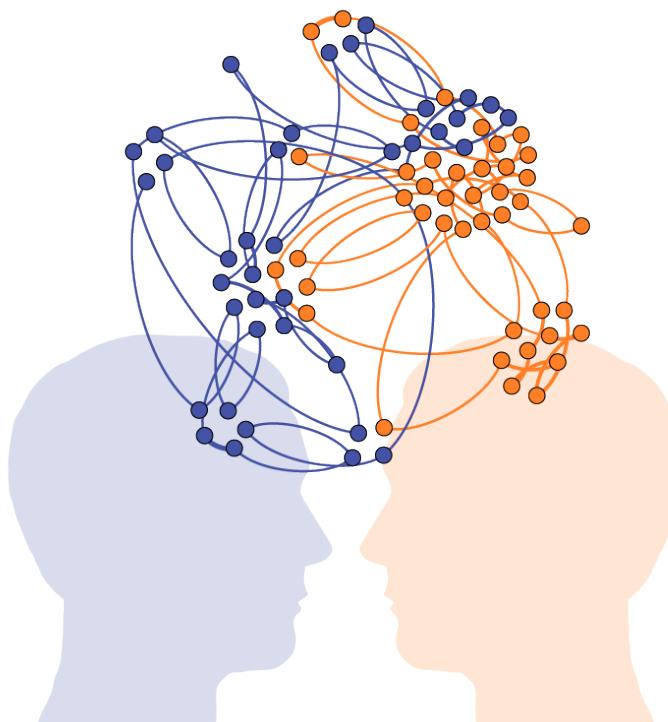


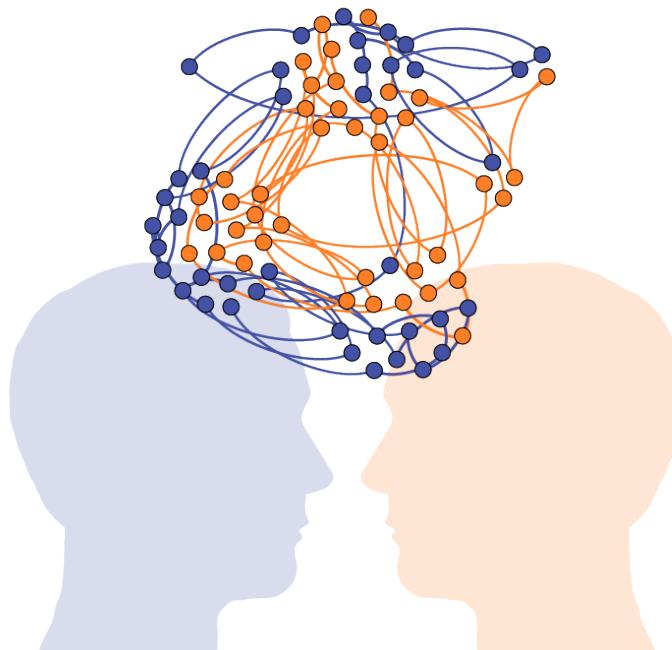
Mind blind?



# Psychiatry of Social Cognition



ASD interaction space



Neurotypical interaction space

# 1. Autism spectrum disorder

Clinical picture, brain overgrowth, causes and courses

# 2. Mind blindness

Theory of Mind in Autism, empirical failures

# 3. Communication deficits

Contingent discourse, communicative alignment

## Clinical picture

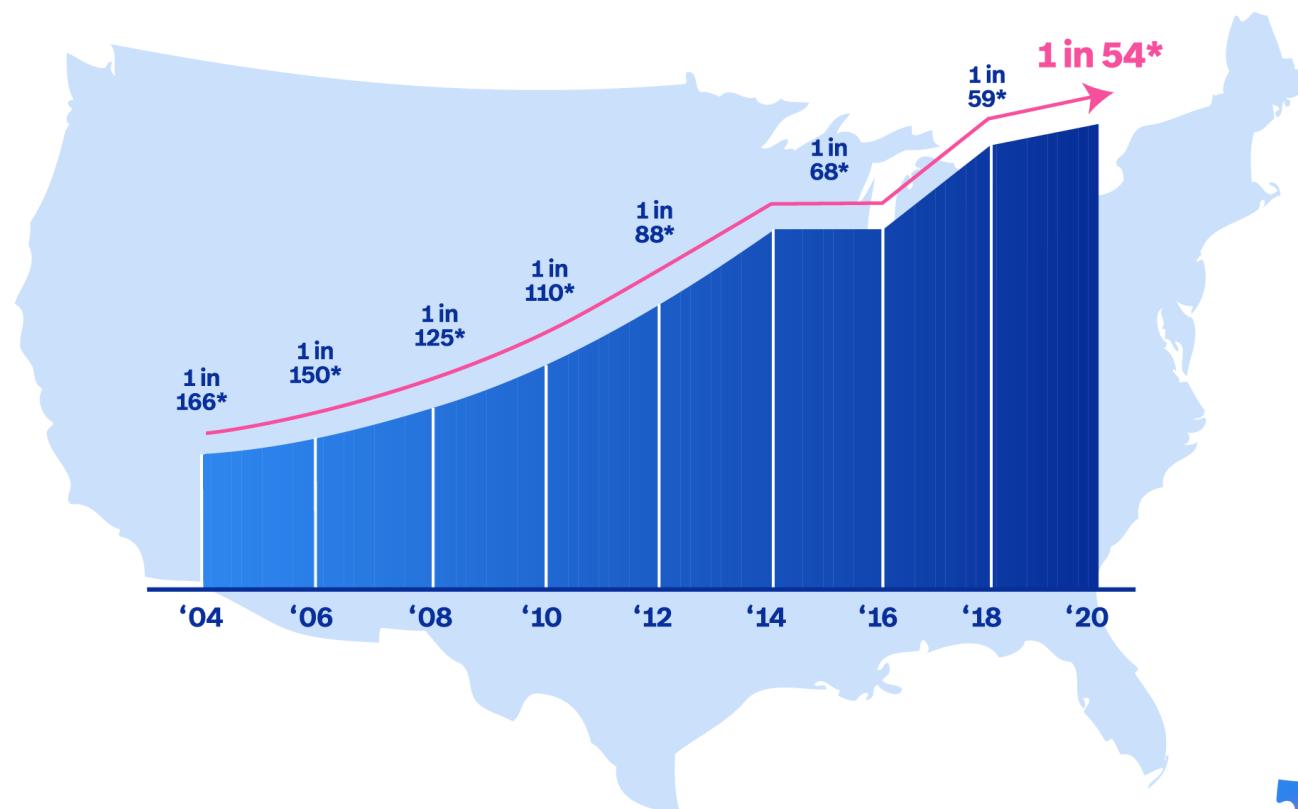
- Leo Kanner, *Autistic Disturbances of Affective Contact* (1943); Hans Asperger, *Autistic Psychopathy in Childhood* (1944)
- DSM5:
  - Social-communication deficits
  - Fixated interests / repetitive behaviors
  - Hypo- / hyperreactivity to sensory stimuli
- Present day: heterogeneous disorder, huge range in symptom severity, several co-morbidities, multiple causes and courses



Asperger's is a high-functioning form of autism



## Estimated Autism Prevalence 2020



\* Centers for Disease Control and Prevention (CDC) prevalence estimates are for 4 years prior to the report date (e.g. 2020 figures are from 2016)

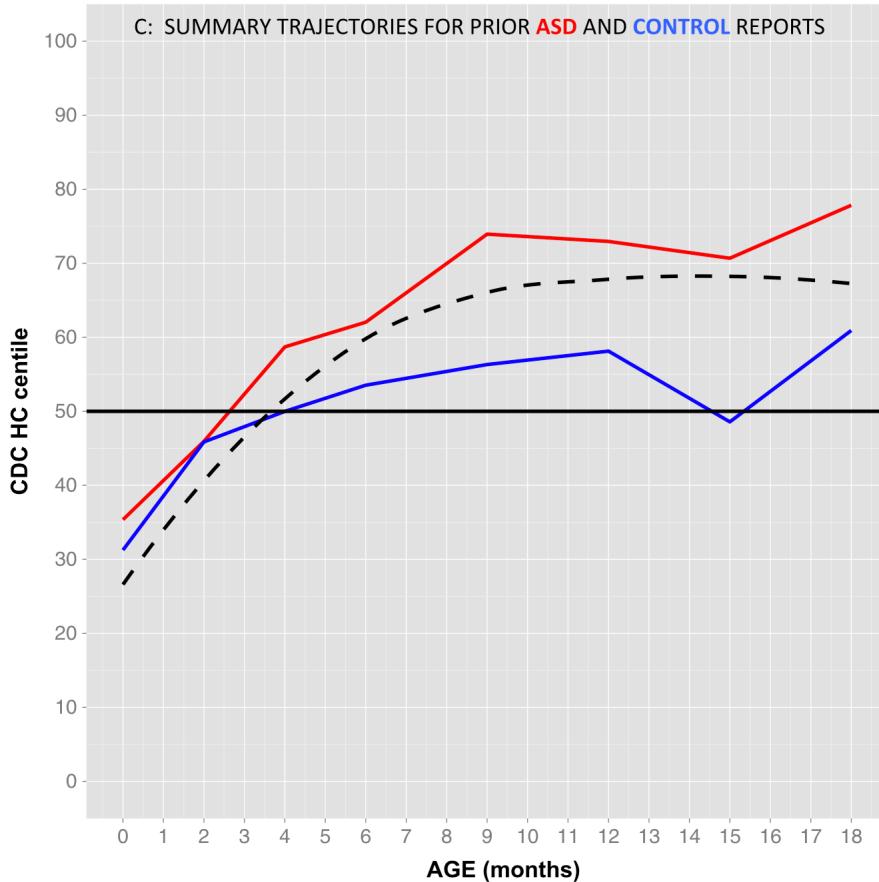


Awareness, changing criteria, and parental age account for the rise in prevalence

