



Language, self and mental health, I: What is un-Cartesian Linguistics?

Wolfram Hinzen
ICREA/Universitat de Barcelona/Durham University
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- Language is subject to **diseases** or **malfunction**, like all other cognitive or bodily function.
- These could concern the structure of **semantics** (not merely 'pragmatics').
- They could fundamentally correlate with - and perhaps be identical to - diseases of **mind**.

Nehat hsist
 Nu, yont 7 Kil
 Dr sim-
 Jins Yard puiank Veah
 foremost deynal Mafucue
 huise Ertm, lite armsice
 Indigent foilarnest Wealth
 at people Breth, Japhone
 fhuir Tam limeput Dremly
 Hudy Toilan de hidmet
 Pussant Mam fat only Tai
 Atteap Lung Helt Upint
 Meet Ue - fresh parvasnt
 Lmy 7 Kiss Juement
 } reserom



- Patients with **schizophrenia** can present with:
 - Mutism.
 - Alogia.
 - Thought block.
 - Disordered, incoherent, or unintelligible speech.
 - Heard speech where there is none.
 - Problems with pronouns.
 - Bizarre predications.

A conclusion was a French professor.

The pond fell in the front doorway.

There is a wine glass in my stomach.

I wear my father's hair.

I am Jesus.

- In **Autism Spectrum Disorders** (ASD):
 - Up to 50% of infants remain **non-verbal**, with no non-verbal forms of communication replacing verbal ones.

- Verbal children with **ASD** can present with:
 - **Echolalia.**
 - Deviant **use** of language (e.g. for behaviour regulation more than for assertion).
 - **Concretism**/presentism.
 - Problems with **pronouns**.
 - Under-generalisation in **description** (e.g. overly precise words, **neologisms**).
 - Disorders of verbal and non-verbal **reference** (both self and non-self).
 - Anomalous **non-verbal** forms of communication replacing verbal ones.

- **Affinities:**
 - Autism [=‘detachment from outside reality’] was one of Bleuler’s (1911) four ‘A’s to capture the clinical essence of ‘schizo-phrenia’.

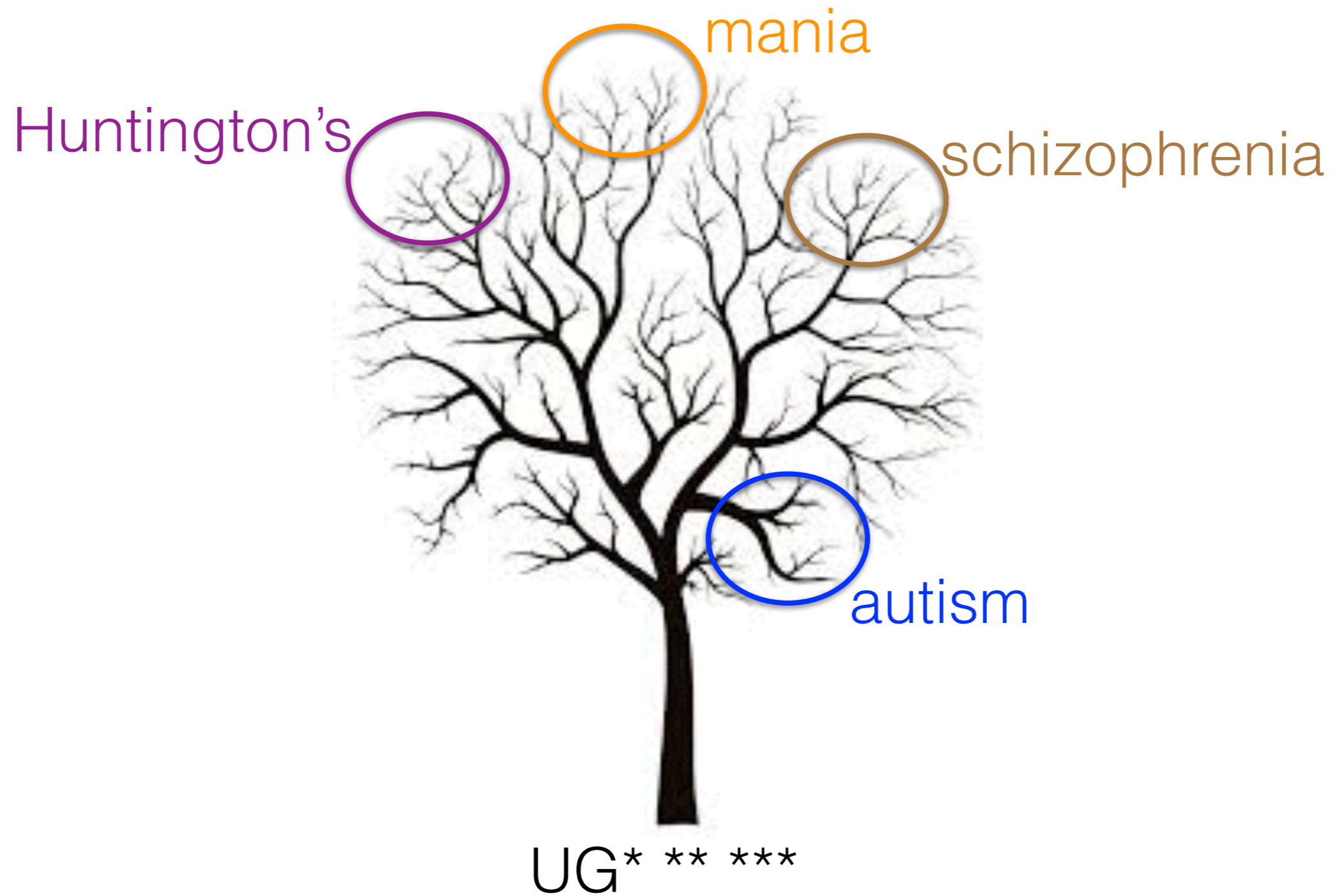
Typology of linguistic diversity



A tree of languages,
but not minds

Universal Grammar
(=the human capacity for language)

A different **kind** of linguistic diversity



- This would be support for the ‘Un-Cartesian Hypothesis’.

Wolfram Hinzen is a Research Professor at the Catalan Institute for Advanced Studies and Research (ICREA) and affiliated with the Linguistics Department of the University of Barcelona and the Philosophy Department of the University of Durham (2006–2014). He writes on issues in the interface of language and mind. He is the author of *Mind Design and Minimal Syntax* (OUP, 2006) and *An Essay on Names and Truth* (OUP, 2007) and co-editor of the *Oxford Handbook of Compositionality* (OUP, 2012).

Michelle Sheehan is a Research Associate at the University of Cambridge specializing in comparative syntax with a particular interest in the Romance languages. She has worked on null arguments, Control, word order variation, extraposition, clausal-nominal parallels and case/alignment. She is co-author of *Parametric Variation: Null Subjects in Minimalist Theory* (CUP, 2009) and the forthcoming volumes *The Final over Final Constraint* (MIT Press) and *Theoretical Approaches to Disharmonic Word Orders* (OUP).

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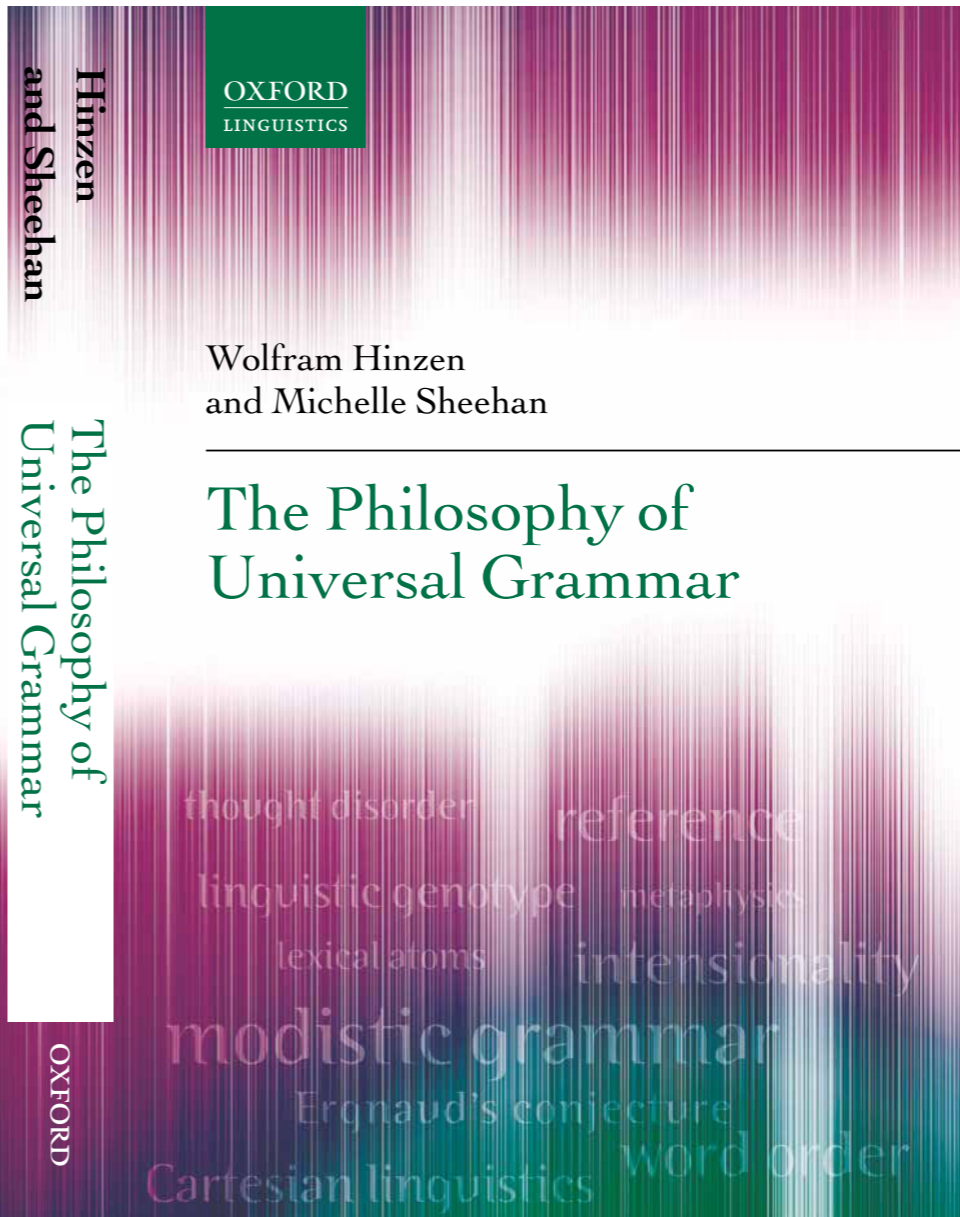
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Wolfram Hinzen and Michelle Sheehan

The Philosophy of Universal Grammar


What is grammar? Why does it exist? What difference, if any, does it make to the organization of meaning? This book seeks to give principled answers to these questions. Its topic is ‘universal’ grammar, in the sense that grammar is universal to human populations. But while modern generative grammar stands in the tradition of ‘Cartesian linguistics’ as emerging in the seventeenth century, this book re-addresses the question of the grammatical in a broader historical frame, taking inspiration from Modistic and Ancient Indian philosopher-linguists to formulate a different and ‘Un-Cartesian’ programme in linguistic theory. Its core claim is that the organization of the grammar is not distinct from the organization of human thought. This sapiens-specific mode of thought is uniquely propositional: grammar, therefore, organizes propositional forms of reference and makes knowledge possible. Such a claim has explanatory power as well: the grammaticalization of the hominin brain is critical to the emergence of our mind and our speciation.

