSOCIATION
Brussels, June 29-July 2, 2000





123456

Hong Kong is great

There were two pictures of a couple and a title on the previous slide:
what else was there?

Experience is not something we feel but something we do: a principled way of explaining sensory phenomenology, with Change Blindness and other empirical consequences.

J. Kevin O'Regan , Laboratoire de Psychologie Expérimentale,
Centre National de Recherche Scientifique, Paris, France and Alva Noë , Department of Philosophy ,
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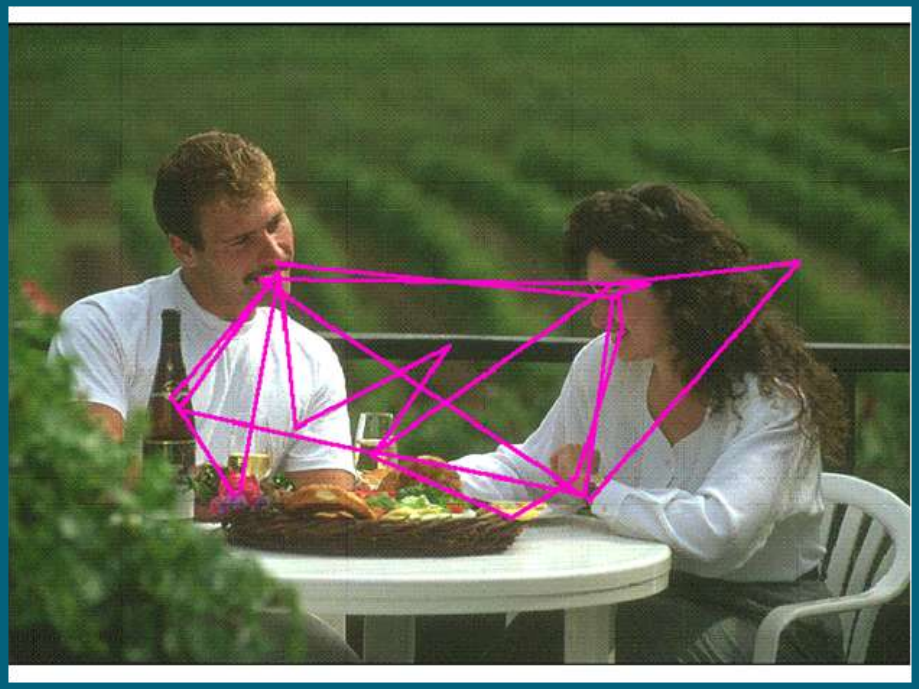