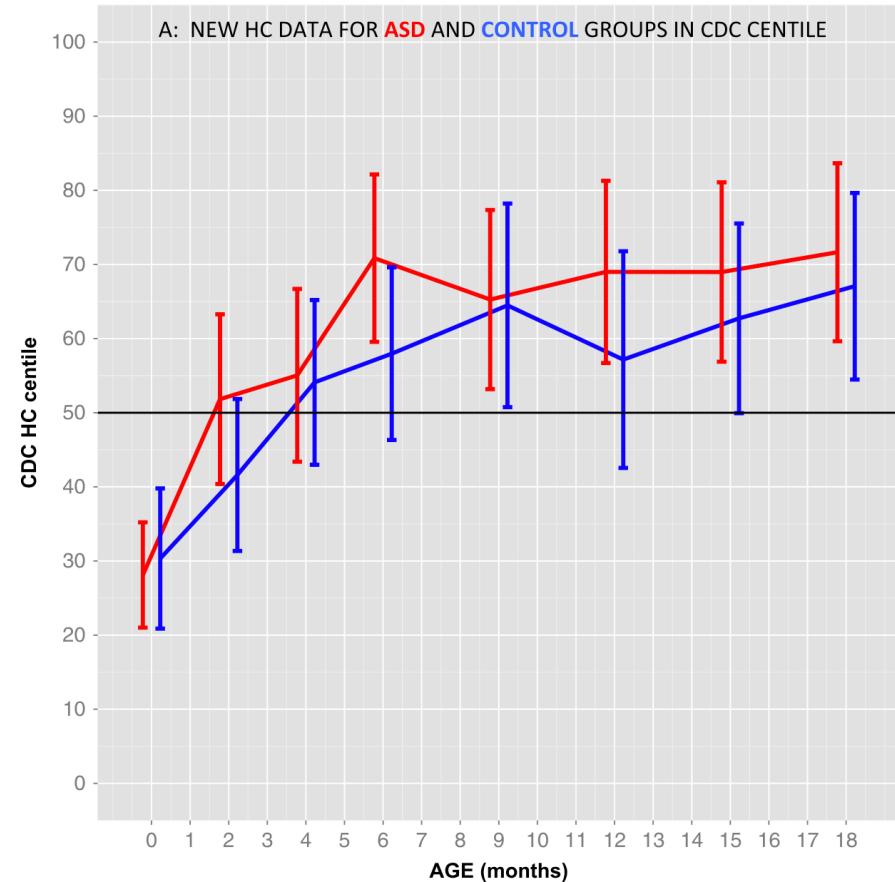


## Brain overgrowth

## Head circumference growth



## Adjusted for population norm



**Compared to What? Early Brain Overgrowth in Autism and the Perils of Population Norms**

Armin Raznahan, Gregory L. Wallace, Ligia Antezana, Dede Greenstein, Rhoshel Lenroot, Audrey Thurm, Marta Gozzi, Sarah Spence, Alex Martin, Susan E. Swedo, and Jay N. Giedd

Observations of head/brain alterations have a hard time replicating

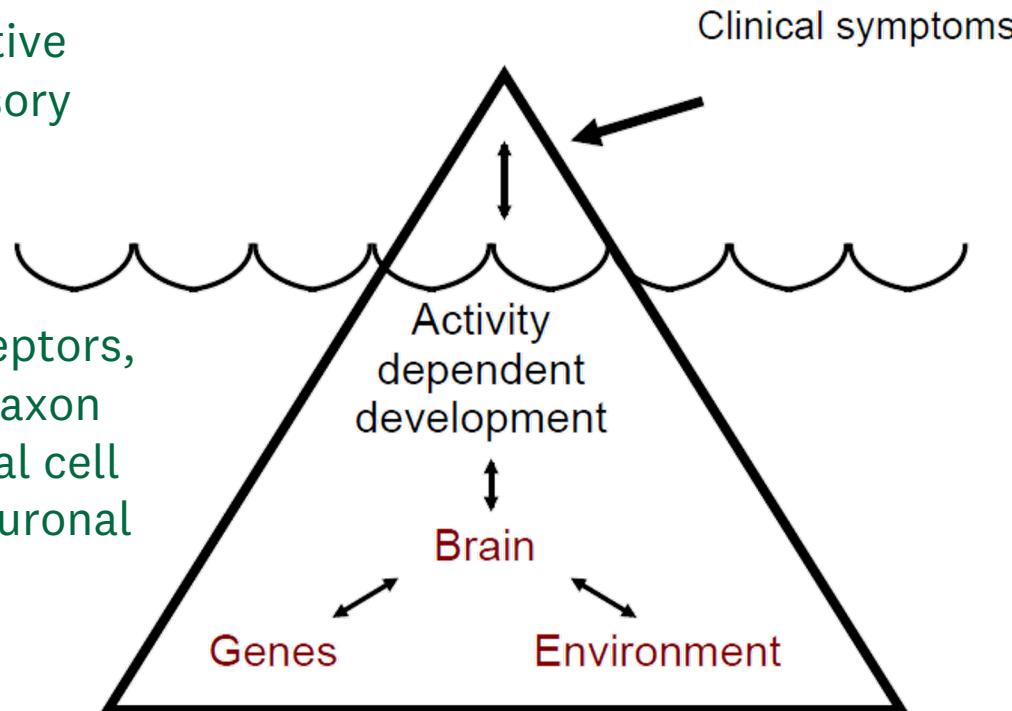


## Causes and courses

social-communication  
deficits, repetitive  
behaviors, sensory  
sensitivity

voltage-gated receptors,  
synaptogenesis, axon  
guidance, neuronal cell  
differentiation, neuronal  
outgrowth