A thoroughly interdisciplinary endeavour, the book seeks to systematically integrate the philosophy of language and linguistic theory. It casts a fresh look at core issues that any philosophy of (universal) grammar will need to address, such as the distinction between lexical and grammatical meaning, the significance of part of speech distinctions, the grammar of reference and deixis, the relation between language and reality, and the dimensions of cross-linguistic and biolinguistic variation.

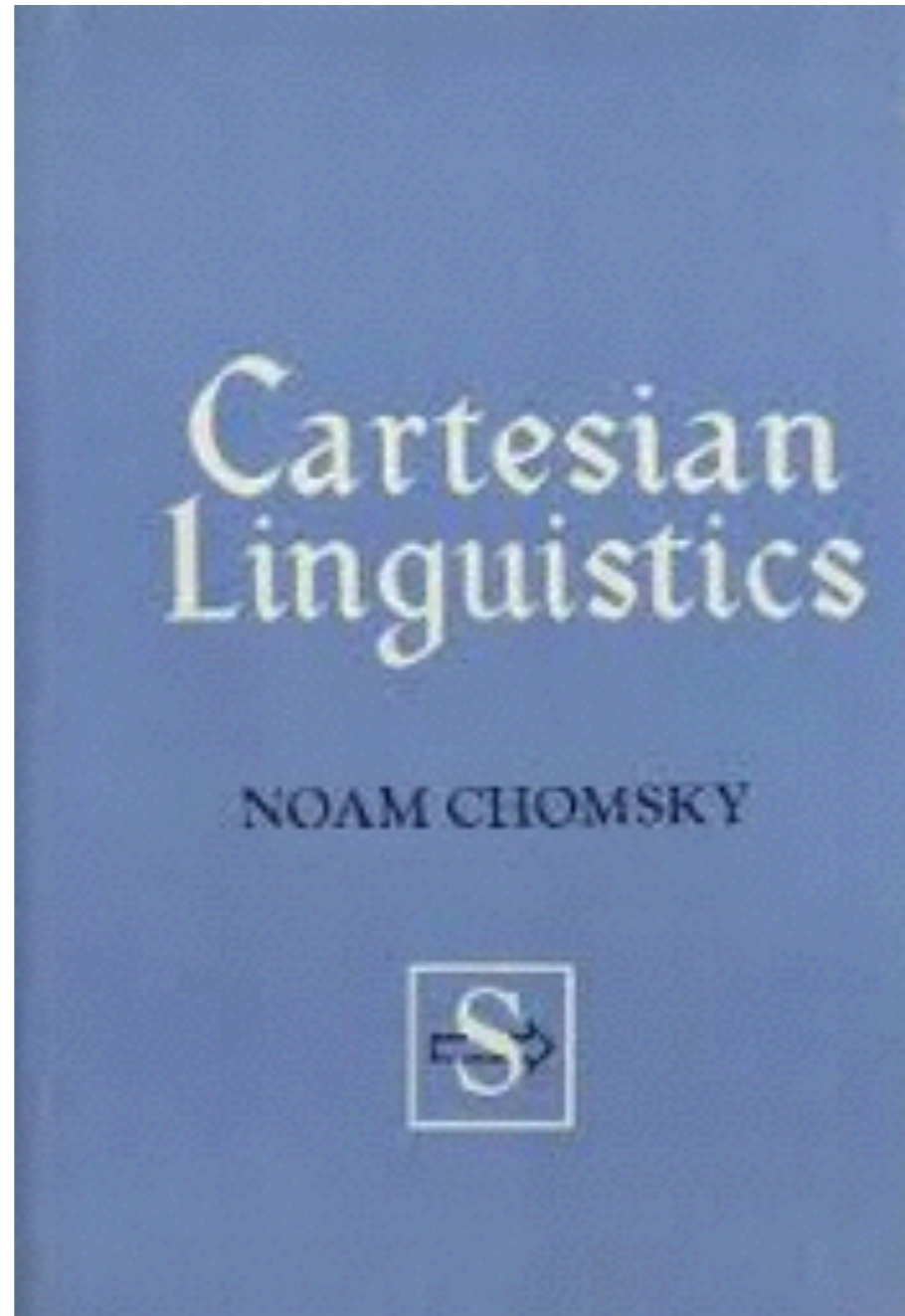


NOT: “He thinks, therefore he is.”

no 287
④
GRAMMAIRE
GÉNÉRALE ET RAISONNÉE
DE PORT-ROYAL,
PAR ARNAULD ET LANCELOT;
Précédée d'un Essai sur l'Origine et les Progrès
de la Langue Française,
PAR M. PEITOT, Imprimeur-Général de l'Université Impériale;
Et suivie du COMMENTAIRE de M. DUCLOS, auquel
on a ajouté des Notes.
SECONDE ÉDITION.
A PARIS,
Chez BOSSANGE ET MASSON, Libraires de S. A. I.
et R. MADAME MÈRE, rue de Tournon, n° 6.
1810.

LA LOGIQUE
O V
L'ART DE PENSER:
*Contenant, outre les Regles communes, plu-
sieurs observations nouvelles propres
à former le jugement.*

A PARIS,
Chez JEAN GVIGNART le pere, au pre-
mier Pillier de la grand' Sale du Palais, au
Sacrifice d'Abel.
CHARLES SAVREUX, au pied de la
Tour de Notre-Dame.
JEAN DE LAVNAY, sous le Porche
des Ecoles de Sorbonne.
M. D. C. LXII.
AVEC PRIVILEGE DU ROY.

1660



1966

Arnauld & Lancelot (1660)

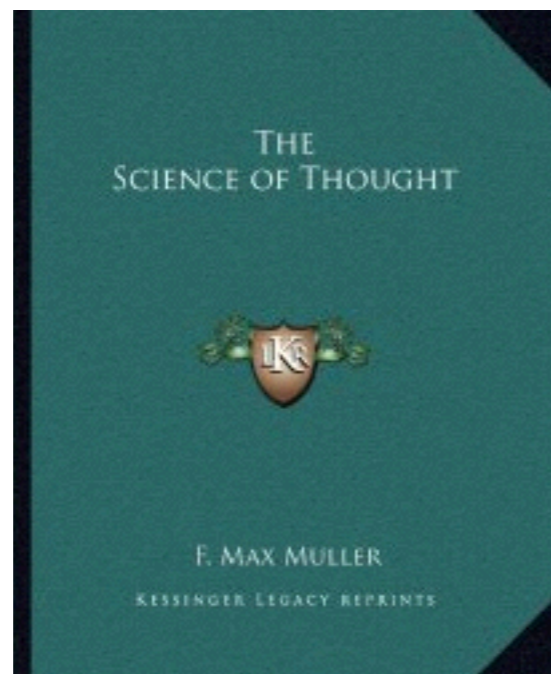
Grammar is 'universal' insofar as it mirrors the independently given structure of 'thought', the proper theory of which is logic.

Chomsky (1966)

Grammar is 'universal' insofar as it is a genetically specified domain-specific 'organ'.

“Whose job is it to provide a ‘theory of thought’” (Ken Wexler, p.c.)?

- Mueller (1887) identified the ‘**science of thought**’ with that of language.



A *general* theory of '**mental representation**' is no substitute for a theory of human-specific thought.



- What 'thought' are we talking about?
 - **Conceptual** rather than perceptual.
 - **Intentional** and **intensional**.
 - **Referential** and **propositional**.
 - Arbitrarily **creative** within the bounds of a **generative system**.

- **Language** without such **thought** would not be language (but a parody).
- **Thought** not expressible in **language** would not be thought of the same kind.

Methodology

- Refute this 'minimalist' claim:

The generative system behind this kind of thought and behind language is the **same**.

- Four potential **refutational strategies**:
 1. Show that grammatical and semantic complexity simply do not **co-vary** cross-linguistically.
 2. Show that languages exhibit forms of structural complexity completely **unrelated** to semantic complexity (structural Case is an alleged example).
 3. Show for some particular constitutive aspect of mental complexity (say, selfhood) that it is **unrelated** to grammatical complexity.
 4. Show that in mental disorders, language is not **affected**.

- A precondition of (rational) thought is that it exhibits a **'formal ontology'**:
 - Objects
 - Events
 - Propositions
 - Facts
 - Truth values
- un-Cartesian linguistics entails that this formal ontology must **co-vary** with forms of grammatical complexity **one-to-one**.

