

Typology of linguistic diversity across clinical populations

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Linguistic diversity

??

Cognitive diversity

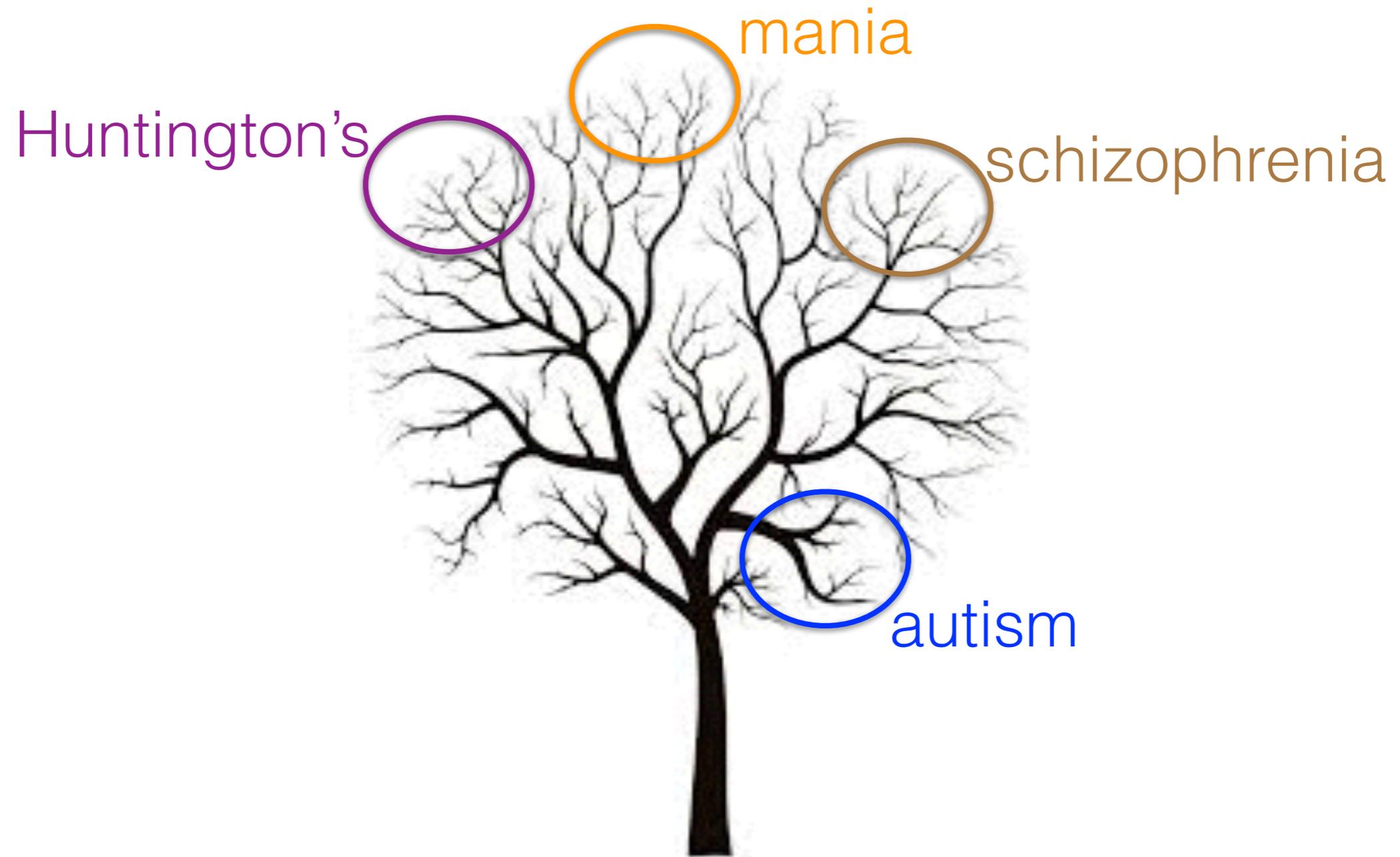
A tree of languages



but not of minds

Universal Grammar
(=the human capacity for language)

A tree of languages *and* minds



Universal Grammar* ** ***

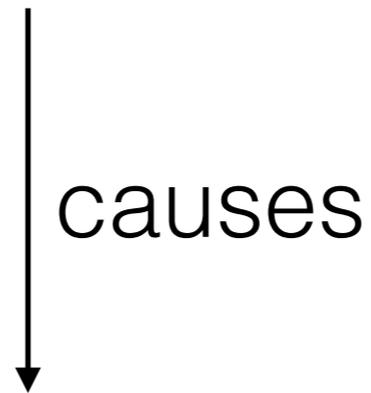
- Autism and schizophrenia:
 - Two **cognitive** types:
 - Two **linguistic** types?

Practical problems

- Lack of linguistic **expertise** in the clinics.
- Lack of sophisticated clinical **tests** of grammatical comprehension (cf. TROG).
- Traditionally **aphasiological** perspective in neurolinguistics.
- The last **linguist** to look at schizophrenic language was Chaika (1974) (but see Bambini et al., to appear; Hinzen & Rossello, to appear).
- Systematically testing 30 patients and building a profile of their language **costs** approx. 1m and takes minimally three years.

The standard view (both ASD and SZ)

'Cognitive' deficit (e.g. 'theory of mind')



symptoms



'pragmatic' deficits in language

Another tempting view

- **Aphasia:**

- A problem with language, not cognition (Varley, 2014).

- **Schizophrenia:**

- A problem with cognition, not language (almost everybody).

- But what is language?