oxytocin, GABA-A,  
glutamate, serotonin  
receptor and transporter  
genes



Compensatory  
processes may  
mask primary  
deficits

Symptoms are a mixed bag of primary causes and developmental trajectory

# 1. Autism spectrum disorder

Clinical picture, brain overgrowth, causes and courses

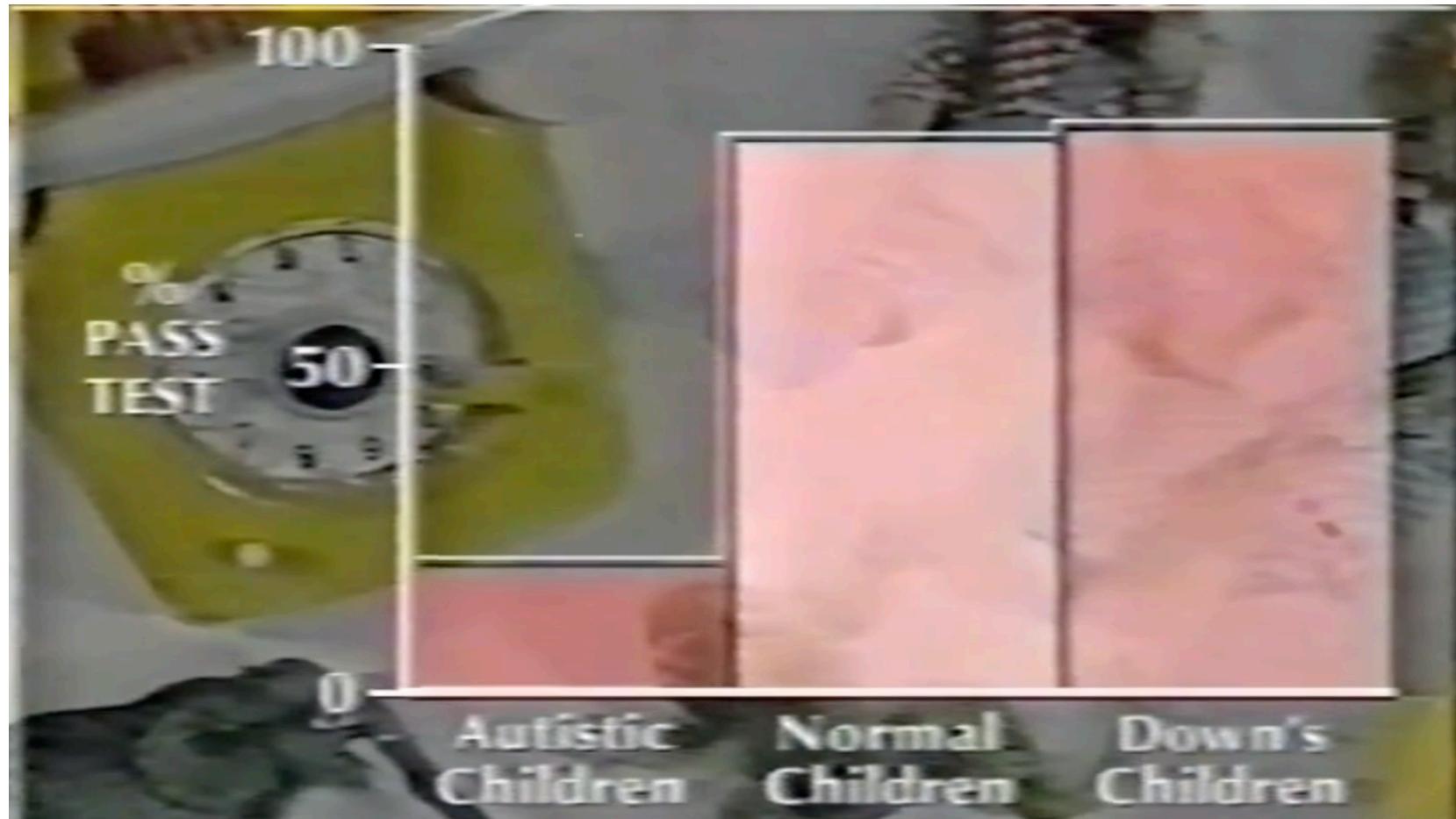
# 2. Mind blindness

Theory of Mind in Autism, empirical failures

# 3. Communication deficits

Contingent discourse, communicative alignment

# Theory of Mind in Autism



Does the autistic child have a "theory of mind"?\*



# Theory of Mind in Autism

The Role of Age and Verbal Ability in the Theory of Mind Task Performance of Subjects with Autism

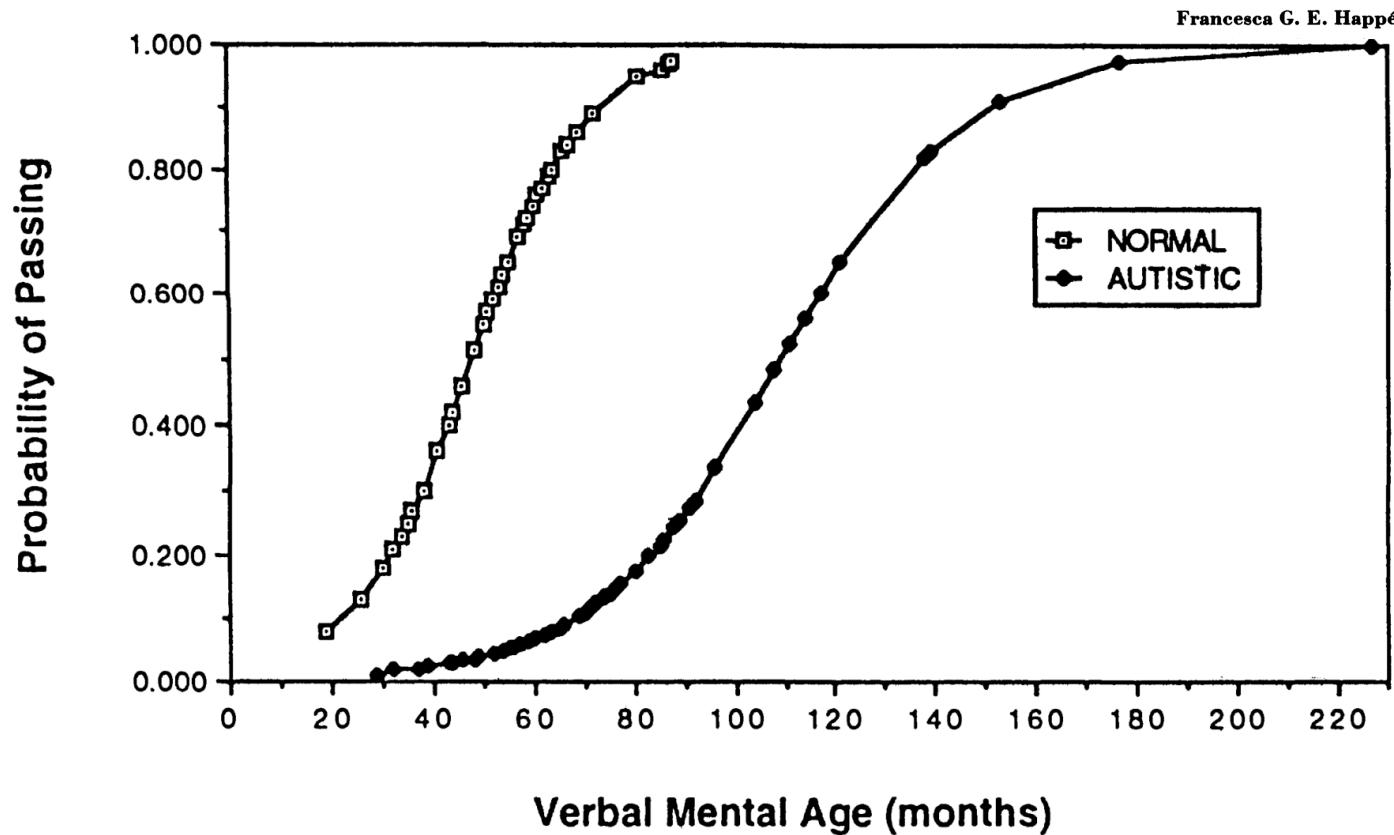
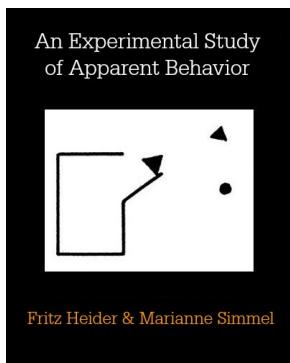
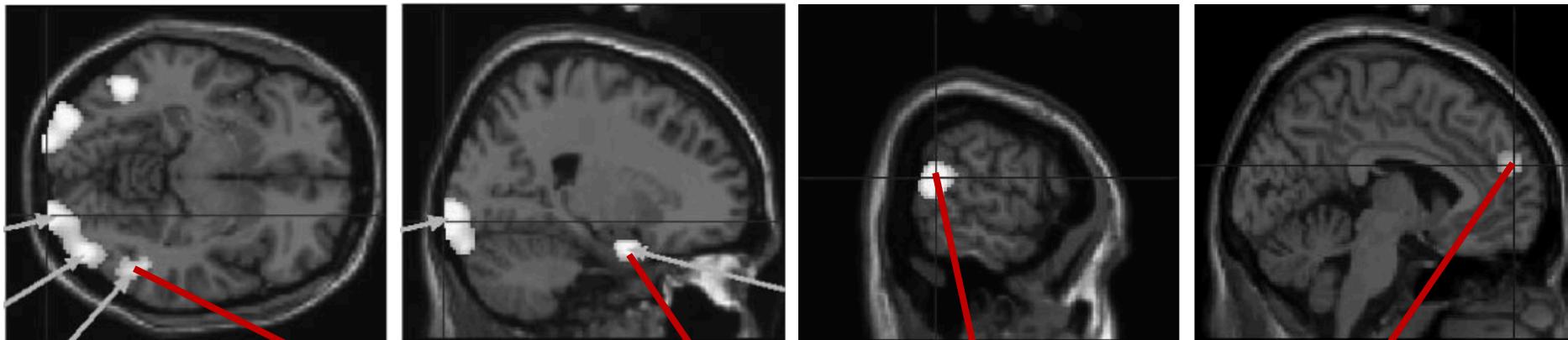