[propositions [events [objects]]]

[CP

[vP

[DP]]]

- The origins of **reference**:

DOG

⊘ DOG

DOG-s

a DOG

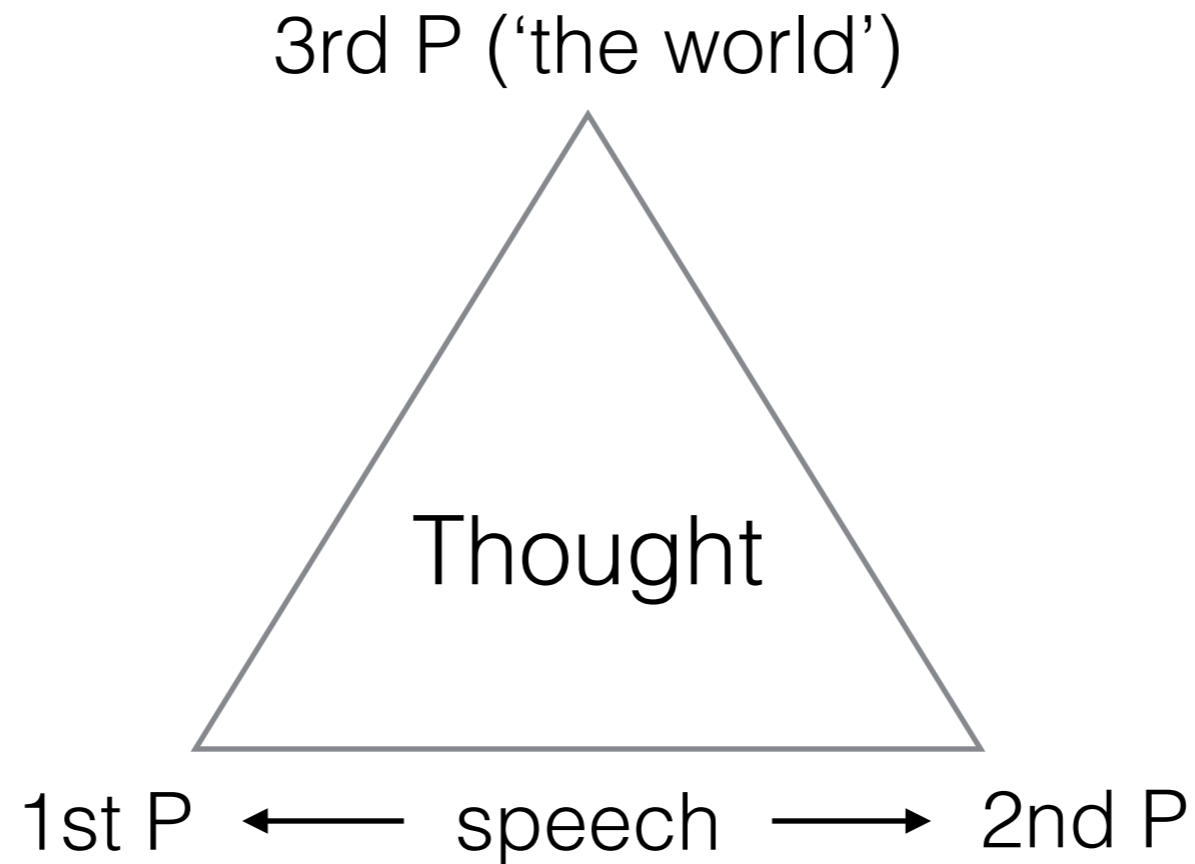
the DOG

this/that DOG

those kinds of DOG-s

those three (kinds of) DOG-s there

The deictic frame



- So reference in humans comes with:
 1. The creative choice of a **lexical description**.
 2. **Grammar**, which creates a ‘functional edge’.
 3. A **deictic frame**.
- (1) induces **intensionality**, hence identity of two objects of reference cannot be determined non-linguistically.
- Same is true for likeness in formal ontology.

Their smiles
They smile



- Same **lexical** concept (SMILE).
- There *is* a **meaning** difference.
- There is **grammatical** difference.
- The difference is one in **reference**.
- And in **formal ontology**.

Summary

- **Reference** is content of grammar.
 - The **cognitive function of grammar** is not classification, but the conversion of lexical concepts into **referential expressions**.
- **Across major mental disorders, we see fundamental problems with reference.**

- The **forms** of object **reference** more specifically:
 - Generic
 - Indefinite
 - non-specific
 - specific
 - Definite
 - non-specific
 - specific
 - Rigid
 - Deictic
 - Personal

A hierarchy of reference

(*the) *(NP) < *(a) *(NP) < *(the) *(NP) < *(this) (NP) < *(he) (*NP) < you < I
indef/quantificational << definite << deictic << personal

Topological mapping

(Longobardi, 1998, 2005)

- Why are **proper names** paradigms of ('rigid') object reference, if they lack a determiner?

The grammar of proper names

[**DP** Il mio [**NP** Gianni]].... (expletive-associate chain)
the my Gianni

[**DP** Gianni mio [**NP** t_{Gianni}]].... (movement chain)
A diagram consisting of a horizontal line with a vertical line at each end. From the left vertical line, an arrow points upwards to the word 'Gianni' in the DP above. From the right vertical line, a line points upwards to the trace 't_{Gianni}' in the NP above.

*[**DP** mio [**NP** Gianni]].... (no PF-visible chain)

- **Object reference iff N-to-D movement**
[substitution]

Parameterization: English

Old John came in.

*[_{DP} John old [_{NP} t_{John}]]



A diagram consisting of a horizontal line at the bottom, a vertical line on the right side, and an arrow pointing upwards from the horizontal line to the word 'John' in the phrase structure above.

(***overt** movement)

[_{DP} the old [_{NP} John]]

(not object-referential!)

[_{DP} D old [_{NP} John]]

(***covert** movement)


Predictions, I: bare NP in English but not Italian can receive referential reading

I love (*the) good wine.

amo	*(il)	buon	vino
love.1SG	the	good	wine

Predictions, II: proper names are 'rigid'

[reference Goedel [description t]]



The diagram shows the text "[reference Goedel [description t]]". A horizontal line with an upward-pointing arrow at its left end and a vertical line at its right end connects the word "Goedel" and the variable t . This indicates that the reference of the name "Goedel" is determined by the description t .

- After N-to-D movement, there is no descriptive condition mediating reference.
- Therefore, there is no change in reference across changes in description.

Updating the TMT

(Sheehan & Hinzen, 2011)

- Object-reference is **three-fold**:

1. Possibly **empty edges**:

[EDGE \emptyset [INT kings of France]] GENERIC, QUANT, WEAK INDEF

2. Necessarily **filled** edges and filled interiors

[EDGE the [INT kings of France]] VAR REF WITH NP-RESTRICTION

3. Empty **interiors** (or CHAIN):

[EDGE Gianni mio [INT \emptyset]] RIGID

Extending the TMT

(Hinzen & Sheehan, 2013)

- **Clauses** have reference, too, referring to:
 1. Propositions
 2. Facts
 3. Truths

The intuition

(Frege, 1898)

- Sentences (with a truth value) are '**derived** proper names'.

A parallel?

(*That) John left.
(*The) John...

The extended TMT: Clausal reference

1. Possibly empty left edges: PROPs
He believes [**CP** (that) [**TP** kings of France are all dead]]
2. Obligatory filled left edges+interiors FACTs
He resents [**CP** *(that) [**TP** kings of France are all dead]]
3. Obligatory empty interiors: TRUTHs
[**CP** (*That) [**TP** kings of France are all dead]]

Predictions, I

- **Maximal** intensionality in PROP
- **Intermediate** intensionality in FACT
- **Minimal** intensionality in TRUTH

Predictions, II

- **Existence presupposition** for ‘definite CPs’:
 - John cares that the earth is flat.
 - The kind of France is bald.

Predictions, III

- Languages like English with covert V-to-C should forbid overt matrix C:

*That John left.

- Languages like German with overt V-to-C movement (V2) should lack an assertive reading when there is a lexical, non-expletive C present blocking the movement:

Dass Du ja das Fenster öffnest!
that you (PRT) the window open

Predictions, IV

- There should be languages with expletive-associate V-C CHAINS:

Cf. Enunciative 'que' in **Gascon**:

*(Que) soi gascon [Gascon, Campos (1992: 912)]

C am Gascon

'I am Gascon.'

- Que appears to be precisely restricted to finite 'assertive' clauses.

Predictions, V

- Factive complements should be distinguishable **grammatically** as a separate class (see Sheehan & Hinzen, 2011).

The crucial test case

- Non-assertive **non-factives**: e.g. *doubt, deny, be possible*
- Non-assertive pure **factives**: e.g. *regret, resent, be surprised*

Parallels between the 2 kinds of non-assertives, I

- Embedded root phenomena:
My mother claims/says/thinks/knows that **to read so many comic books** is a waste of time.
?My mother doubts/denies that **to read so many comic books** is a waste of time.
?My mother **resents/minds/cares** that to read so many comic books is a waste of time.

Parallels between the 2 kinds of non-assertives, II

- ‘Slifting’ impossible:
**The class is cancelled, he regrets/resents/doubts/denies.*
- Both can take gerundive Complements.
I resent/regret/avoid/deny [PRO being wrong].
**I assume/disclose/know/suppose/say [PRO being right].*

Differences between the 2 kinds of non-assertives

1. True factives can never be the **Main Point of Utterance** (Simons 2007):

What's up with Mary?

I think/guess/know [she's not feeling well].

[I regret that she's not feeling well].

It's possible/likely [she's not feeling well].

2. Non-assertive non-factives freely permit **subextraction**, but true factives are weak islands (cf. Vikner 1995):

*When do you regret that he arrived?

When is it likely that he arrived?

3. True factives disallow **C-drop**, non-assertive non-factives freely allow it:

I doubt/it's possible/likely (that) John's late.

I regret/resent/care/mind *(that) John's late.

Conclusions

- The grammatical character of reference is reinforced when we see it **crossing** lexical category.
- Grammar may ‘carve out’ the *entire* space of 3rd Person reference, in the domain of **both** DPs and CPs.

Unfinished business

What about **event**-reference?
What about **self**-reference?