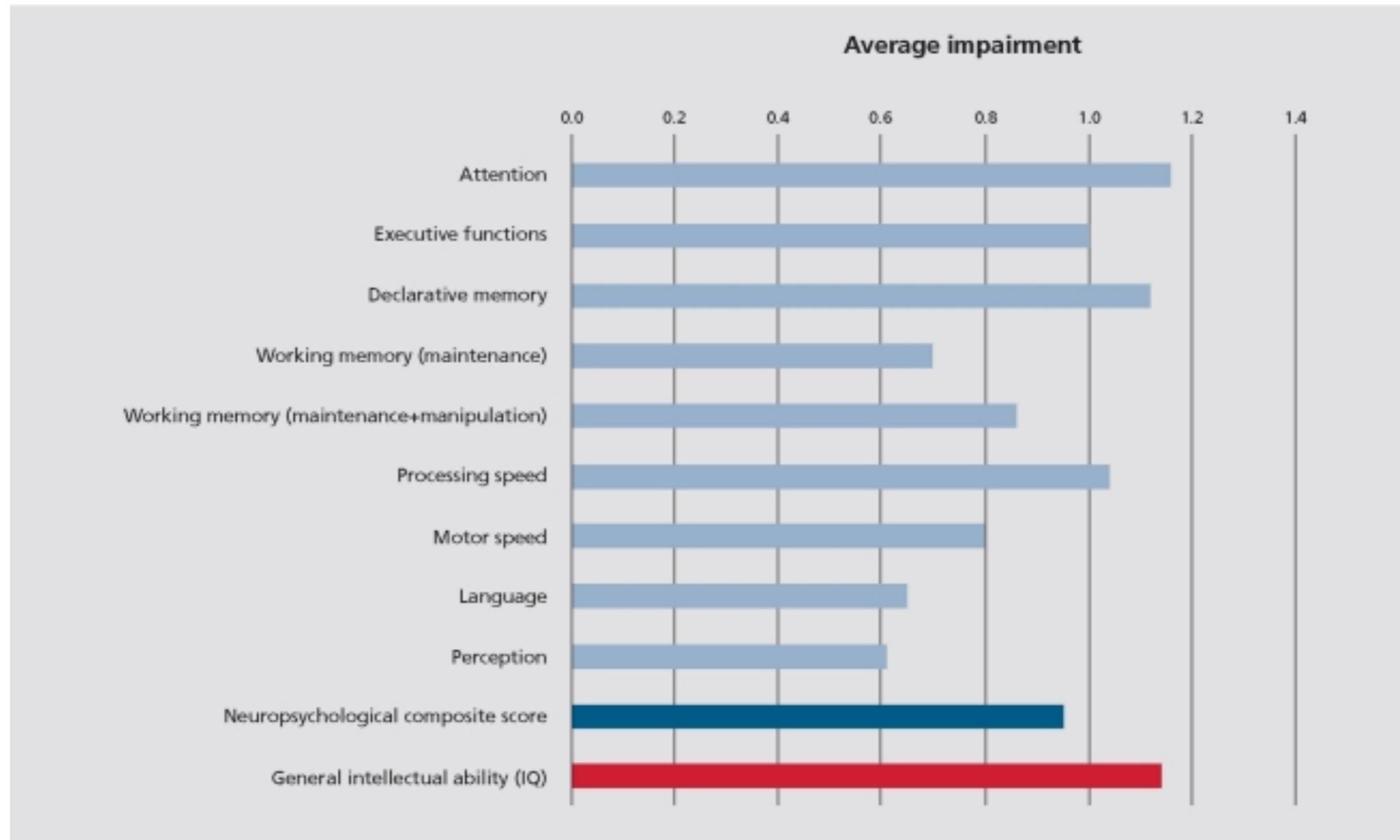
“It is sufficient to say that the consensus of psycholinguistic investigators is that **schizophrenic language** is nonexistent, although **schizophrenic thought** abounds.” (S. Schwartz, 1978, citing Brown, 1973)

Critchley (1964): ‘the causation of schizophrenic speech defect lies in an **underlying thought-disorder** rather than in a linguistic inaccessibility’ (p. 359).

Maher (1972): expressed language is ‘a mirror of **the [disordered] thought**’.

Titone et al. (2007:93): ‘the thinking anomalies associated with psychotic conditions are not, fundamentally, speech or language disorders (...). Rather, when language is used in an idiosyncratic way, it represents the outcome of **a deviant thought process**’.

Comparative neurocognitive impairment in SZ



Summary of results from meta-analytic studies presented in effect-size units (median effect size calculated from available meta-analyses).

(from Reichenberg, 2010)