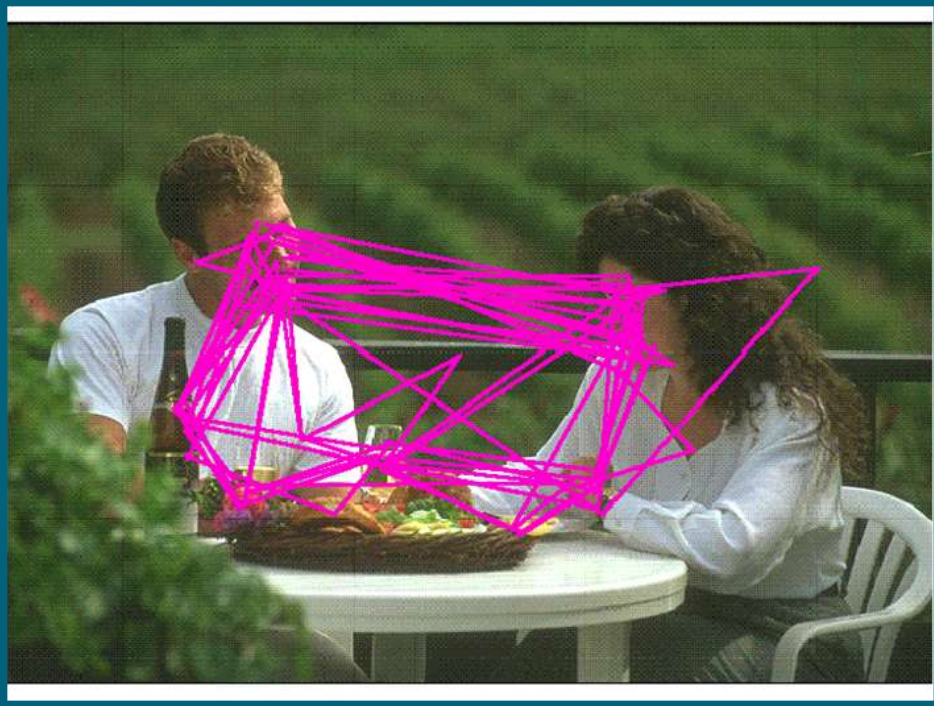

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