Hobbes, DeVilliers, Nordmeyer, 2011: Study of '**event-abstraction**'

- 61 2/3/4 olds.
- Act-out procedure



Results (Fig.2 from DeVilliers, 2014)

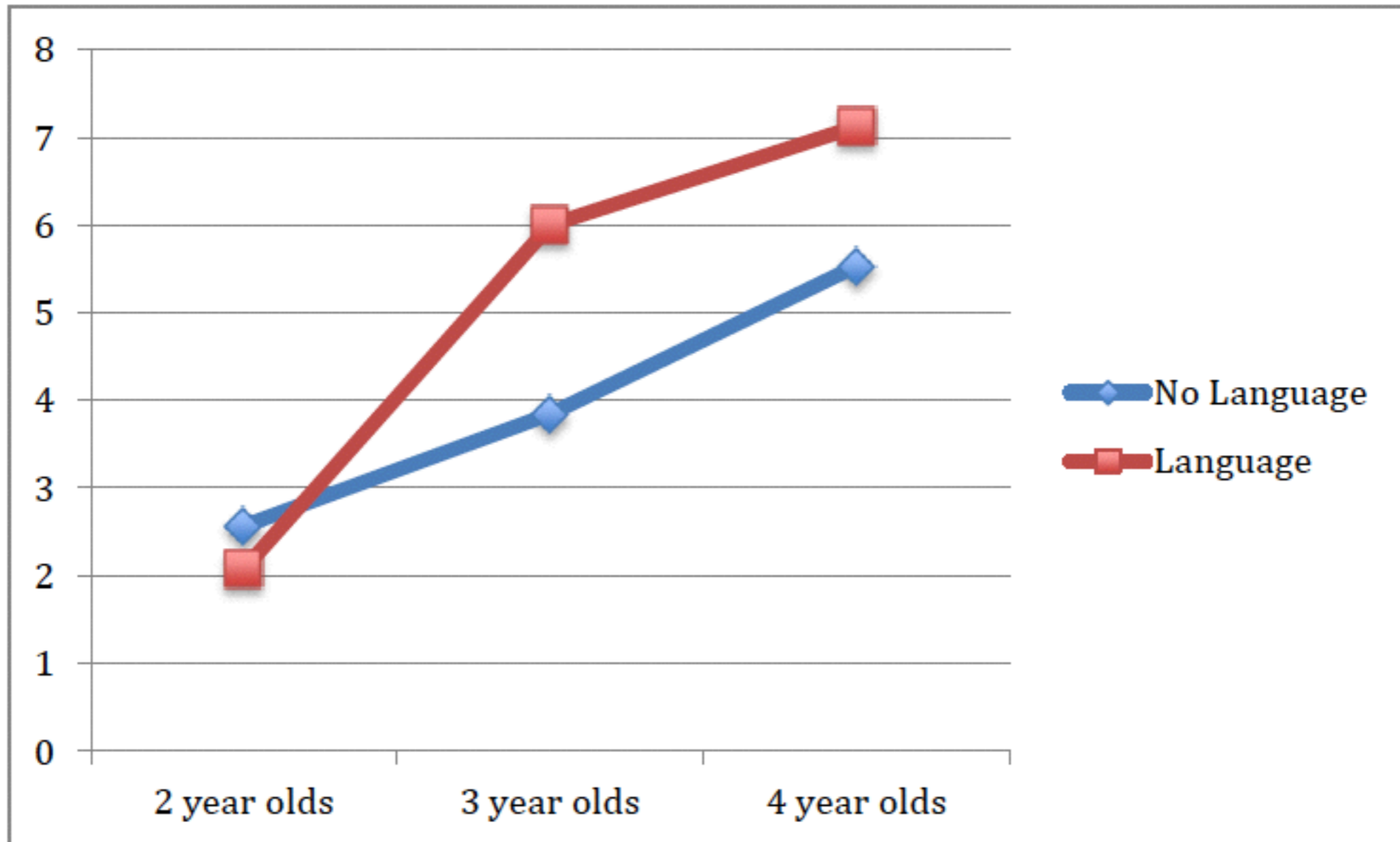
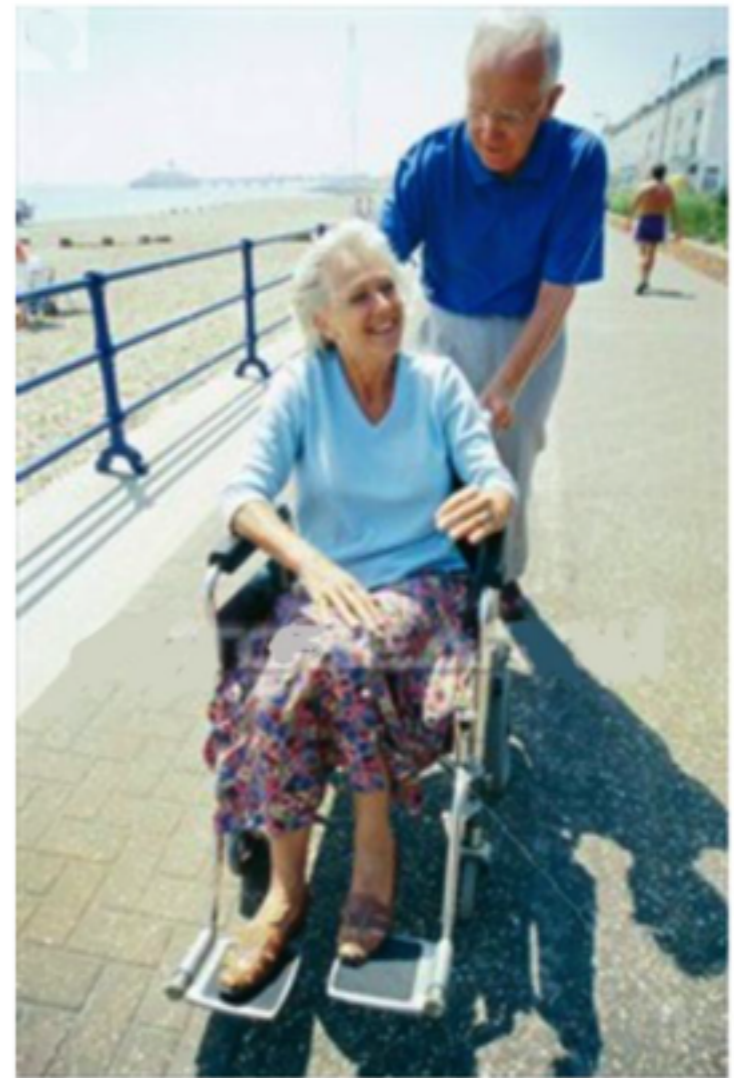