	Positive	Disorganisation	Negative
<i>Executive function</i>			
WCST		✓ ³ ✓ ¹⁹ ✓ ⁵ ✓ ²² ✓ ²³ ✓ ⁶ ✓ ²¹ ✓ ¹⁸ ✓ ²⁴ ✓ ⁹	✓ ¹² ✓ ¹³ ✓ ⁴ ✓ ¹⁷ ✓ ²⁴ ✓ ⁹
Verbal fluency	✓ ⁹	✓ ³ ✓ ⁹ ✓ ² ✓ ¹⁶	✓ ³ ✓ ¹² ✓ ¹³ ✓ ¹⁹ ✓ ⁴ ✓ ²³ ✓ ¹⁶ ✓ ¹⁷ ✓ ⁹
Stroop test	✓ ¹⁰	✓ ³ ✓ ¹⁴ ✓ ²² ✓ ¹⁰ ✓ ²⁶	✓ ³ ✓ ⁷
Trailmaking test (B)		✓ ³ ✓ ¹⁸ ✓ ²² ✓ ²³ ✓ ⁹	✓ ¹³ ✓ ¹⁹ ✓ ⁴ ✓ ²³ ✓ ⁹
<i>Short-term memory</i>			
Digit span		✓ ¹⁸ ✓ ²² ✓ ⁴ ✓ ²⁰	✓ ⁸ ✓ ²¹
Corsi blocks		✓ ¹	
<i>Long-term memory</i>			
General memory		✓ ¹⁵	✓ ¹³
Verbal memory	✓ ¹²	✓ ¹ ✓ ⁸ ✓ ¹⁸ ✓ ²⁵	✓ ¹² ✓ ¹³ ✓ ¹⁹ ✓ ¹⁷
Visual memory		✓ ¹² ✓ ¹³	✓ ⁸ ✓ ¹³ ✓ ¹⁹ ✓ ¹⁷
Other		✓ ²	✓ ¹
<i>Working memory</i>		✓ ²³ ✓ ²⁴	✓ ²³
<i>General intellectual function</i>			
Full scale IQ		✓ ¹³ ✓ ¹⁹	✓ ¹³
Verbal IQ		✓ ⁸	✓ ⁸
Performance IQ			✓ ¹⁷
Other IQ		✓ ⁷ ✓ ⁸ ✓ ²	✓ ¹ ✓ ² ✓ ⁷
<i>Miscellaneous</i>			
Language		✓ ⁸	✓ ¹
Visual/spatial function			✓ ¹¹
Sustained attention		✓ ¹ ✓ ¹⁸ ✓ ² ✓ ²¹	✓ ¹⁹ ✓ ¹⁸ ✓ ² ✓ ²¹

Liddle's three syndromes and associated neurocognitive deficits (McKenna & Oh, 2005)

see also Donohoe & Robertson, 2003; McKenna, 2007:Table 9.2; Dibben et al., 2008.

Is language an 'accessory' symptom?

“Thought block, poverty of ideas, incoherence (...), delusions, affective anomalies find their expression in language; here the abnormality lies not in language itself, but **in what it has to say.**”
(Bleuler, 1911:121)

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Eugen Bleuler's **primary and fundamental** symptom

- 'Disorder of associations', leading to a **disintegration of the 'psychic functions'** and thus a self-disturbance ('Spaltung').



- But what integrates all the psychic functions?
- Language is not like other cognitive variables.

'Schizo-phrenia'

1. Auditory Hallucinations:
 - Prototypically **verbal** when occurring with a schizophrenia diagnosis (Bleuler, 1911; Baethge et al., 2005): disorder of **speech** (or **language**) perception.
2. Formal Thought Disorder:
 - Disorganised **speech**.
3. Delusions:
 - False and bizarre **utterances/assertions** that cannot be true.
 - 'Negative' symptoms: **alogia, ambivalence**.

Samples, I: Loss of goal

How are you?

To relate to people about new-found . . . talk about statistical ideology. Er, I find that it's like starting in respect of ideology, ideals change and ideals present ideology and . . . new entertainments . . . new, new attainments. And the more one talks about like, ideal totalitarianism or hotelatarianism, it's like you want new ideas to be formulated, so that everyone can benefit in mankind, so we can all live in our ideal heaven. Presumably that's what we still want, and with these ideas it can be brought about. I find the . . . it's like a rose garden.

Samples, II: Poverty of content

I feel quite well, but I keep expecting to get well, to be made well, but I never seem to get well and, you know, every day I put in, I expect the following day to get better and to be well and doing things and achieving goals and aims and all that sort of thing, but I just sort of get the pills every day and I don't seem to make much progress. But I would like to be, you know, feel well in myself and I would like to be talking more to people and socialising and all that kind of thing but, um, maybe it's because I haven't seen an awful lot of the doctors over the period, I don't know. I feel that talking to a doctor helps, you know, with your problems and everything. Um, the way things are going I am hopeful for things to come. I have achieved all I have wanted to, but there is a lot more, you know, and I have got the next six months to go and I have got to do more than I have done in the last six months. I want to do a lot, but it is just getting well, you know. It's relying on doctors and nurses for help and sort of... I wouldn't be promulgating your illness or anything else... that's partly my intention.

Language as a diagnostic tool

Syntactic changes and cohesion (SZ vs. mania): Morice & Ingram (1982), Wykes & Leff (1982)

Referential disturbances (SZ vs. other psychoses): Docherty et al. (2003), Docherty et al. (1996), Docherty et al. (1988)

Idiosyncratic thinking (Harrow & Marengo, 1986), **poverty of speech and content** (Andreasen, 1979b), and **disorganization** (Holzman et al., 1986) (more specific to and less state-dependent in SZ vs. mania)

Subtyping FTD (Andresen, 1979): poverty of content vs. disorganisation

The 'radical' view

(Chomsky, 2007; Hinzen, 2006;
Hinzen & Sheehan, 2013)

- There is no 'semantic component'; 'syntactic' structure-building *is* for certain semantic structures to arise.

What kind of meaning is grammatical meaning?