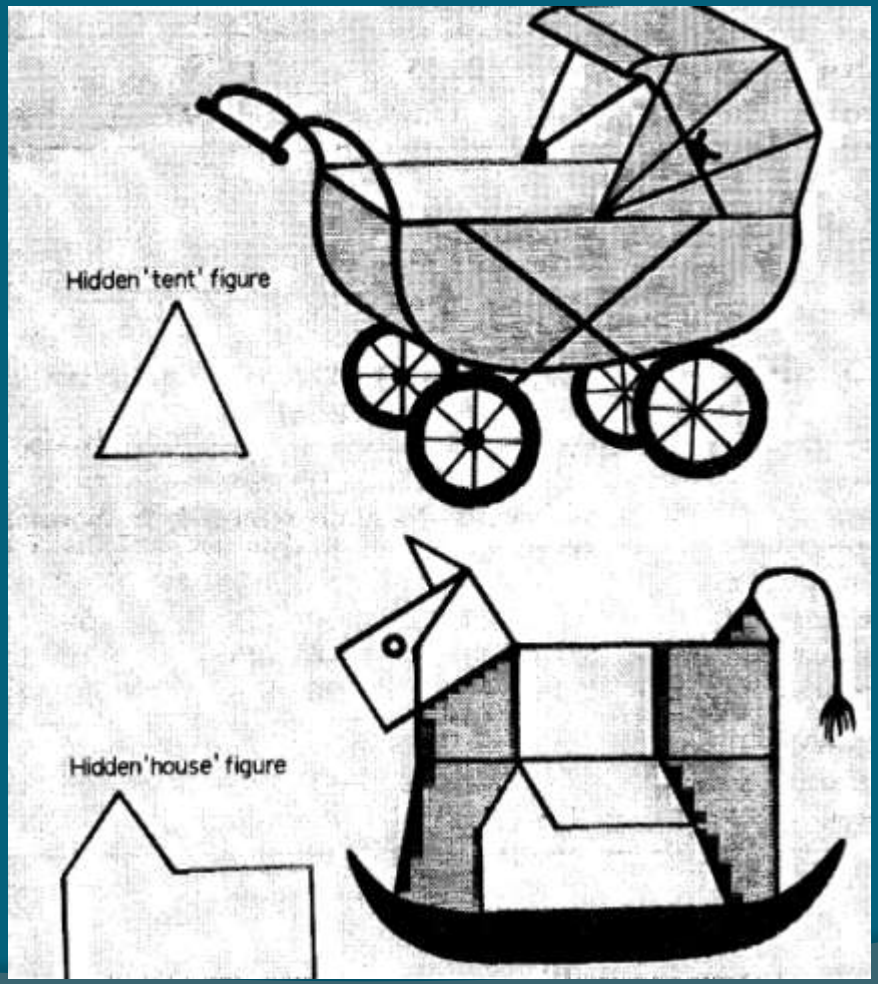
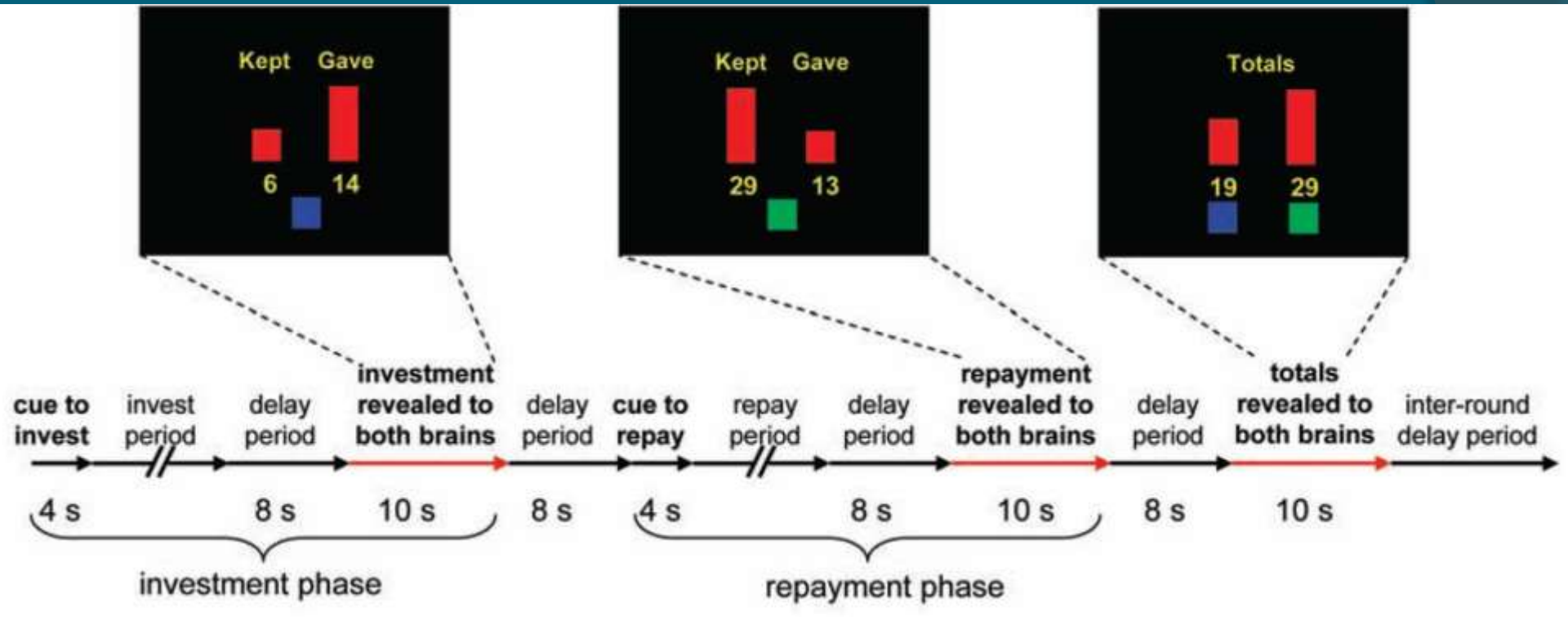
Hong Kong is great