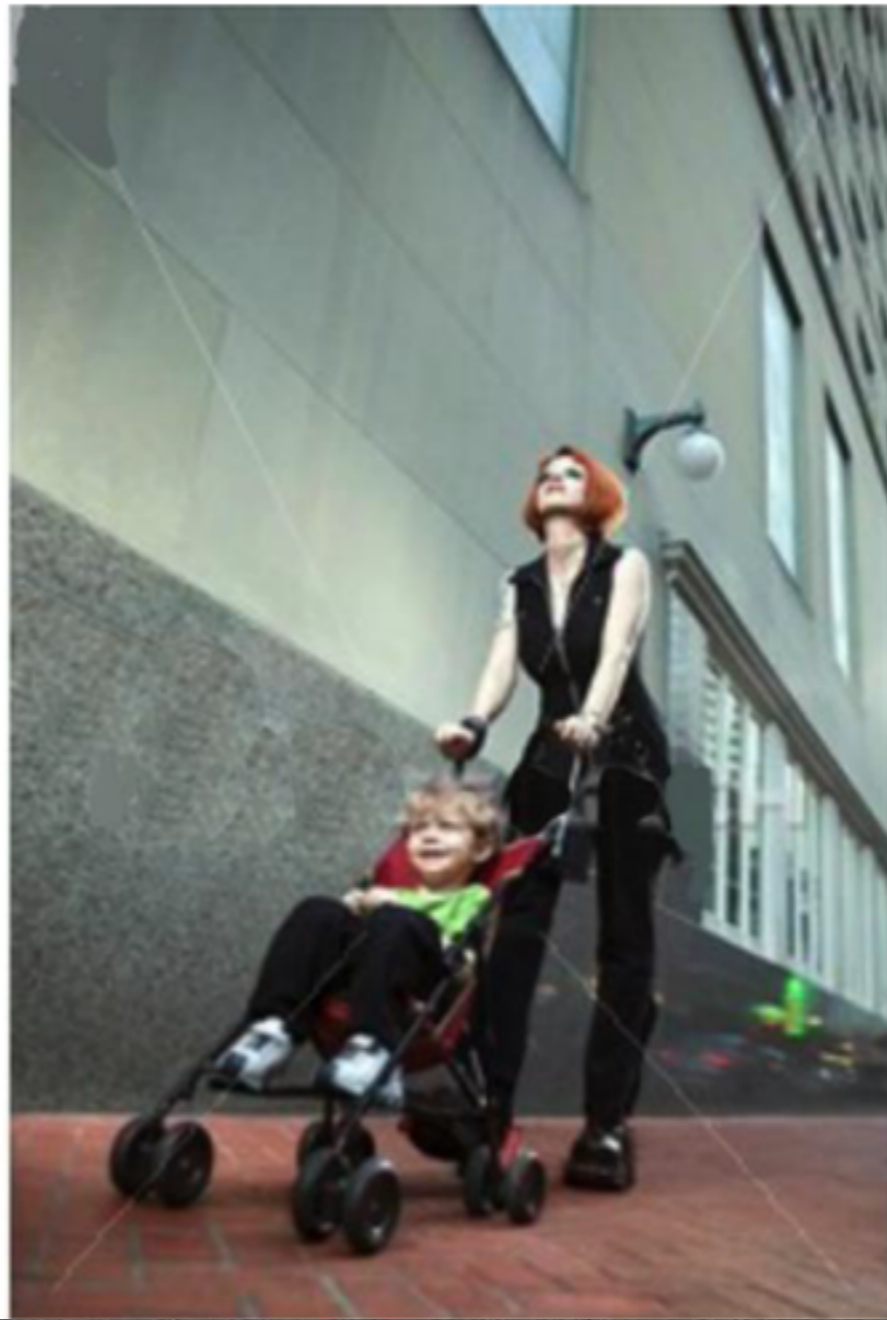
Figure 2

Study 2 of DeVilliers, 2014

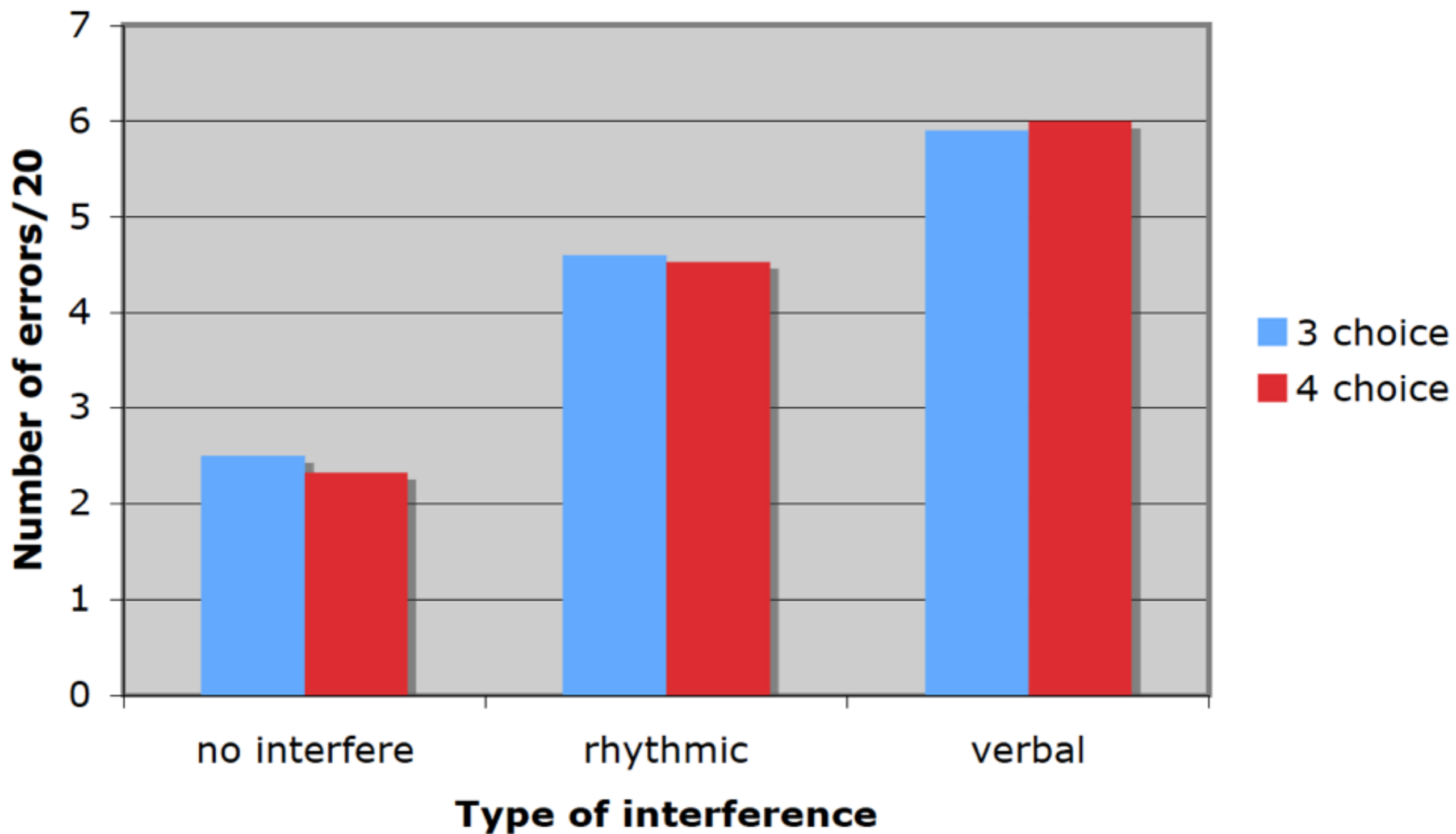
- 63 adults (aged 18-22)
- picture choice procedure under conditions of (i) **verbal** or (ii) **rhythmic** shadowing matched for attentional demands.



6 seconds later...



Errors on event matching



Study 3 of DeVilliers, 2014

- Controlling for executive demands (rehearsal, response selection): Adults (N=27) in an **eye-tracking task** reduced to chance when forming implicit concepts of the **'same' structured event** while verbally shadowing.
- Measure: **Anticipatory eye-gaze.**



Study 4 of DeVilliers, 2014

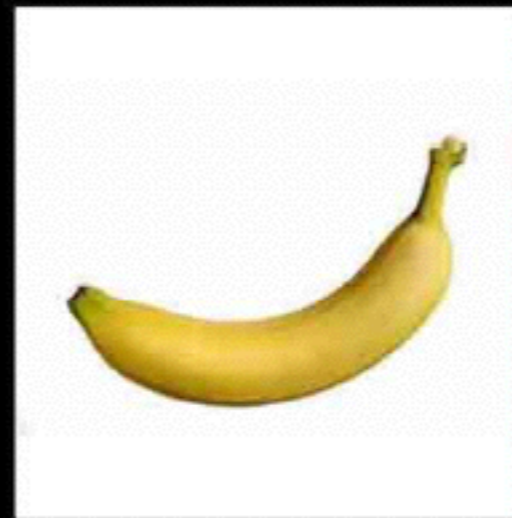
- Same results with animation: adults cannot track similarity across events, as determined from a verbal description (complex VP).



Study 5 of DeVilliers, 2014

- What kind of abstract concepts does verbal shadowing *not* disrupt?
- Verbal shadowers **completely fail to generalize to the concept of negation**, while generalising appropriately to natural kinds?





Summary

- There is considerable evidence that the formal ontology of the world is not the same when we use language (VP-structure) and when we do not.

Is this grammar the most complex in the domain of object-reference?

- Martin & Hinzen (2014): a study of the internal complexity of Romance object clitics.
- **Predicative** clitics < **Accusative** clitics < **Dative** clitics
non-referential **can** be referential **must** be referential

Predicative nominals

- Lack **referentiality**, banned from subject and IO (DAT) positions, cannot express **definiteness**, have **lowest** scope, and do not support backward **anaphora** (Picallo, 2007; Dechaine & Wiltschko, 2002):

- a. El president necessita **escorta** SPAN
the president needs bodyguard-MASC
- b. En Pere sempre porta **jaqueta** SPAN
Pere always wears jacket-FEM
- c. Hay **silla** para todos CAT
there is chair-FEM for everybody
- d.*Como ya **la_i** he arreglado, podemos conservar el whisky en **barrica_i**
as already it-FEM have.1S fixed, can.1.P preserve the whisky in cask-FEM
'As I have already fixed it_i, we can keep the whisky in cask_i'

Predicative clitics

El president **en** /***la** necessita
The president PART/*ACC.3FS need.3S
'The president needs it' (a set of bodyguards)

- 'en' lacks phi-features and Case.

ACC clitics

- Also specified for Gender and Number.
- Traditionally linked to reference and specificity.
- Out with negative phrases, nonspecific indefinites, or interrogative elements. E.g.:

*[A ningun bedel]_i lo_i veo trabajando
To no janitor ACC.3MS see.1S working

INTENDED: 'I see no janitor working.'

ACC clitics weak and strong

(*A) una secretaria_i todos la_i buscan
to a secretary all.PL ACC.3SF look-for
'They all look for a secretary' (quantificational)

*(A) una secretaria_i todos la_i buscan
to a secretary all.PL ACC.3SF look-for
'There is a secretary everybody is looking for.'

DAT clitics

- Pattern with strong ACC in terms of referentiality.
 - e.g., obligatory **[a]-marking**.
 - Also share a number of properties with **personal** clitics (e.g. **doubling**, **[a]-marking**, **deictic** interpretation, lack of **Gender**, incapacity to double **bare** (i.e. predicative) **nominals**).
 - Doubling is obligatory with referential nominals, which can then be **dropped**.
 - Like personal clitics, are arguably directly base-generated in inflectional positions, hence in an **edge** position (Roca, 1992, 1996, or Sportiche, 1996).

DAT clitics: illustrations

*Le_i di un libro a niño_i
dat.3s gave.1s a book to child

*Les_i di un libro a niños_i
dat.3s gave.1s a book to children

Obligatory [a]-marking with personal pronouns:

Me vieron *(a) mi
CL1S see.3P to me

Can only be referential:

*[A cada hombre]_i le_i dijeron eso *(a) el_i
To each man CL3S said.3P that to he
INTENDED: 'They told that to each man.'

Decomposing DAT clitics

Li dono els llibres **[a [la noia]_{ACC}]_{DAT}** CAT
DAT.3s give.1s the books to the girl

[l - i]

Definiteness DAT (Bonet, 1991)

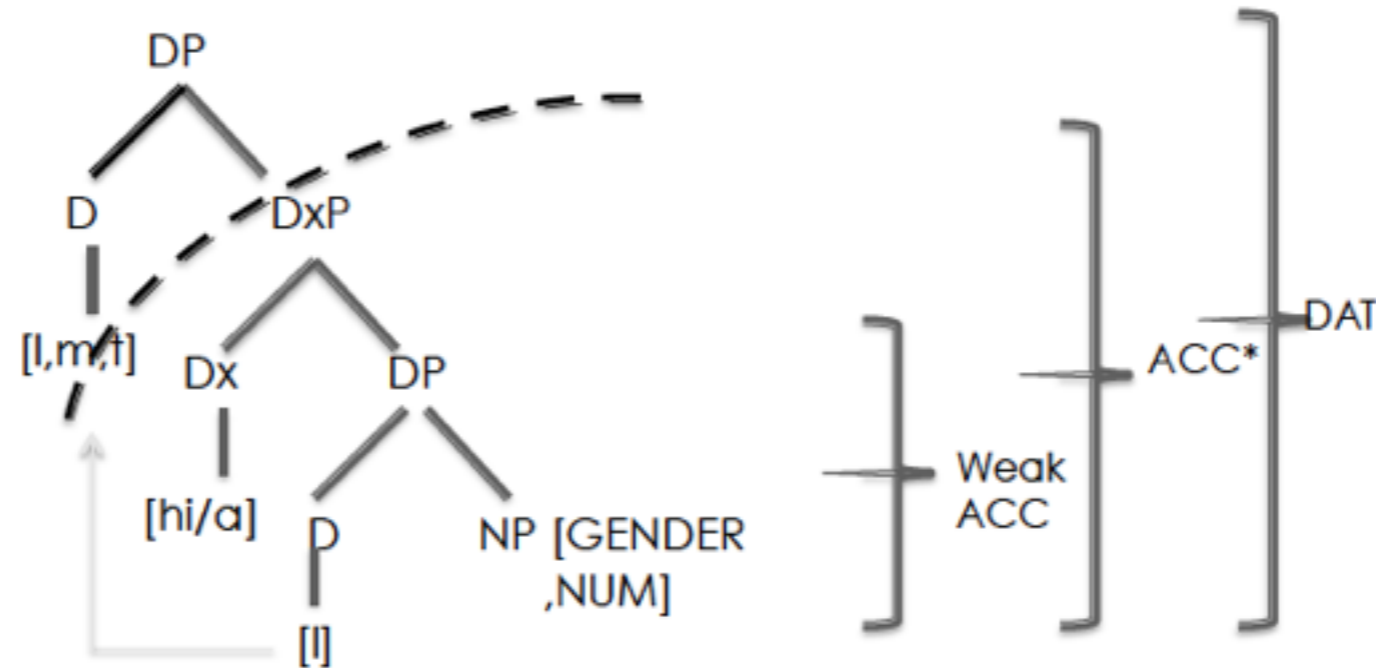
ACC + [i]

ACC + deictic = DAT (Martin, 2011)

Cf. French: Jean y pense or Jean pense à Marie

The extended left periphery

(Martin & Hinzen, 2014)



- Lat. dative pronoun *tibi*: second person [t] + deictic [i] + place [bi].
- Leu (2008) on *this man* as $[_{DP} [this\ here\ t_{NP}] [_{DP} the\ [_{NP} man]]]$.
- Greek determiner doubling: *afta ta nea fenomena*.