- MAN \longrightarrow [the man]
- [the man] \longrightarrow [[subject/referent the man] predicateleft]

not = 'semantics'

The forms of reference

(Sheehan & Hinzen, 2011; Martin & Hinzen, 2014; continuing Longobardi, 1994, 2005)

generic

indefinite

definite

rigid

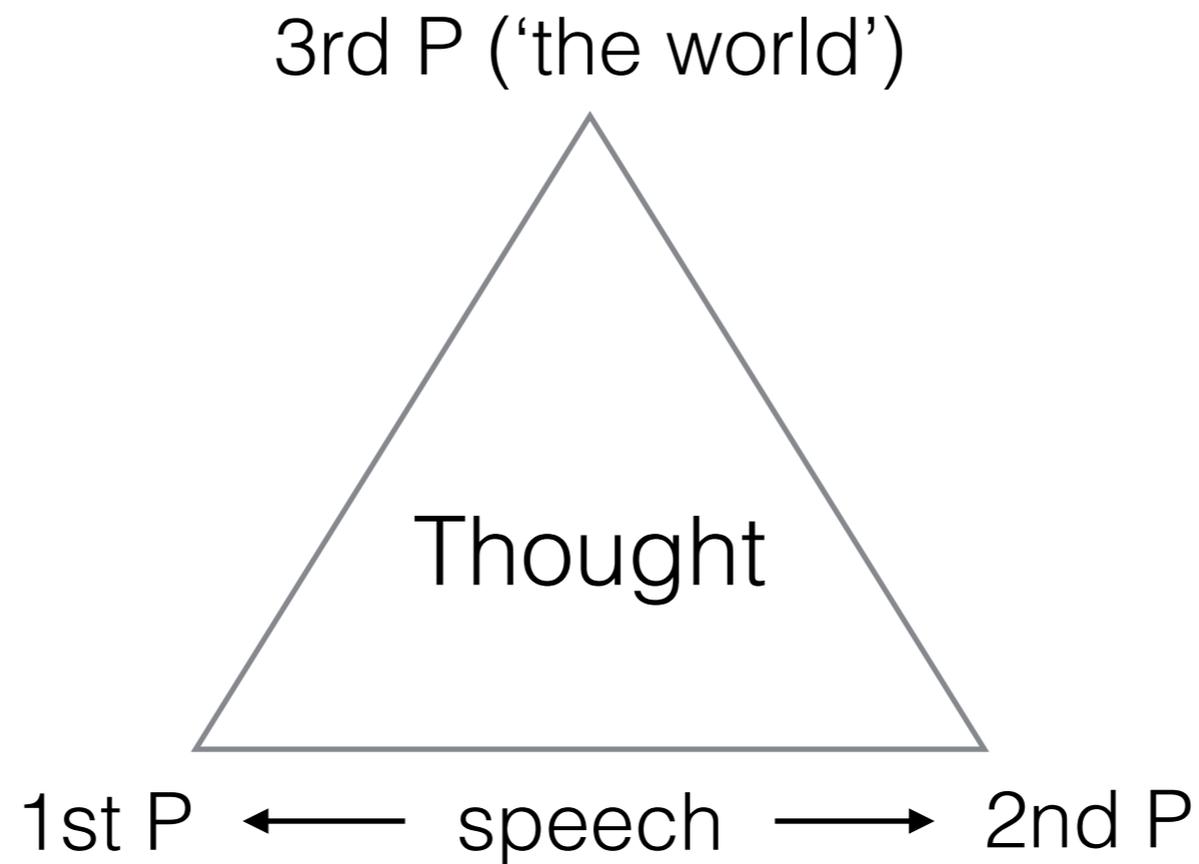
deictic

personal

The nature of propositional meaning

- Information about the **world**.
- Asserted as **true**, excluding the opposite as false, though possibly incorrectly.
- **Typically true** when asserted.
- **Novel** information about familiar topic.
- Sets a content/context **boundary**.
- The content of a thought of a **1st Person**.

The triangulation



Breaking the language frame

Speech **content** (Delusions)

Thought

Speech **production**
FTD

Speech **perception**
AVH

(Hinzen & Rossello, 2014)

Predictions

General:

1. We should see symptom-specific distortions at the level of the kind of meaning that grammar is hypothesised to mediate.
2. The **neural correlates** of schizophrenia should concern 'language areas'.

Specific:

- The **more grammatical** a form of reference, the more severe the distortion should be.

Findings, A: **FTD**

- Insofar as there are ‘lexical-level’ anomalies at all, they transpire in the **grammatical use** of words in context.
- Lack of **definiteness** is almost a defining property of ‘poverty of content’, and delusions tend to be definite.
- **Grammatically referential** devices in language have long been noted to be loci of vulnerability.
- The uncontrolled intrusion of irrelevant aspects of **context** is a classical feature of discourse in FTD (Chaika, 1974).

T: What is the worst thing about people saying that you are just unwell?

S: See the car, Carl, is impotent.

T: Ahhhh

S: I can't help with my publicity, so I guess I sit and cry

T: Ahhh. So it annoys you that the nurses.....

S: The camera, I thought I painted. See my painting, is far higher work, much more than any oil paintings.

T: What if you were just a normal person like me, rather than having all these titles and achievements? Would it be bad just to be a normal person?

S: The OBE, George cross, which I am proud I am.

T: OOO! Amazing achievements!

S: Before that, I was earning £6.00 a week in a barber shop.

(patient SH, from the PaLS study)

- S is fluent: 'Merge' (blind combinatorics as such) is not the problem.
- No problem with 'procedural' memory either.
- S is also a fully cooperative communicator.
- But she cannot handle **referential phrases** and her language largely does not carry **propositional** information.
- She systematically mis-locates herself in **deictic space** when saying 'I'.

- (2) a. My mother's name was Bill. (pause)
- b. (low pitch, as in an aside, but with marked rising question intonation) . . . and coo?
- c. St. Valentine's Day is the official startin' of the breedin' season of the birds.
- d. All buzzards can coo.
- e. I like to see it pronounced buzzards rightly.
- f. They work hard.
- g. So do parakeets.

(from Chaika, 1974)

- Patients with schizophrenia ‘frequently fail to use **pronominal reference** correctly’ (Frith, 1992:99; see also McKenna & Oh:2005:112; Rochester & Martin, 1979; Hoffman et al., 1985; Watson et al., 2012).
- None-standard **self-reference**: Some patients refer to themselves only in the 3rd Person, some only in the 2nd (Bleuler, 1911).