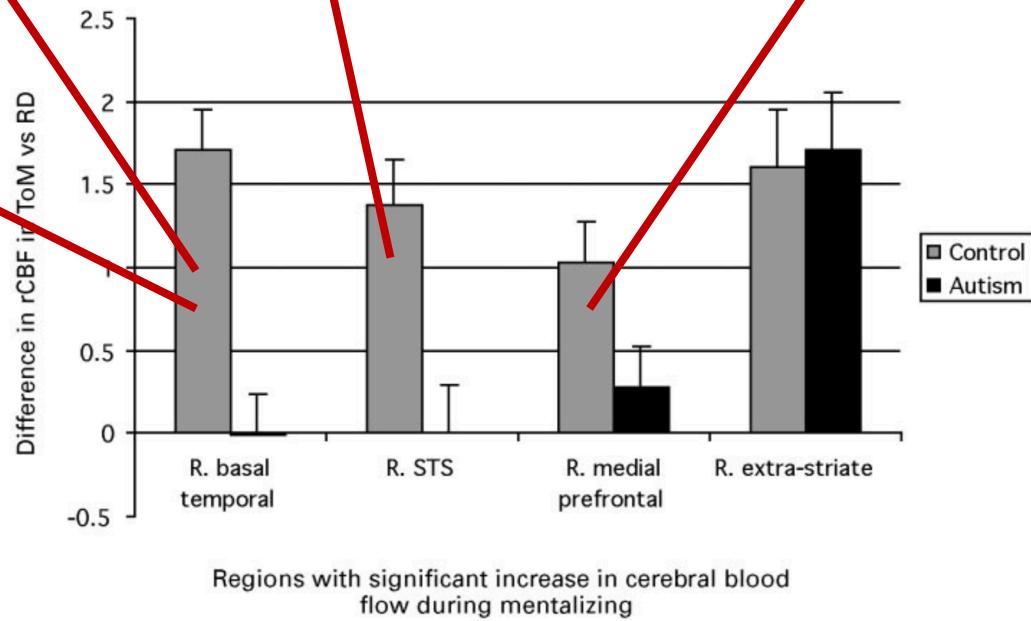
FIG. 1.—Predicted probability of passing both theory of mind tasks by verbal mental age (for autistic and young normal subjects).

Verbal mental age is a strong predictor of false-belief task performance

# Theory of Mind network activation



Autism, Asperger syndrome and brain mechanisms  
for the attribution of mental states to animated  
shapes



**Autistic people show less activation in the Theory of Mind network**

# A note of caution

Empirical Failures of the Claim That Autistic People Lack a Theory of Mind

Morton Ann Gernsbacher  
University of Wisconsin—Madison

Melanie Yergeau  
University of Michigan

## Specificity

Autistic children are not unique in failing false-belief tasks; so too do children with specific language impairment, Down syndrome, and so on. Overall, the more atypical the child, the more likely they are to fail false-belief tasks

## Universality

Vocabulary and grammar account for nearly three fourths of the variance in individuals' performance, suggesting theory-of-mind tasks capture language rather than social deficits in autism

## Replicability

The pooled effect size of over a dozen direct replications not only overlaps zero, but also fails to overlap the pooled effect size of the seminal studies, which had precariously small sample sizes

## Convergent validity

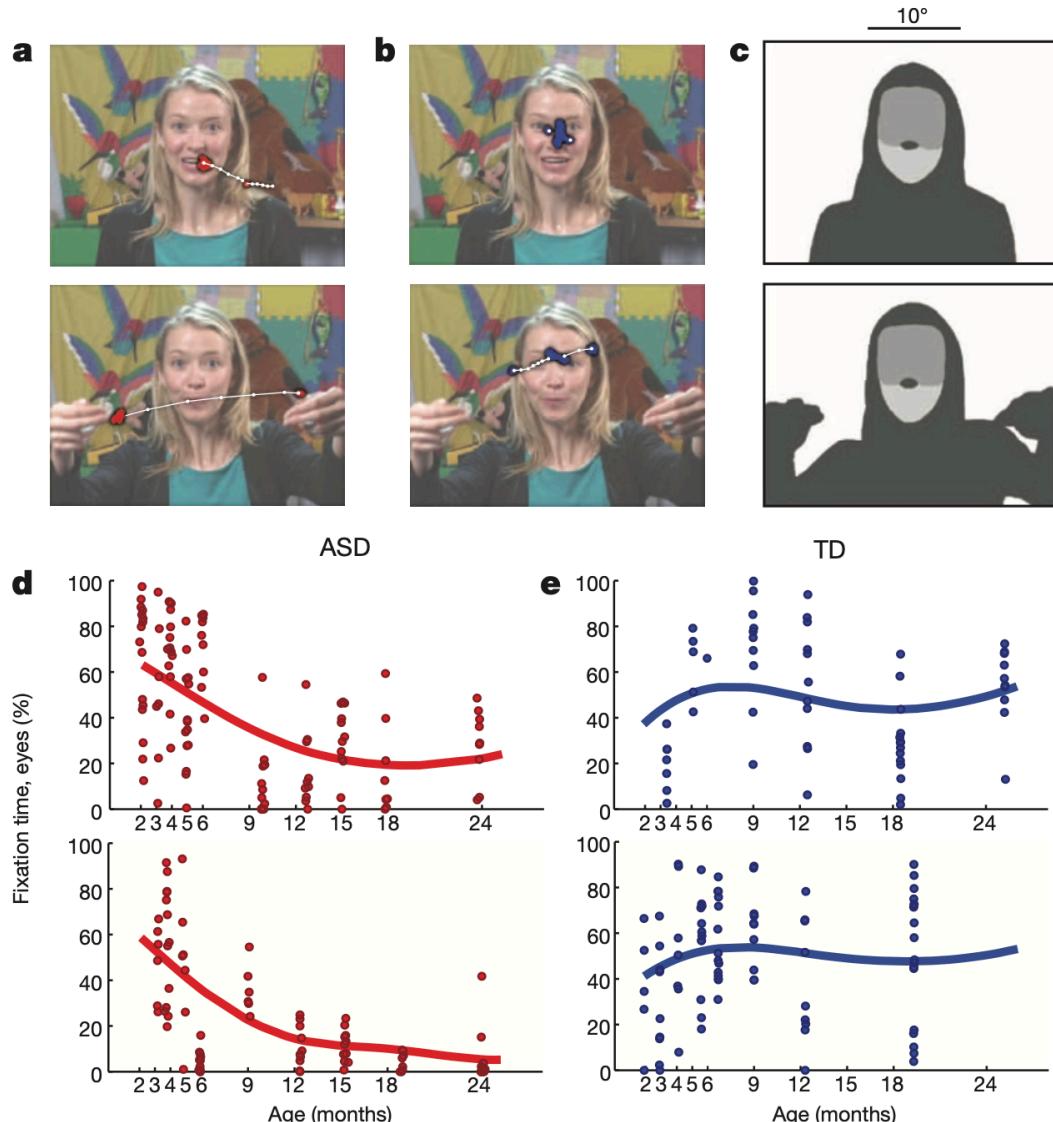
The several tasks that have been proposed to assess theory of mind fail to correlate significantly with one another, undermining the core construct validity of theory of mind

**Empirical failures of the claim that autistic people lack a Theory of Mind**

# Early indicators of social disability

Attention to eyes is present but in decline in 2–6-month-old infants later diagnosed with autism