Summary clitics

- There is a progression, in terms of **referential import**, from predicative, neuter, and partitive clitics, to weak and then strong Accusative ones, and finally to Dative and personal ones
- Dative and personal clitics are essentially **exhausted** by the indexicality of the phrase they double, without which they can now appear, losing any descriptive content.
- This progression is mirrored by an increase in **grammatical complexity** (e.g. Gender, obligatory [a]-marking, Deixis, Person).

Conclusions

- Object, event, and fact reference are mediated by specific forms of **grammatical complexity**.
- A system with **lexicalised percepts** (=concepts) that has become **grammaticalised** so as to have a formal ontology, *is* a thought system.
- If grammar spans the entire **space of possible (rational) thought**, it must be involved when thought of this kind is disturbed.



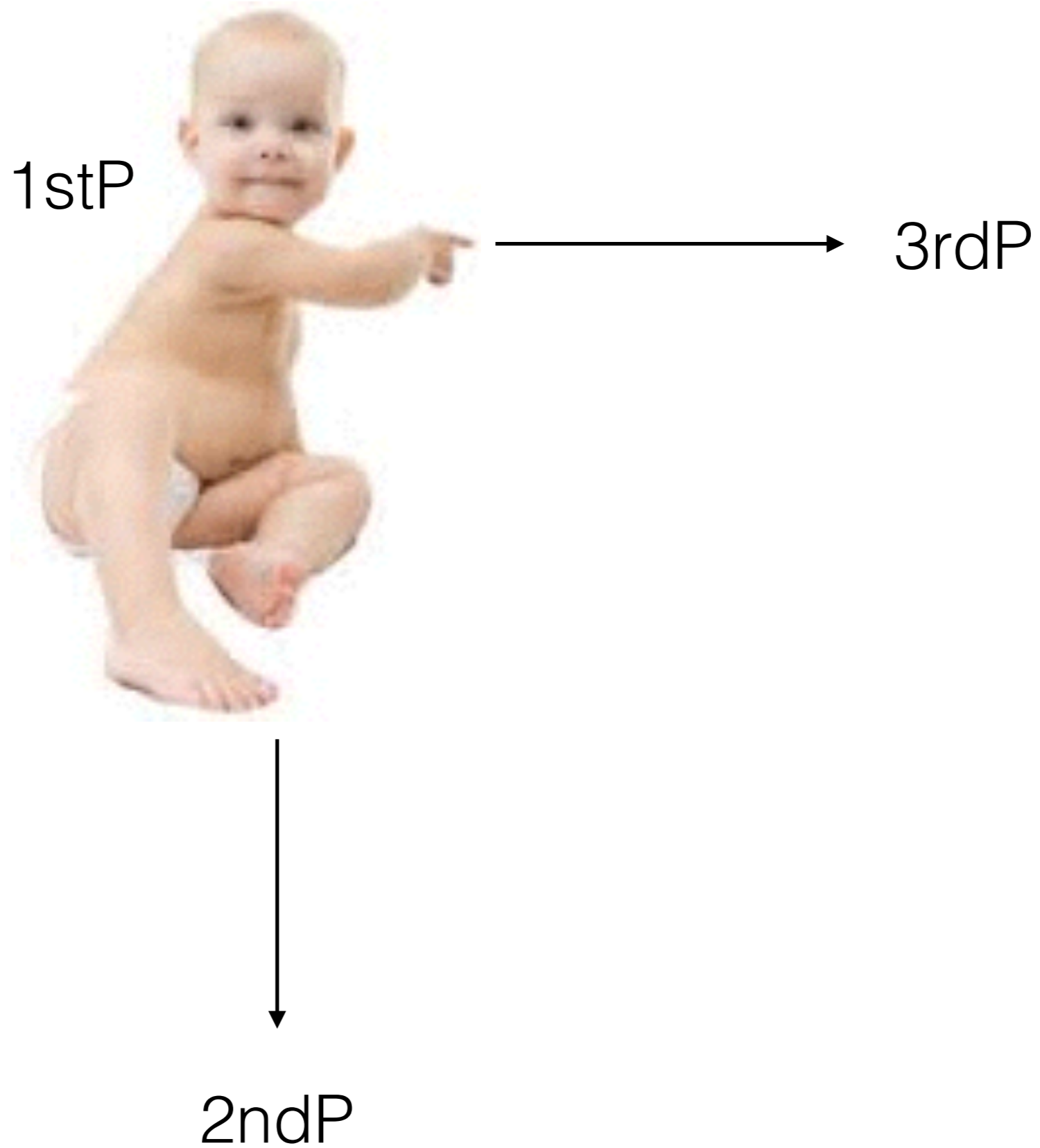
Language, self and mental health, II: The linguistics of autism

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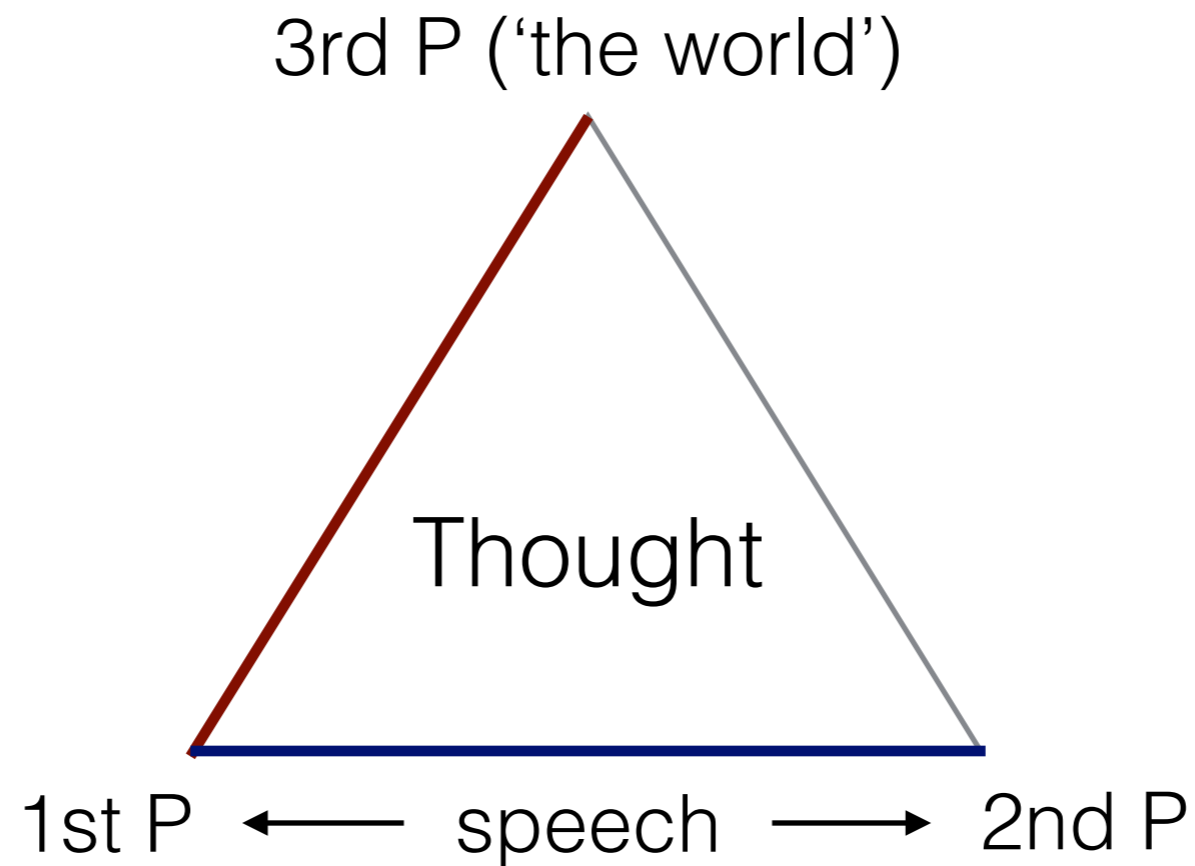


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Distorting the deictic frame



Autism: diagnosis (DSM-5)

- Impairments in:
 1. Social **communication** and interaction.
 2. Restricted and repetitive **behavioural** patterns.

Language is highly significant

- Virtually inseparable from (human) communication.
- The essential associate of human creativity.
- Dramatic delays in onset.
- Absent in 25-50% of cases, without replacement.
- Frequent reason for initial referral.
- Diagnosis.

From affect to cognition

- **Deficits** in non-linguistic cognitive variables invoked:
 - ‘theory of mind’ (ToM)
 - ‘Central coherence’

Introduction

The beautiful otherness of the autistic mind

(Happe & Frith, 2009)