5 REFERENTIAL FAILURES

Unclear links (anaphoric) which leave excessive ambiguity as to which expressions refers back (or forth) to which items in preceding and subsequent speech.

Example:

"Why do you think some people believe in God?"

"I just know it no matter what the public who knows is told by the church people, I am not sure they have any idea how complicated it is. They are working on them and so is he. There is no scientific formulation to address."

CLANG item (5), from Chen et al., 1996

Findings, B: **Delusions**

‘something basic and primary,
which comes before thought,
although it becomes clear to
itself only in thought.’

Jaspers, 1959, p196



- **Linguistically highly articulated** thought, that is:

Distortions in the **experience of the thought process**:

“I feel that it is not I who is thinking.”

Referential delusions:

“This policeman is there only because of me.”

“This shooting means I will die tomorrow.”

Propositional delusions:

“I have a wine glass in my stomach.”

“I wear my father’s hair.”

“I am Jesus”

“The Mafia is trying to kill me.”

Propositional delusions

I am Jesus.

- **3rd Person** reference intact.
- **1st Person** reference impaired, when seen with Agreement.

- Some **unlikely or impossible delusions**:

“Obama is Jesus.”

“I think I am Jesus.”

“I am me.”

“I am not Wolfram.”

“I will be Jesus.”

“The movie was great.”

“I bought a coffee this morning.”

“He’ll watch the movie tonight.”

“German cities are beautiful.”

- A **linguistic** profile of (propositional) delusions?

Non-embedded.

Non-negatable.

Non-tensed.

Non-episodic.

Non-generic.

1st subject/object+ 3rd Person predicate.

Referentially specific.

Findings, C: **Voices**

- **The Person-shift (1st to 3rd)** in ‘commanding and commenting’ voices:

“tumour on the brain. He’s a sucker. He better pack it in. I’m going to give him an explanation. Alison, of who, of which taught me my art at college. Grass him. It’s all over. He does though. Help him. He has problems. He is keep wrestling. He needs maltesers. Turn it off. He is scared. Persevere. He is a lot cleaner. (...) Now he won the lottery. No he never. He is writing everything down about voices. He didn’t. Is he awake? Press the button. He has voices always. They always know which buttons to press. He is still writing down.”

(patient KE, from PaLS study)

Quantitative formal linguistic analysis (with M. Yazdani)

Total Utterances	Lack Lexical Verb	With Copular Verb	Clausal Embedding	1 st P	2 nd P	3 rd P	Expletive it/this/that	Present Tense	Past Tense	Future Tense	Ungrammatical	Incomplete Utterances
552	126	102	8	29	14	319	58	356	13	35	25	21

- The only kinds of **embedded clauses**:

They always know which buttons to press.

I understand where he is coming from.

Make him have a heart attack.

Do you think we should writing everything down?

Do you think I'd do that one?

Content analysis for the three subtypes of AVH identified in McCarthy-Jones et al. (2012)

- ‘Constant commanding and commenting’ voices **do not speak propositionally.**
- ‘Replay’ voices even **less.**
- Dito for ‘thought becoming loud’ voices.

'Iipseity' disturbances

- E.g. uncertainty over 'who thinks' (delusions of thought control).
- Predicted from a disturbance of the deictic frame.

Referential delusions

- A disorder in the attribution of **reference**.
- **Person-shift:** Patient becomes a **3rd Person**.

Summary on SZ

- A linguistic typology of positive symptoms:
 1. **Delusions**: Disorder in the referential use of language with loss of deictic anchoring.
 2. **FTD**: Loss of referential content and return to lexical-associative and contextually-driven rather than grammatical structuring of texts.
 3. **AVH**: Erasure of a boundary between (linguistically articulated) thought and speech.

Language use in ASD: Problems

- **Interrogatives** and **declaratives**.
- Language is a **tool** to satisfy desires and regulate behaviour (Maljaars et al., 2011).
- **Grammar** (Bartolucci..., 1970s; Eigsti et al., 2007; Terzi et al., 2014).
- **Concretism**: language more rigid, 'context-bound'.
- Language as a **stimulans** (e.g. delayed echolalia).
- Modelling output on **input** (e.g. adopting wrong conversational role: Dascalu, 2014).
- Under-generality in **description** (e.g. overly precise words, **neologisms**).
- Disorders of verbal and non-verbal **reference** (both self and non-self).
- Often anomalous **non-verbal** forms of communication replace verbal ones.

Passive comprehension study

(Schroeder, K., Gavarró, A., and K. Jensen de Lopez, in prep.)

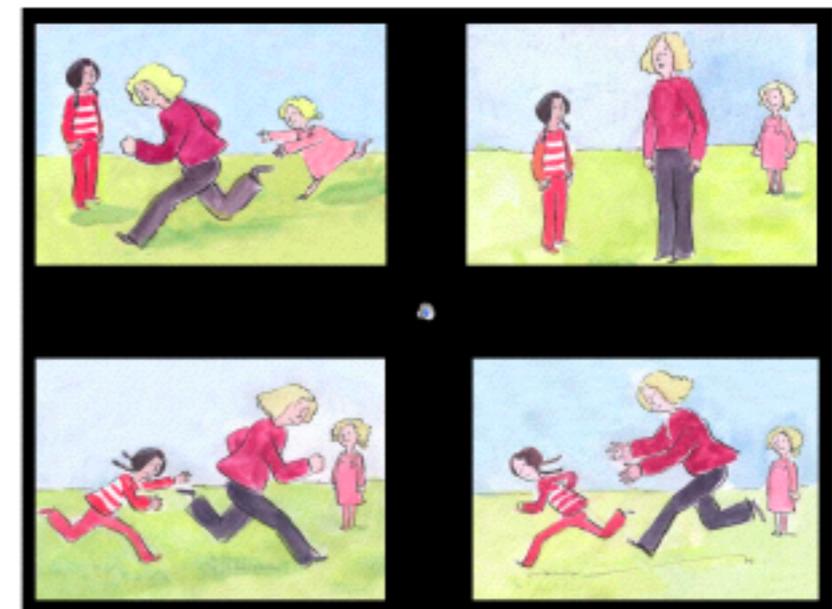
Background: Previous research finds passives to be a point of difficulty for children and teens with autism when non-verbal IQ is heterogeneous (Perovic et al. 2007) and that young children with autism with non-verbal IQ within norms show below-ceiling performance on par with TD peers (Terzi et al. 2014)