Warren Jones<sup>1,2,3</sup> & Ami Klin<sup>1,2,3</sup>



Eye looking is not immediately diminished in infants later diagnosed with autism

# 1. Autism spectrum disorder

Clinical picture, brain overgrowth, causes and courses

# 2. Mind blindness

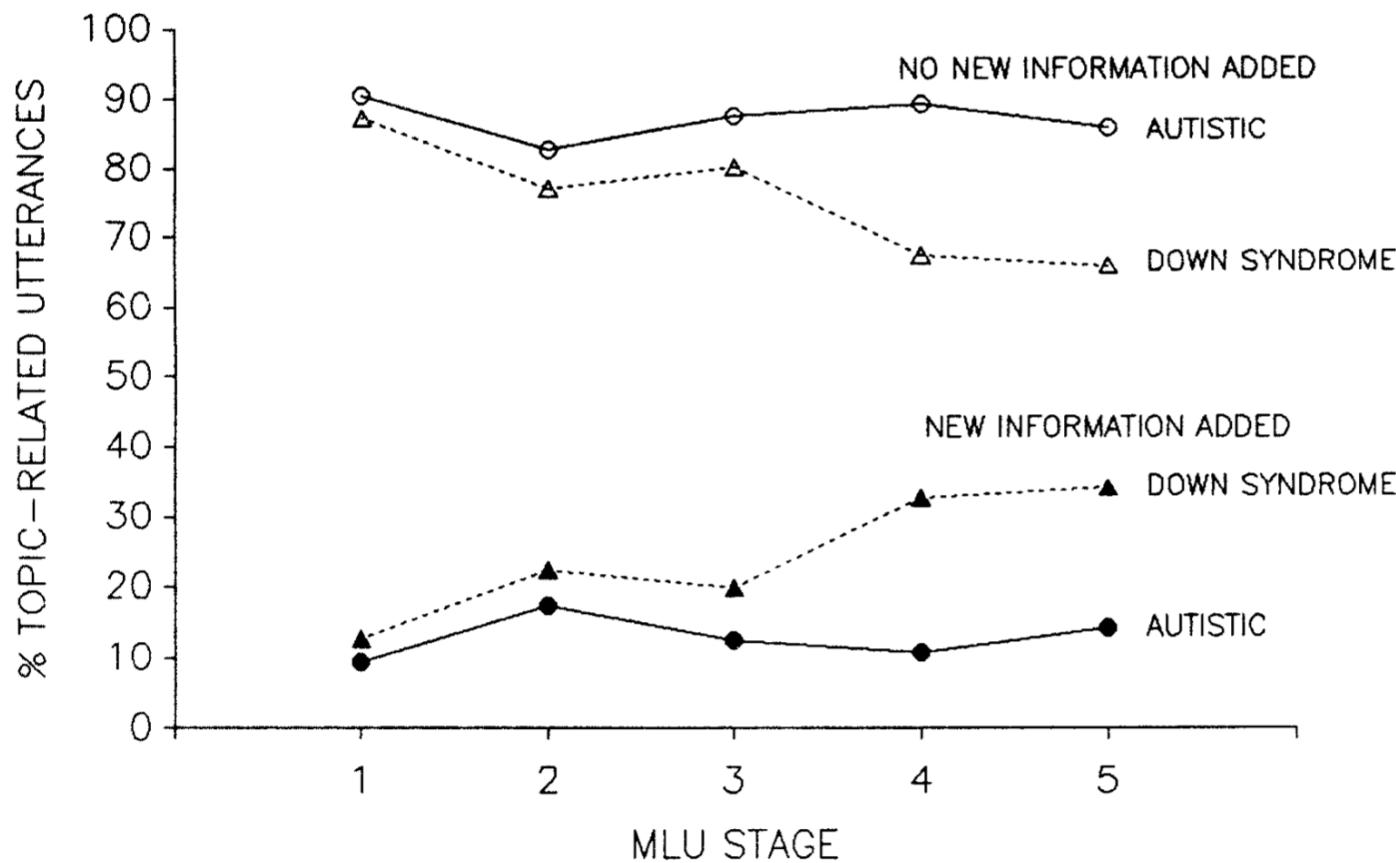
Theory of Mind in Autism, empirical failures

# 3. Communication deficits

Contingent discourse, communicative alignment



## Contingent discourse

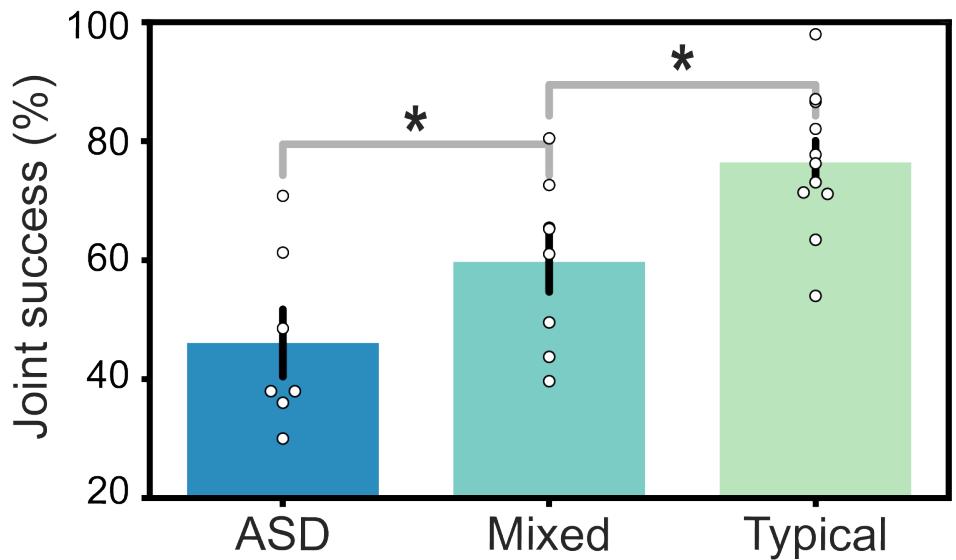


**Fig. 3. Distribution of topic-related utterances that do and do not add new information.**

The Development of Contingent Discourse  
Ability in Autistic Children

# Communication deficits

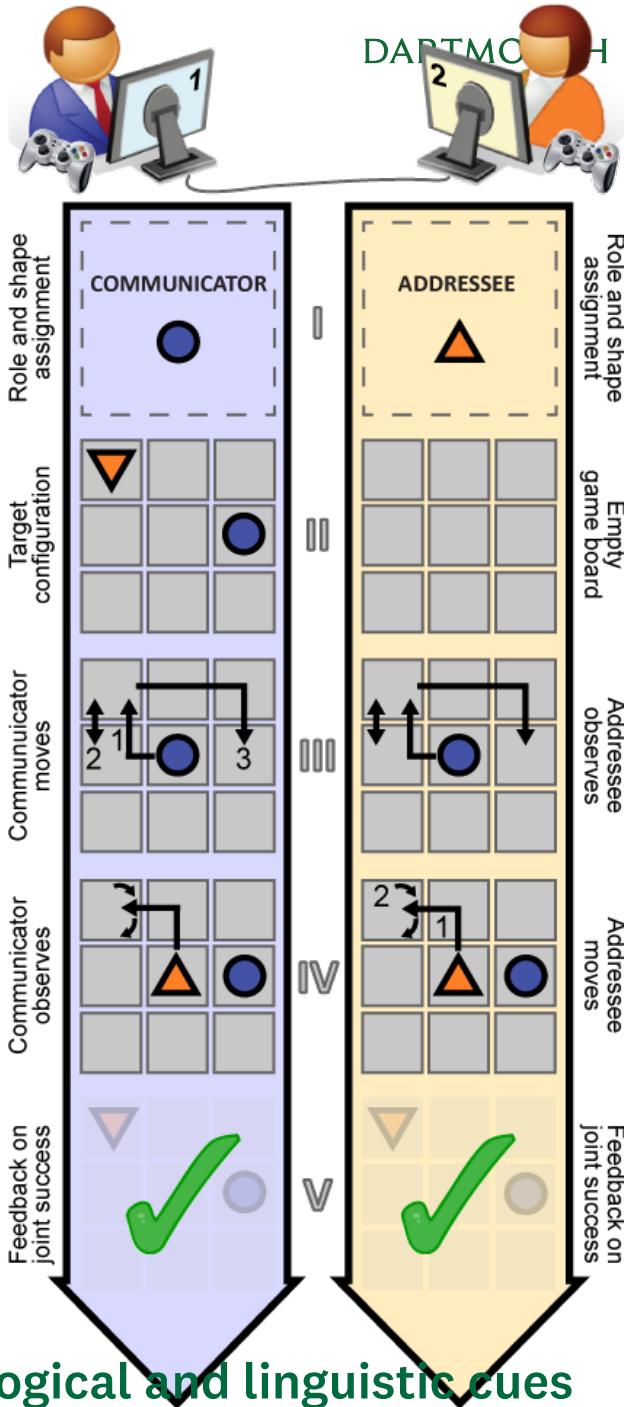
- Open-ended communicative interactions
- Stripped of face-to-face contact and verbal demands, purported causes of ASD social-communication deficits