Earlier 'modularist' visions, I

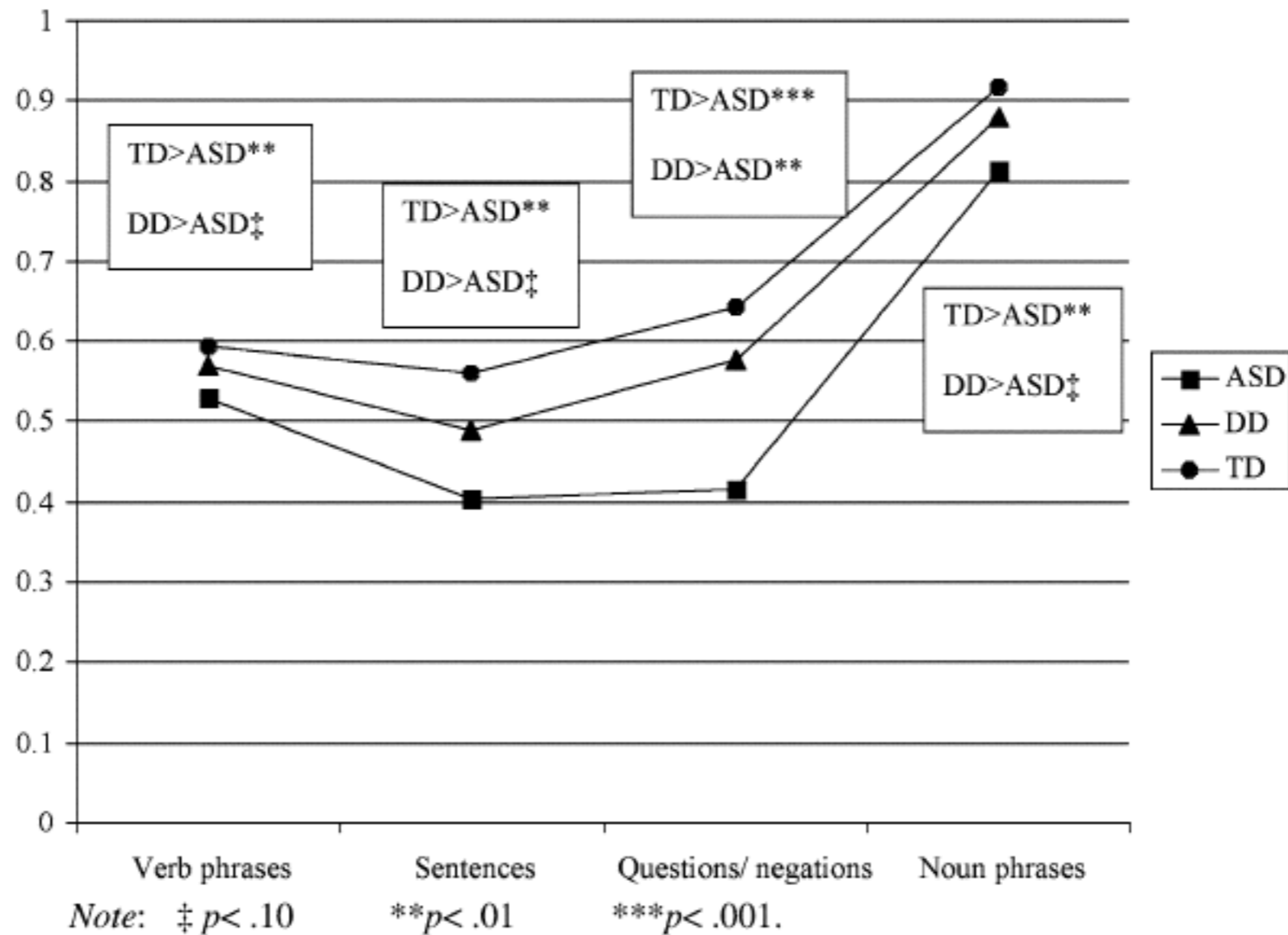
- Tager-Flusberg (1981): 'phonological and syntactic development **follow the same course as in normal children** and in other disordered groups, though at a **slowed rate**, while semantic and pragmatic functioning may be specially deficient in autism'.

Earlier 'modularist' visions, II

- **'Autism with language impairment' (ALI)**: deficits in structural aspects of language (non-word repetition, morphology) in a subtype of ASD comparable to Special Language Impairment (SLI) (Tager-Flusberg & Joseph, 2003).
 - Rapin & Dunn (2003) suggested a **relation** between phonological and syntactic deficits, and between semantic and pragmatic ones.
 - Kjelgaard & Tager-Flusberg (2001), too, suggest that phonological deficits are only present in those children **with** higher-order semantic and syntax deficits.

'Beyond pragmatics'

(IPSyn, from Eigsti et al., 2007)



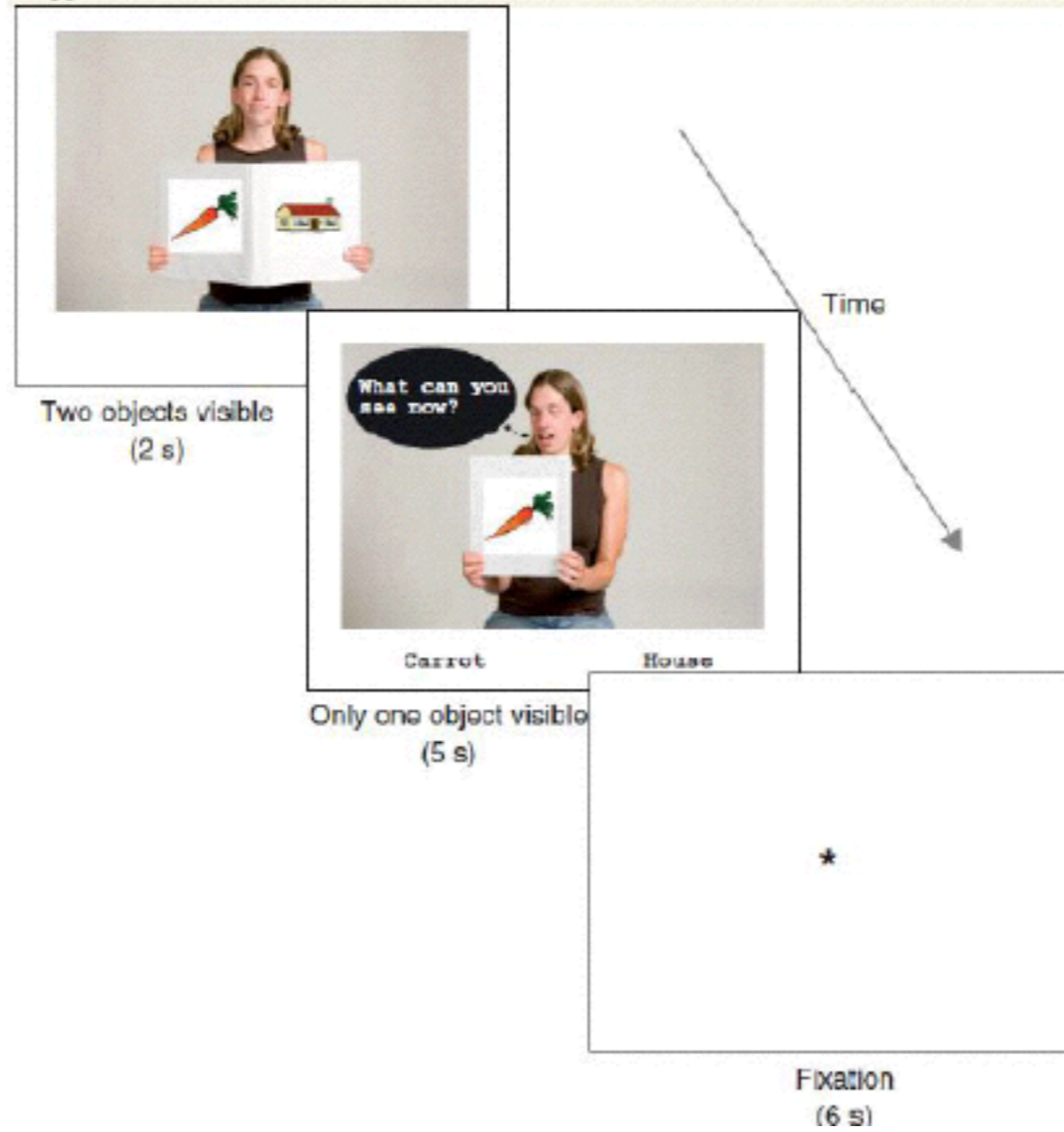
- Negative correlation between language ability and jargon/echolalia.
- Negative correlation with presentism/concretism.

Person-shift (to non-1st) in pronouns

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

Mizuno et al. (2011)

Fig. 1



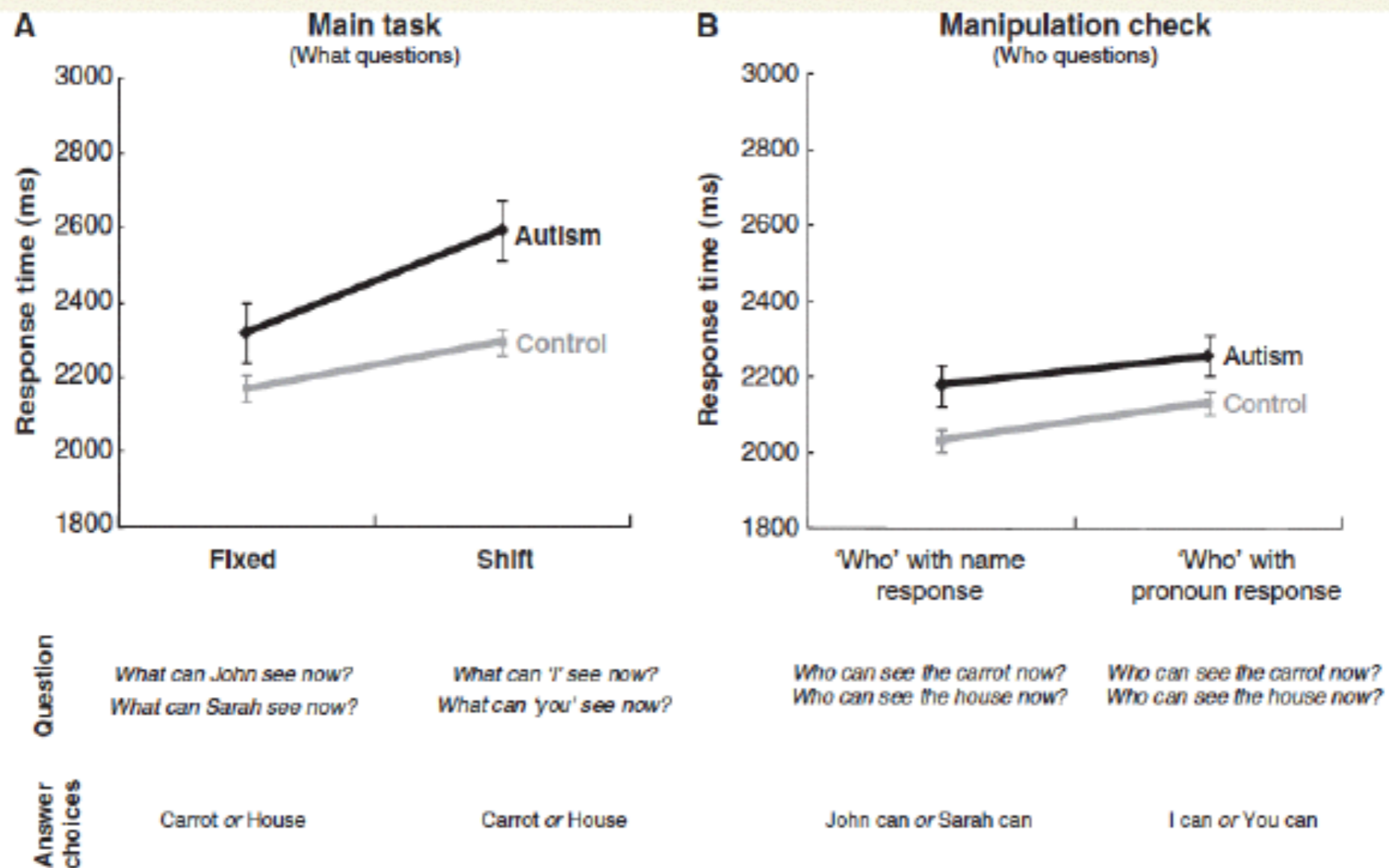


Figure 2 Mean reaction time. (A) A reliable interaction between the Group (Autism, Control) and Deixis (SHIFT, FIXED) ($P = 0.02$) for 'What can X see now?'. (B) No reliable Deixis and Group interaction for 'Who can see the Y now?'. The error bars represent the 95% confidence interval for the within-subject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

The nature of pronouns

- **Universal** in language (?)
- Crucially involve a (three-fold) **grammatical Person** distinction.
- Essentially devoid of **lexical-descriptive** content (and hence of lexical ambiguity).
- Can lose **phonological** content as well.
- **Lexicalized** cross-linguistically in highly diverse ways.
- Highly **grammaticalized**.