Uta Frith and lack of central coherence

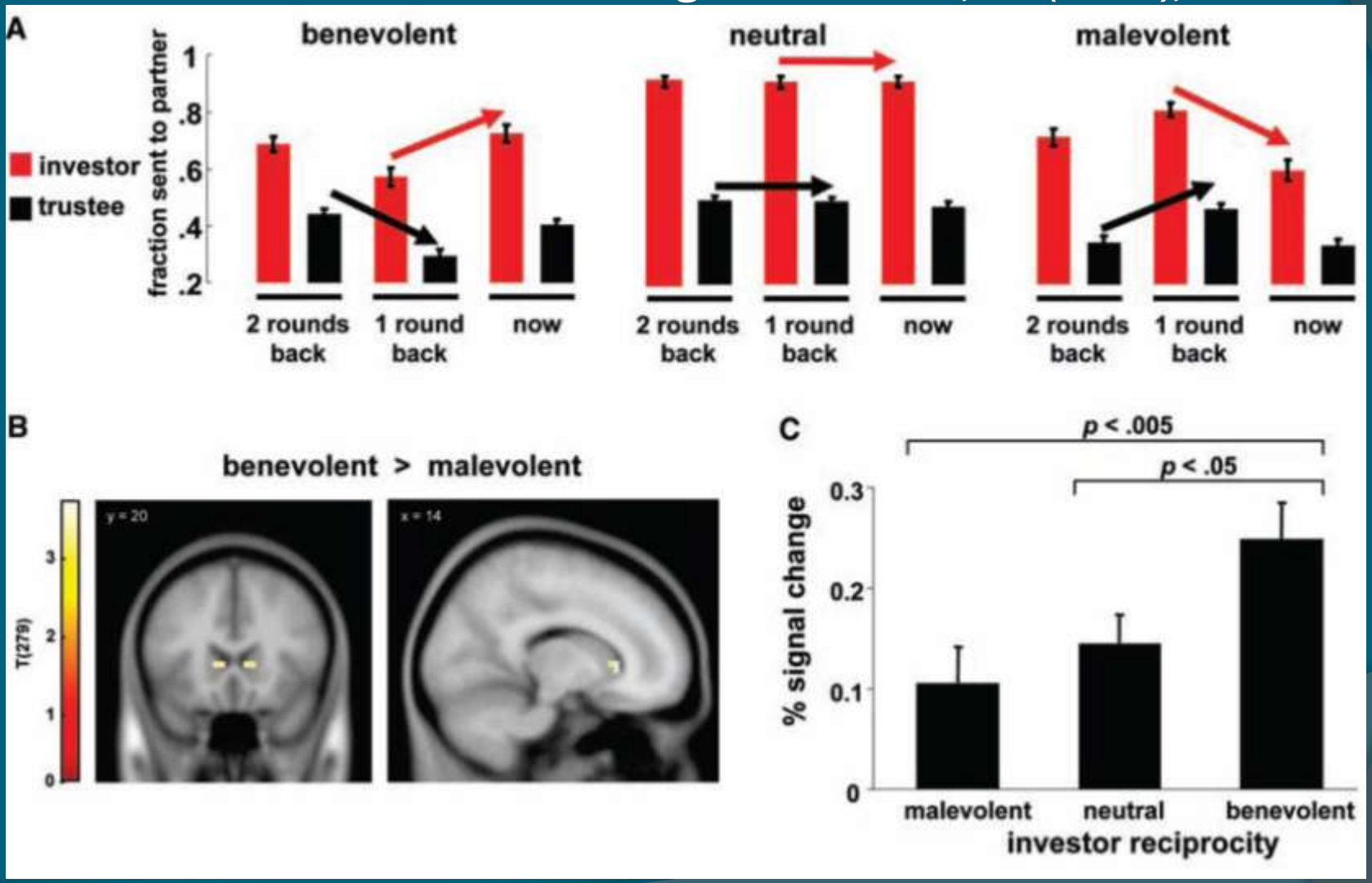


- Shah, A., & Frith, U. (1983). **An islet of ability in autistic children: a research note.** Journal of Child Psychology and Psychiatry, 24, 613-620.Figure ground slide

Brooks King-Casas, *et al.* **Getting to Know You: Reputation and Trust in a Two-Person Economic Exchange** *Science 308, 78 (2005);*