Communicative misalignment in Autism Spectrum Disorder

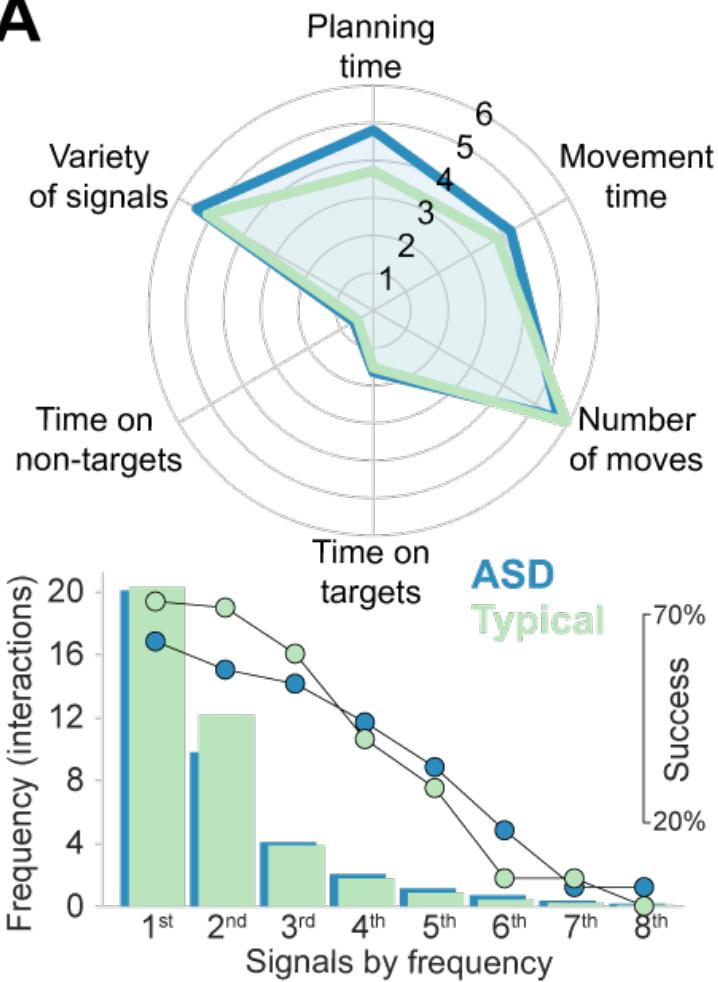
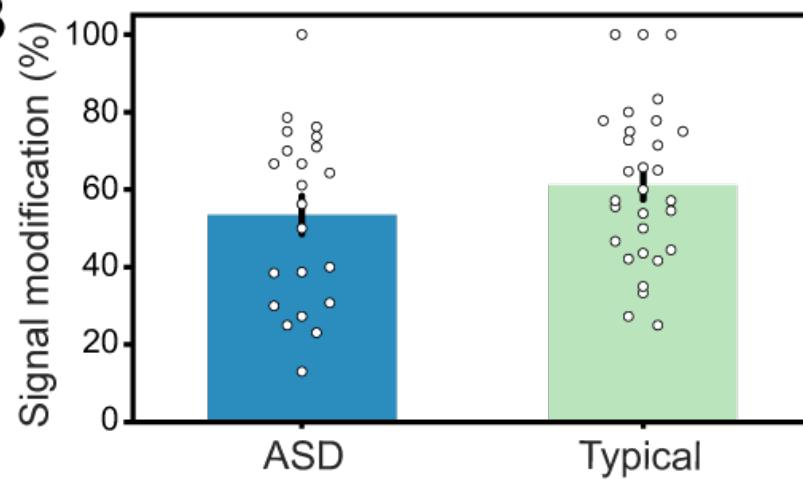
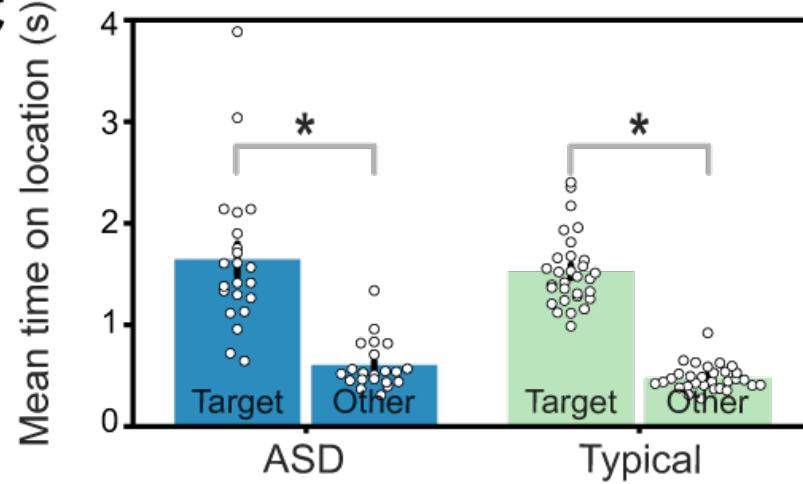
Harshali Wadge <sup>a</sup>, Rebecca Brewer <sup>b</sup>, Geoffrey Bird <sup>c,d</sup>, Ivan Toni <sup>e,1</sup> and Arjen Stolk <sup>a,e,\*,1</sup>

Impairment persists in interactions stripped of biological and linguistic cues





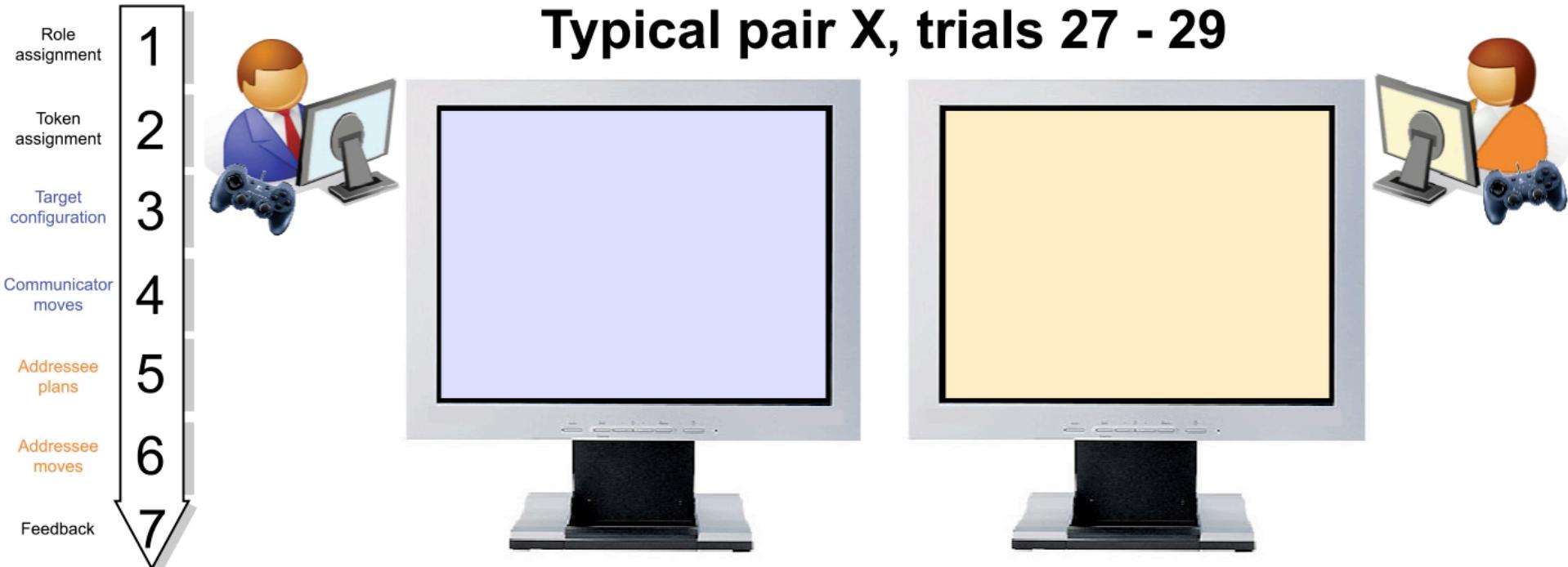
# Preserved abilities and propensities

**A****B****C**

Impairment not due to altered motor performance, cognitive flexibility, or prosocial motivation