Participants: 12 Native Danish adolescents (13-17 years) with autism (non-verbal IQ within norms)

Findings: In a picture selection task teens with 'high-functioning' autism comprehended passive structures with 99% accuracy.

Take-away: Autistic Individuals who have non-verbal IQ within norms achieve **full mastery of passive structures**.

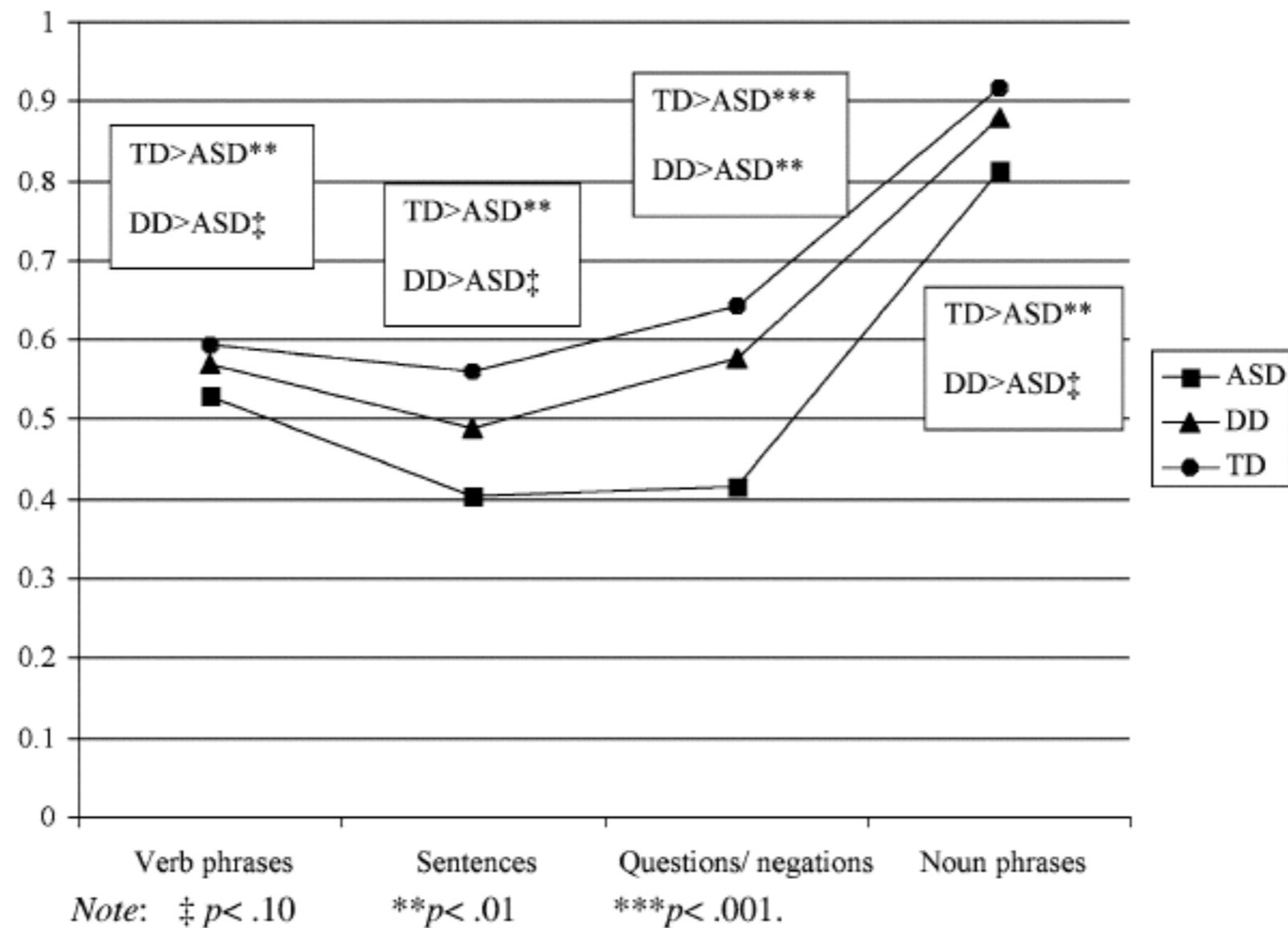
Non-verbal IQ seems to be predicative of passive



Ex: Big sister is chased by mom

Grammar

(IPSyn, from Eigsti et al., 2007)



- Negative correlation between language ability and jargon/echolalia.
- Negative correlation with presentism/concretism.

Language in ASD: **Non**-problems?

1. Perspective-taking and self-reference as such

Germain, 4y:

CHI: une pause...

MOT: une quoi ?

CHI: **je veux te donner une pause**

[je=MOT; te=CHI; PERSP:MOT]

MOT: tu veux que je te donne une pause?

MOT: ok tu veux sortir du bain ?