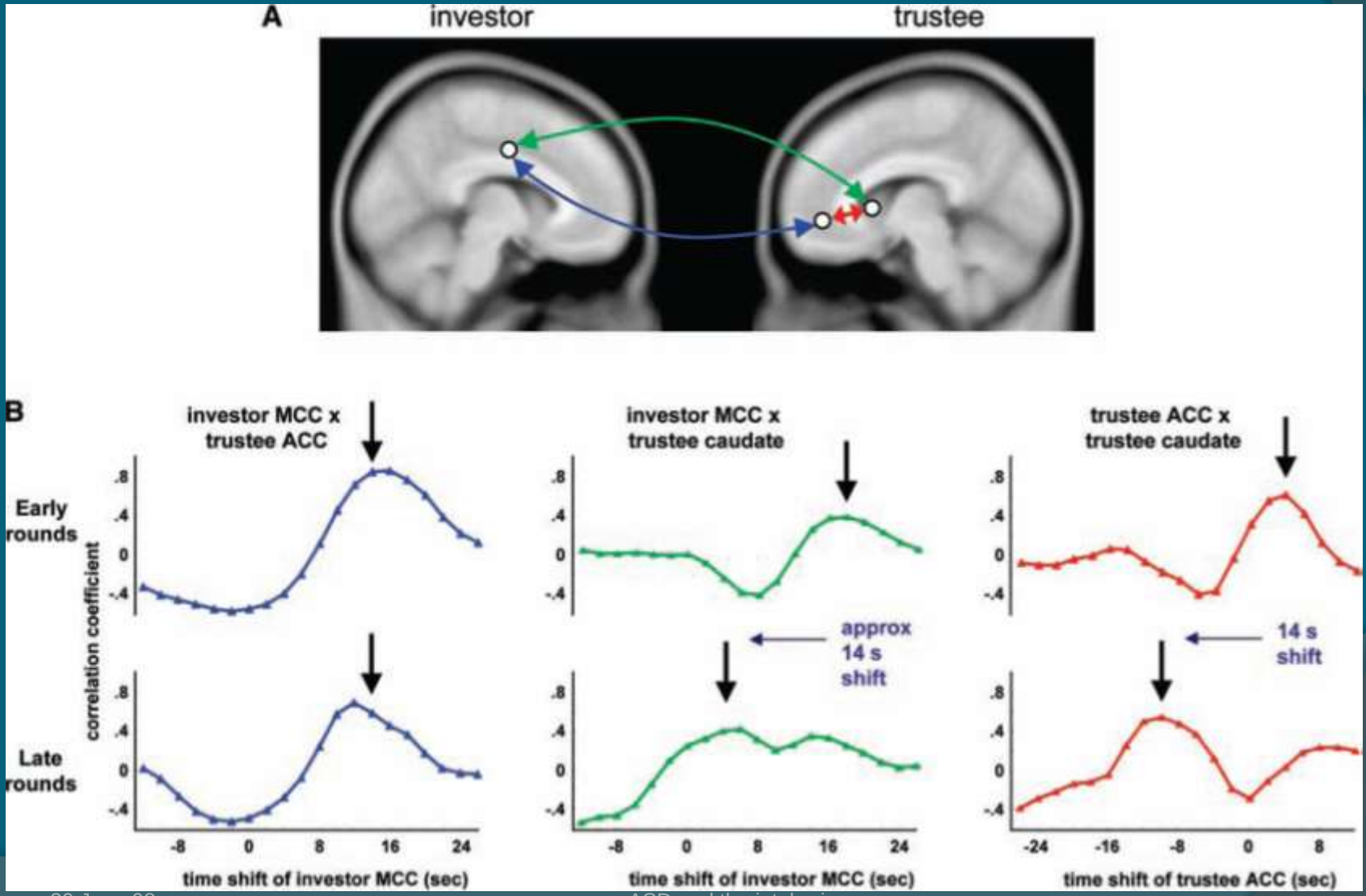


Head of caudate activated by benevolence : 'intention to trust'
Brooks King-Casas, *et al.* **Getting to Know You: Reputation and Trust in a Two-Person Economic Exchange** *Science 308, 78 (2005);*



Cingulate cortex activated when investment decision revealed: anteriorly in investor, medially in trustee

Brooks King-Casas, *et al.* **Getting to Know You: Reputation and Trust in a Two-Person Economic Exchange** *Science* ***308, 78 (2005)***



The interbrain

- Extended cognition
- Automatic processing
- Reflexive vs. reflective processing
- ‘The borg’
- Is there an interbrain?
- Is the bandwidth reduced or zero in people with ASD?
- I think so

Coping with a lack of identity

- Fads
- ‘Obsessive’ relationships
- Lack of identity in many people with ASD
  - Adopting identity wholesale
  - Joining charismatic groups
  - Moving places and work
- Searching for identity
  - ‘Transexualism’
  - ‘Aspie’
- Identities off the peg
  - Gangster
  - Professor
  - Teddy bear

THE END

www.aspergersyndrome.info

www.dilemmas.org