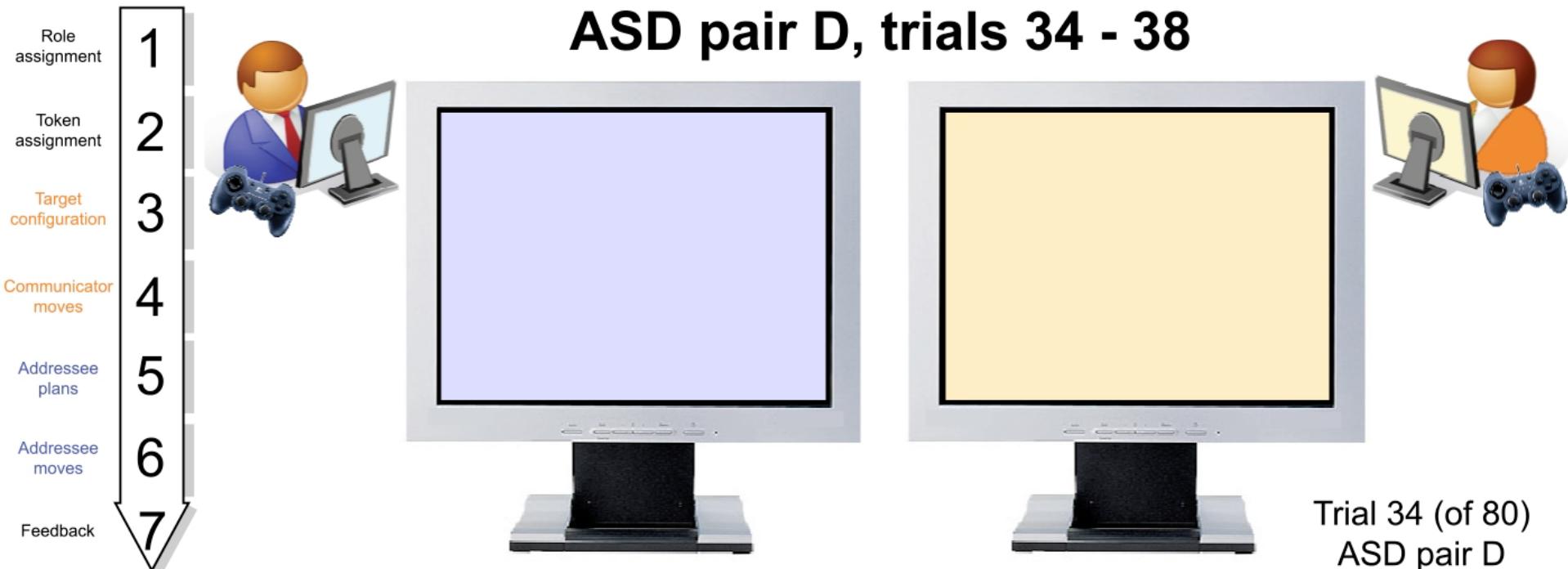


## Pairwise alignment (qualitative)



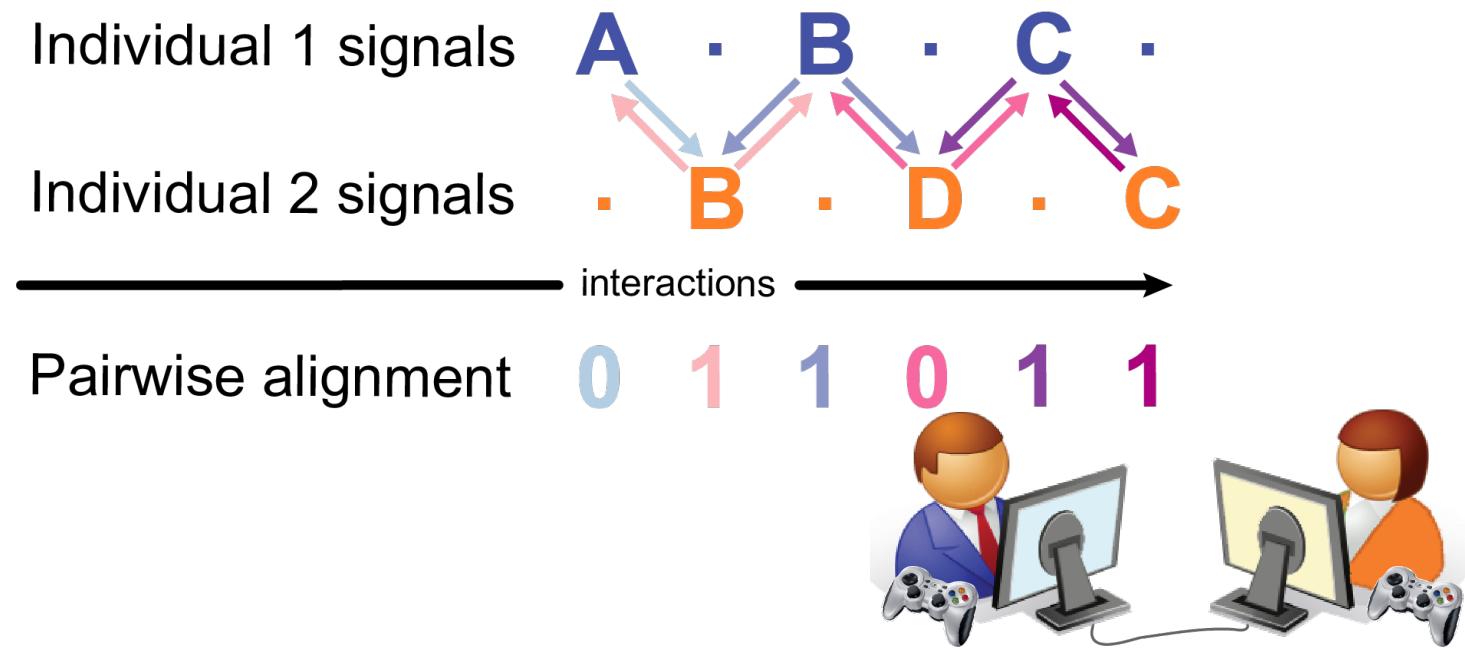


## Pairwise alignment (qualitative)





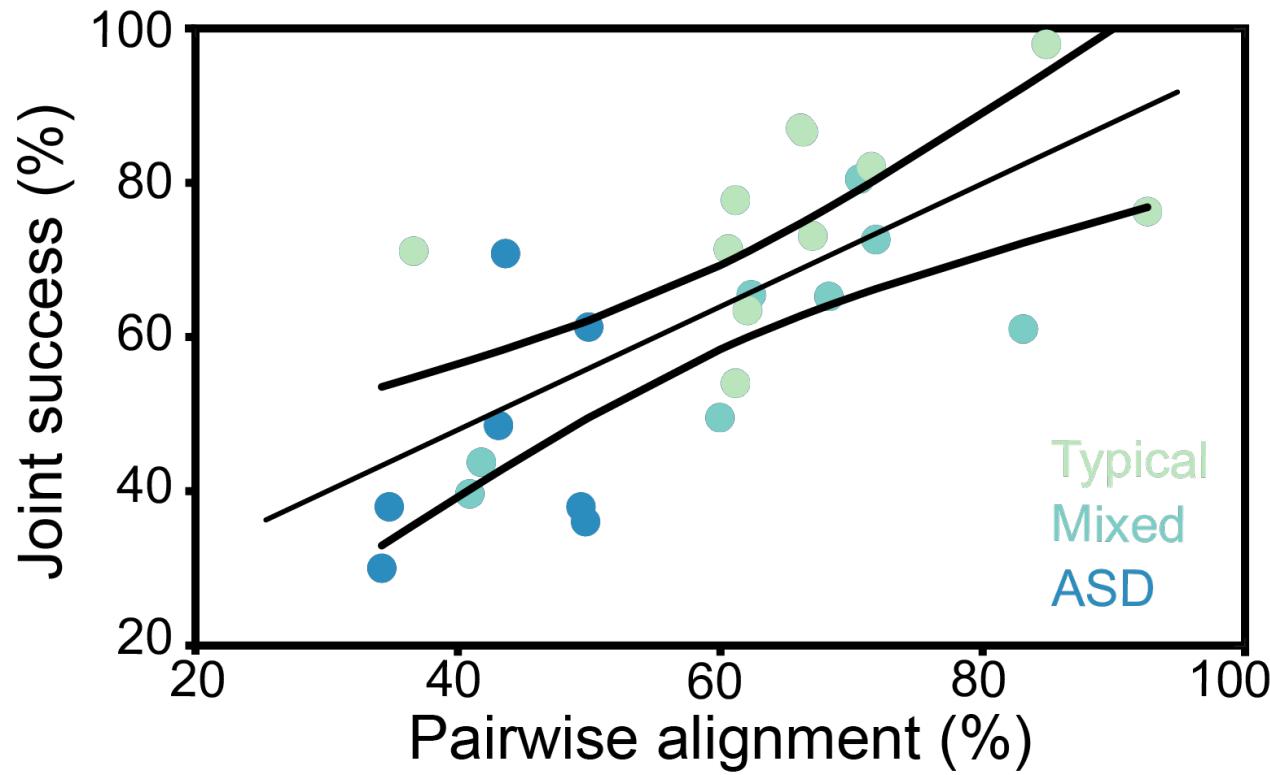
## Pairwise alignment (quantitative)



A pair has converged on a shared meaning for a signal only if both individuals manage to comprehend and reproduce that signal successfully