CHI: **maman il veut sortir du bain**

[il=CHI]

MOT: <je veux sortir du bain>

CHI: il veut sortir du bain

CHI: **il veut des smarties dans ta main!**

[il=CHI; ta=CHI]

MOT: tu veux des smarties dans la main ?

(exs from corpus of Camelia Dascalu, Dascalu, 2014)

'il' as a passe-partout referential device

- **'il' for 'elle'**, inanimate:

MOT: c'est toi Lyron?

MOT: tu fais un câlin à Naya?

CHI: il va tomber la neige!

CHI: il va tomber!

MOT: oui elle est tombée la neige du ciel!

- **'il' for 'tu'**:

EDU: tiens je te les mets là.

EDU: voilà !

CHI: il peut les l'ouvrir ?

EDU: tu peux tu peux l'ouvrir s'il te +

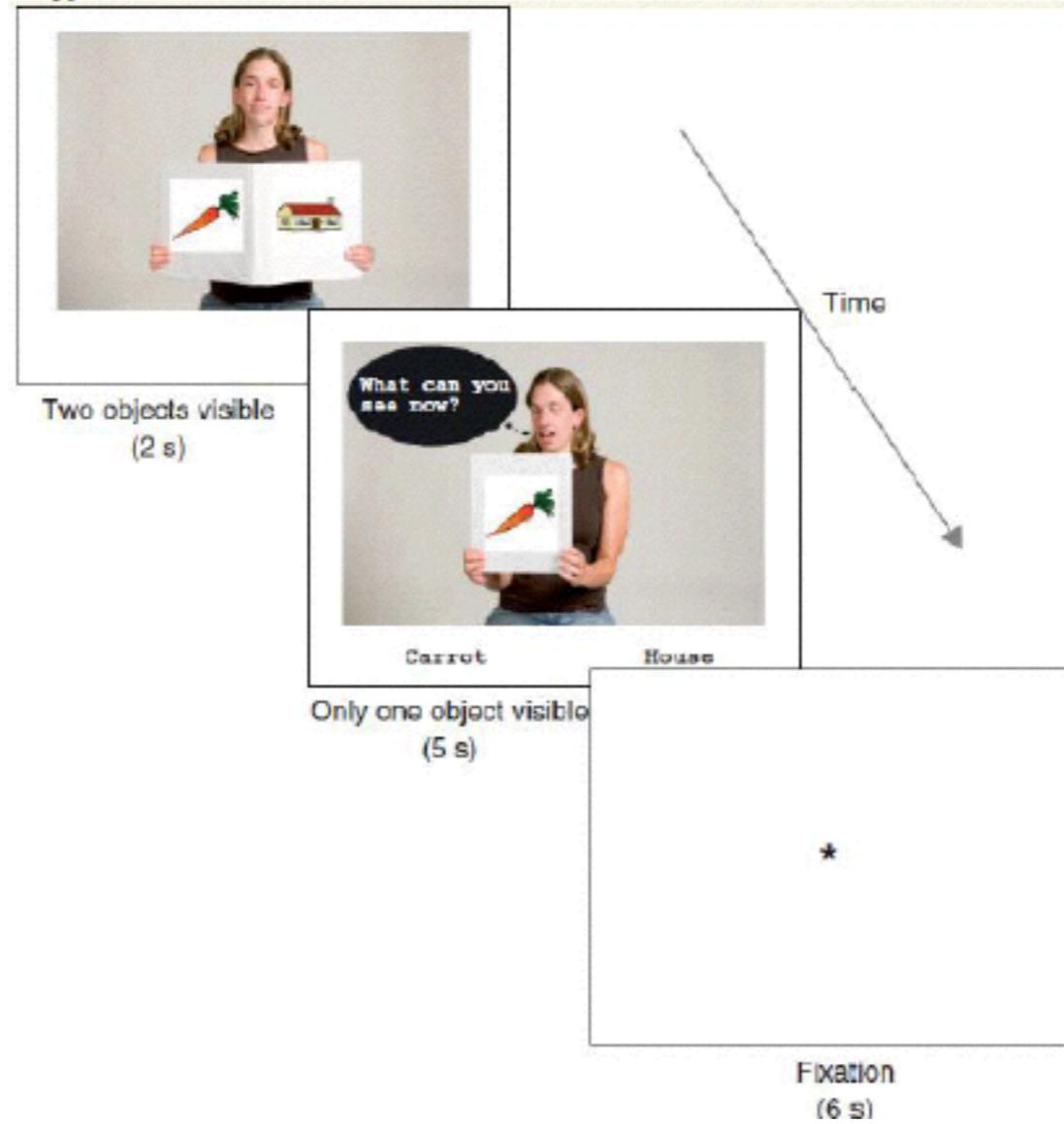
CHI: tu peux l' ouvrir s'il te plait ?

(exs from Dascalu corpus; Lyron uses such non-standard forms of reference **78%** of the time)

Person-shift (to 3rd)

- **Jordan et al.** (1989): kids with ASD showed a preference for proper **names**, used incorrect pronouns, and made errors like 'I' vs. 'me', as in 'Now the puppet's tickling...?' task.
- **Lee et al.** (1994): In a photograph-naming tasks, children with ASD less likely to employ the pronoun 'me' than to **name** themselves and less likely to employ the pronoun 'you' than to name the experimenter.
- **Shields & Meyer** (2015): native signing kids with ASD prefer to self-refer via their **name**-sign.

Fig. 1



Mizuno et al. (2011)

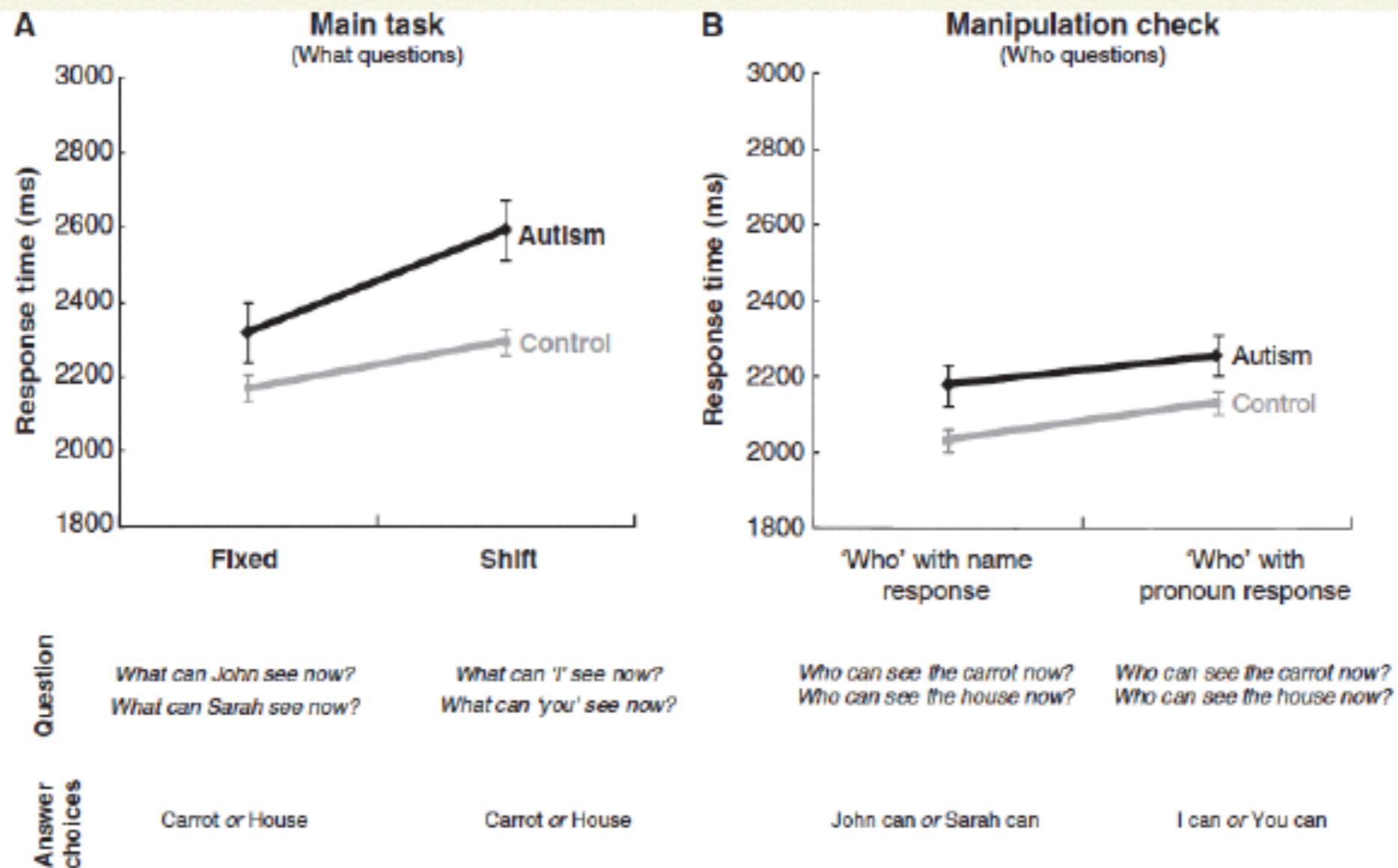


Figure 2 Mean reaction time. (A) A reliable interaction between the Group (Autism, Control) and Deixis (SHIFT, FIXED) ($P = 0.02$) for 'What can X see now?'. (B) No reliable Deixis and Group interaction for 'Who can see the Y now?'. The error bars represent the 95% confidence interval for the within-subject effect in each condition (Loftus and Masson, 1994).

'Non-verbal' communicative strategies

Foundations for self and other: a study in autism

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Abstract

There is controversy over the basis for young children's experience of themselves and other people as separate yet related individuals, each with a mental perspective on the world – and over the nature of corresponding deficits in autism. Here we tested a form of self–other connectedness (identification) in children with and without autism, who were group-matched according to CA (approximately 6 to 16 years) and verbal MA (approximately 2½ to 14 years), and therefore IQ. We gave two forms of a novel 'sticker test' in which children needed to communicate to another person where on her body she should place her sticker-badge. Across the trials of Study 1, all of the non-autistic children pointed to their own bodies at least once, but over half the children with autism failed to point to themselves at all, even though they communicated successfully in other ways. In Study 2, where a screen was introduced to hide the tester's body, group differences in the children's communicative self-orientated

Person-Centred (Deictic) Expressions and Autism

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Anthony Lee

participants spontaneously produced deictic terms, often in conjunction with pointing. Yet only among children with autism were there participants who referred to a location that was distal to themselves with the terms 'this' or 'here', or made atypical points with unusual precision, often lining-up with an eye. In Study 2, participants with autism

Summary:

- No problems *per se* in:
 - ‘perspective-taking’
 - (self-) reference
 - ‘communication’
 - lexicon (a relative strength)
- Problem with the triangular deictic frame as structured by grammatical Person distinctions, and more generally the use of language for purposes of reference.

A hypothesis

- Does autistic speech not grammaticalise **Person**?

Conclusion

- The deictic frame is disturbed in **both** ASD but in **different** ways, which is part of larger disturbance in the referential and propositional use of language.
- What is it to have your thought structured by grammatical **Person**, and what is missing, if you don't?



Thanks