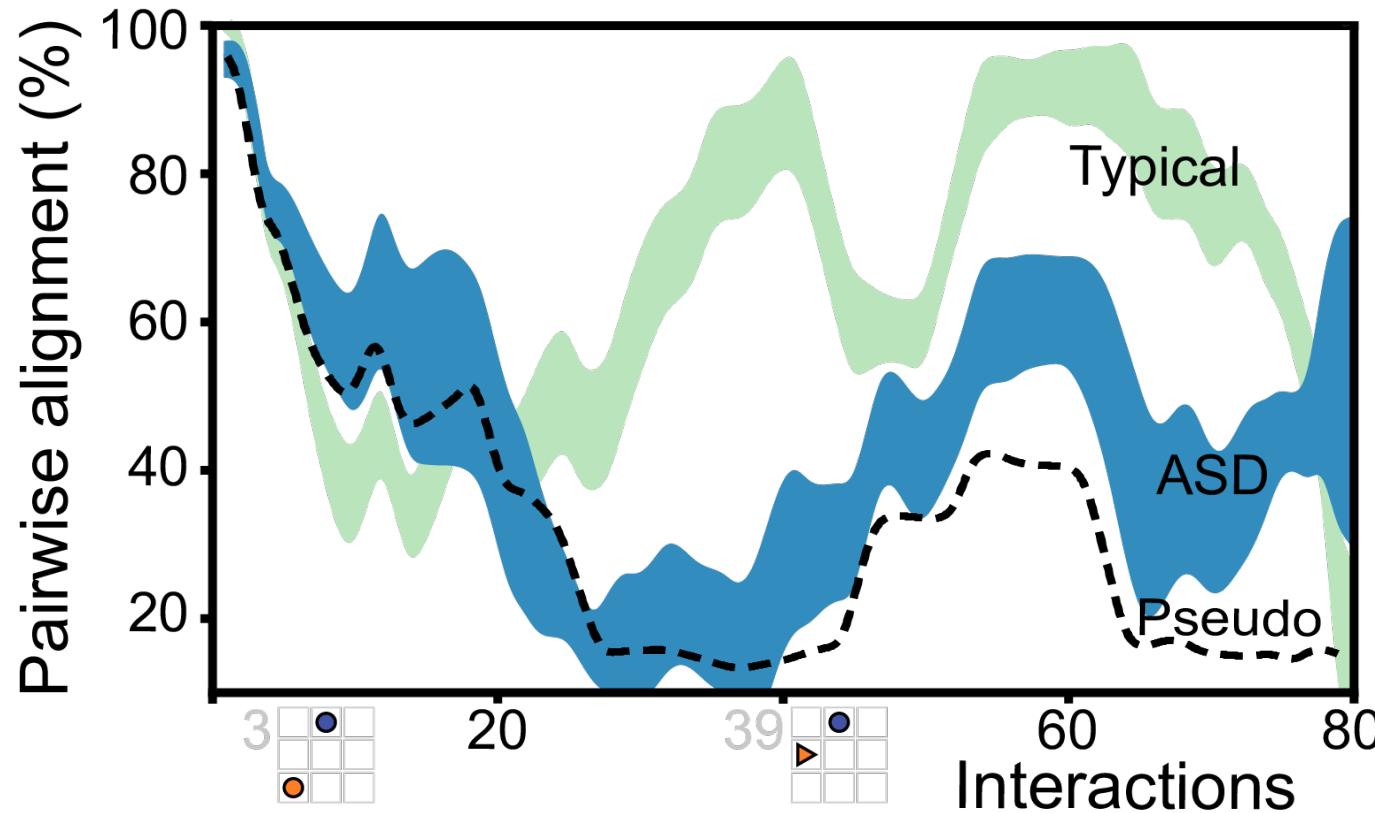
## Pairwise alignment (quantitative)



Pairwise alignment predicted communicative success across pairs



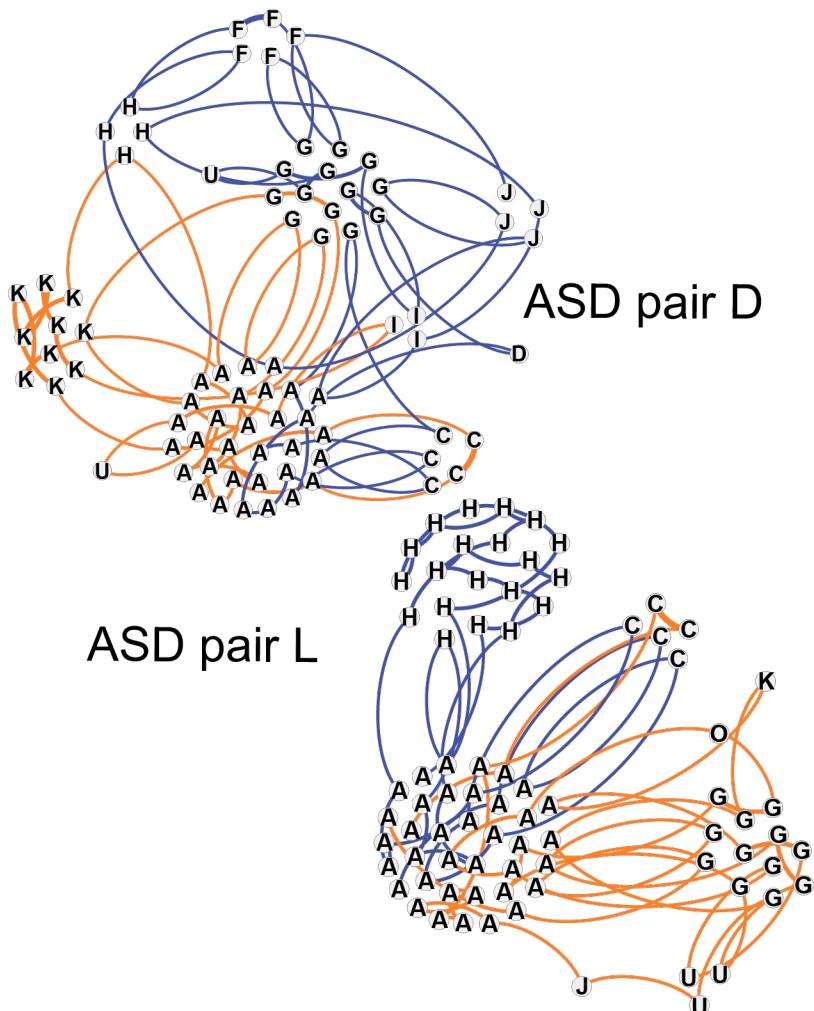
## Pairwise alignment (quantitative)



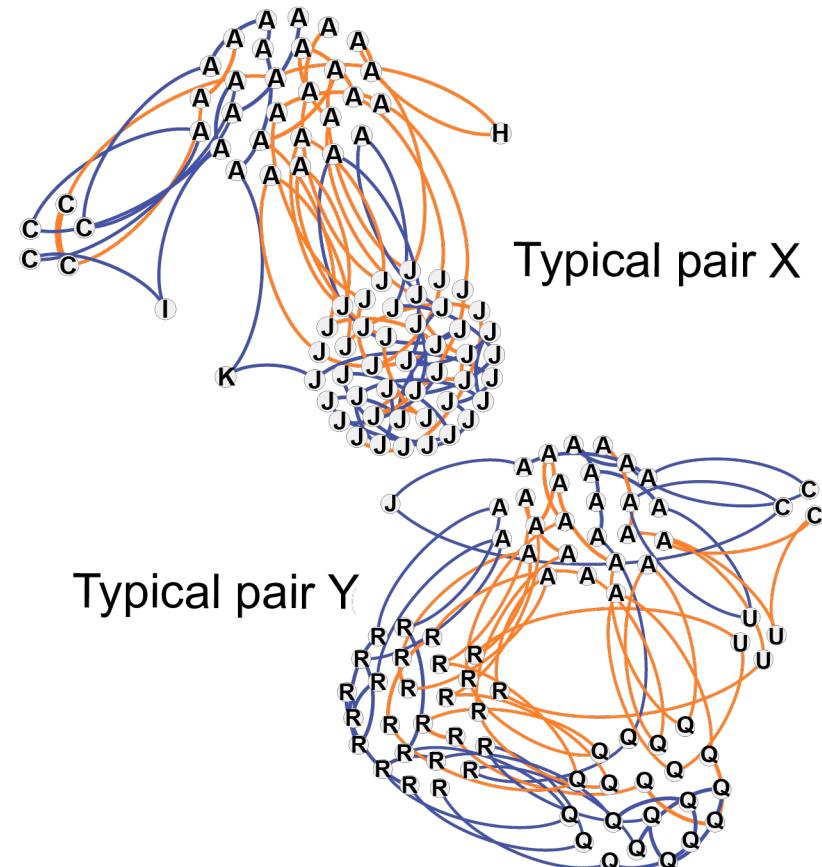
Autistic individuals struggle to rapidly converge on a shared meaning when meaning requires referencing the shared communicative context



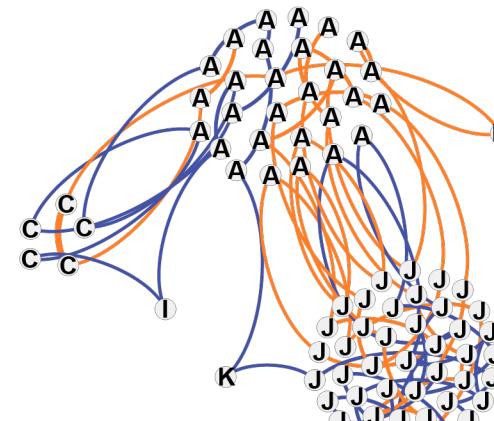
## Interaction space



ASD pair L



Typical pair Y



Typical pair X

Neurotypicals embed their signals in a strongly interconnected space of meaning and relationships between one another's signals



- The idea that autistic people lack a Theory of Mind is empirically questionable
- Autism communication deficits are likely not due to altered motor performance, cognitive flexibility, or prosocial motivation
- Rather, deficits may arise from difficulties in referencing the shared context established with a communicative partner

- Dual 3: Autistic Communication