Pronouns are devices of self-reference

- Chest-drumming in gorillas.
- ‘Hrm’, ‘Hey’ in humans.
- Non-verbal (?) gestural (pointing)
- Verbal 3rd Personal:
 - This man thinks...
 - He who loves you does not want...
- Verbal 1st Personal
 - ‘I think...’

The meaning of grammatical Person

'I love you.'

= the relation between the lover and the speaker is identity, as and when the speech act takes place.

- So gr. Person involves reference to **speech acts**.

The grammar of personal reference

- The **least lexical**-descriptive way of all ways of referring.
 - 1stP pronoun lacks Gender and Number.
- The most **referential**:
 - NP-description is obligatorily absent.
 - Unmodifiable:
 - He who enters this room will be shot.
 - *I who enter(s) this room will be shot.
 - Personal pronouns resist binding:
 - I'm the only one around here who can take care of **my/his** children.
(Kratzer, 2009)

The significance of gr. Person

Kaplan, 1977

His/that guy's/your/Kaplan's pants are on fire

My pants are on fire.

Perry, 1977

Lingens/this famous professor is at Stanford.

I am at Stanford.

This is the Stanford library.

- 3rdP controlled PRO cannot enforce '**de se**' meanings:
 - John thinks he/this guy is a war hero
 - John expects [PRO to get a medal]
 - I expect [PRO to get a medal]

Why we need grammar for self-reference

1. Consciousness is **first-personal** essentially by definition.
2. 'Selves' are nothing that can be **empirically** discovered, as an object of experience.
3. **Essential indexicality**: Empirically, nothing can replace the specific form of self-reference that the grammatical 1st Person encodes.
4. The grammar of Person is defined via speech acts, which occur in the **deictic frame**, which grammar defines.

Dascalu comparative corpus study (2014),
 Dascalu, Schroeder, & Hinzen (2015)

	Age	Hours	Diagnosis	Nonverbal MA	language profile
Germain	5,4-5,10	5	ASD (PEP3)	1,8	complex, stutter
Lyron	4,6-4,10	4	ASD (PEP3)	3	simple, echolalia
Leonard	1,08-3,3	12	-		

Analyses quantitatives corpus autisme (from Dascalu, 2014)

1. Fréquence des types des formes non-standard chez Germain et Lyron en moyenne rapportées au nb. de formes de réf. à soi

Moyenne formes non-standard réf. à soi	Germain	Lyron
il pour je	24,80%	53,26%
tu pour je	6,78%	17,27%
Prénom	0,63%	1,67%
Il+prénom		1,67%
Prénom+il	0,43%	
sans sujet	3,45%	4,21%

2. Fréquence des formes non-standard chez Germain et Lyron rapportées au nb. de formes de réf. à soi

Séance	Référence à soi non-standard Germain	Référence à Soi - non standard Lyron	Nb. formes non-standard Germain	Nb. formes non-standard Lyron
Séance 1	63,83%	86,67%	30	39
Séance 2	43,75%	81,82%	14	27
Séance 3	20,51%	57,14%	8	8
Séance 4	21,43%	86,67%	3	13
Séance 5	36,00%		9	
Moyenne	37,10%	78,07%		

Table 5. Fréquence des différentes formes de « il » chez Lyron en occurrences et pourcentages (en moyenne, rapportés au nombre d'énoncés)

	il pour je	il pour tu	il pour elle - animé	il pour elle inanimé	il animé	il inanimé	il imp	total il personnel	total énoncés	total formes
Lyron 1	33	5	1	0	23	2	1	62	260	65
Lyron2	23	1	2	0	1	0	1	27	155	28
Lyron 3	7	0	1	0	10	1	2	18	287	21
Lyron 4	4	1	1	3	10	2	0	16	167	21
il pour je	il pour tu	il pour elle -animé	il pour elle inanimé	il animé	il inanimé	il imp				
46,32%	4,01%	4,55%	3,57%	33,55%	4,34%	3,66%				

from Dascalu, 2014

Lyron: 'il' as a 'passe-partout' referential device

- Not only 'il' for 'je' in **self-reference**, but also:
- 'il' for 'elle', animate and inanimate:

MOT: c'est toi Lyron?

MOT: tu fais un câlin à Naya?

CHI: il va tomber la neige!

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 ?

Germain: je/il/tu/PN/0 as **context-equivalent** in self-reference

*MOT: c'est très gentil!

*CHI: **il veut** du fromage blanc.

*MOT: tu veux du +...

*OBS: qu'est+ce+que tu veux jouer?

*CHI: **je veux** beaucoup les voitures de police!

*MOT: c'est qui que tu regardes dans la glace?

*CHI: **il se** regarde dans la glace ...

*CLE: <je me regarde dans la glace>

*CHI: se regarde dans la glace!

*CLE: comment je m' appelle?

*CLE: je m' appelle Clément.

*CHI: et **je** m' appelle Germain!

*CLE: tu prends un coussin?

*FEL: regarde!

*CHI: **tu** feras une colère!

*CHI: **0** est en train de mettre la tête (.) **Germain** est en train de mettre la tête dans l'éléphant!

Non-standard reference to **others**

	Non-standard 2ndP	Non-standard 3rdP
German	je elle Maman elle elle Maman c'est maman qui	—
Lyron	il Maman il elle maman je	Il pour elle (animé) Il pour elle (inanimé) elle pour il (inanimé)

'Perspective-taking' and 'self-reference' as such

Germain:

CHI: une pause...

MOT: une quoi ?

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

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

MOT: tu veux que je te donne une pause?

Lyron:

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

[il=CHI; ta=CHI]

MOT: tu veux des smarties dans la main ?

Germain:

*MOT:c'est bon ?

*OBS: il n'a pas le temps de respirer hm?

*CHI: **il va avoir des problèmes!**

[il=CHI; PERSP:OBS]

(exs from Dascalu, 2014)

Imitation, role-playing

Germain.

*CHI: **<où est petit lapin?>** [change of voice]

*MOT: tu veux?

*CHI: je veux une bougie!

*MOT: voilà c'est bien!

Germain.

*OBS: Germain (.) tu me regardes!

*CHI: **<je m'appelle pas Germain (.) je m'appelle robot télécommandé!>** [=! imite].

*MOT: pfuuu@i!

*MOT: un robot télécommandé!

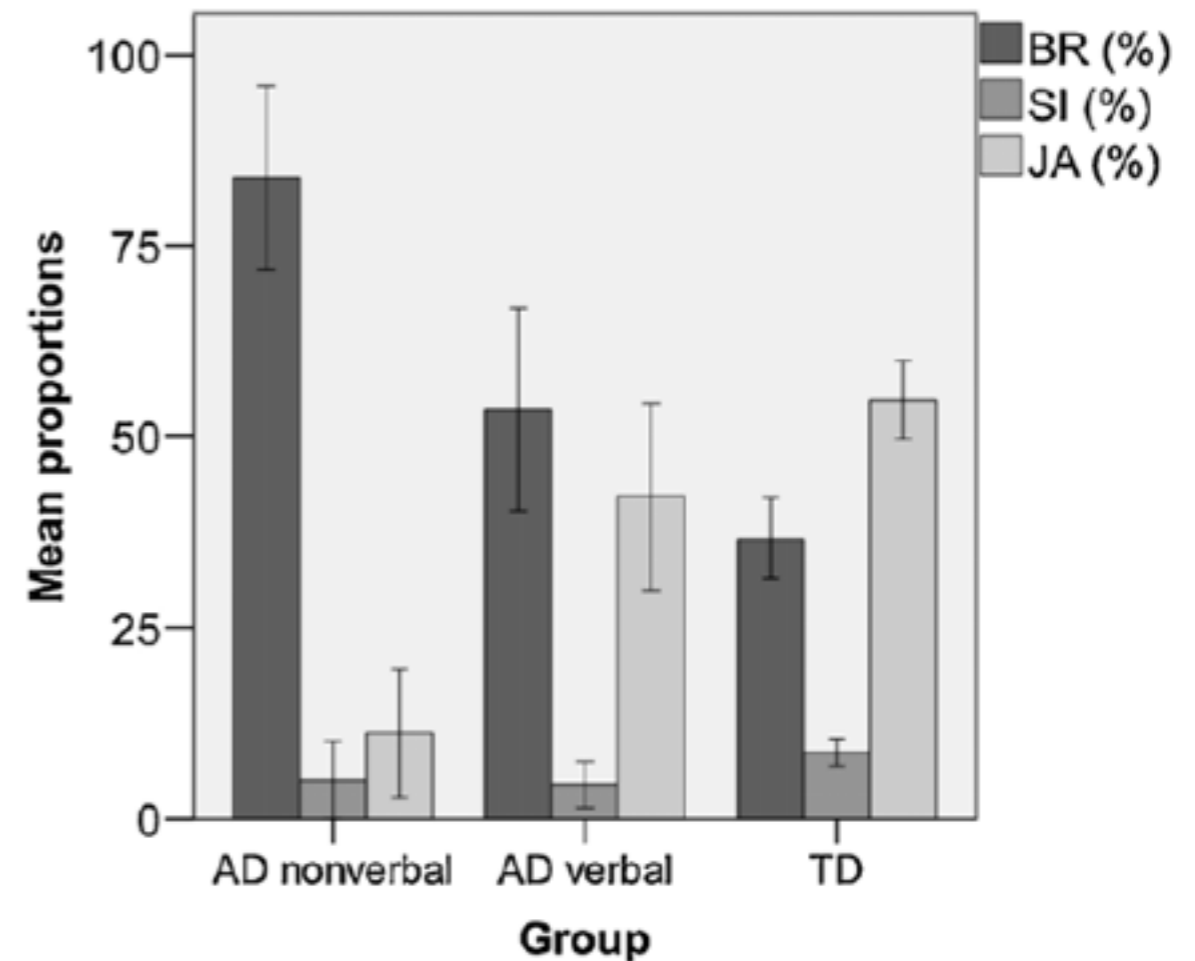
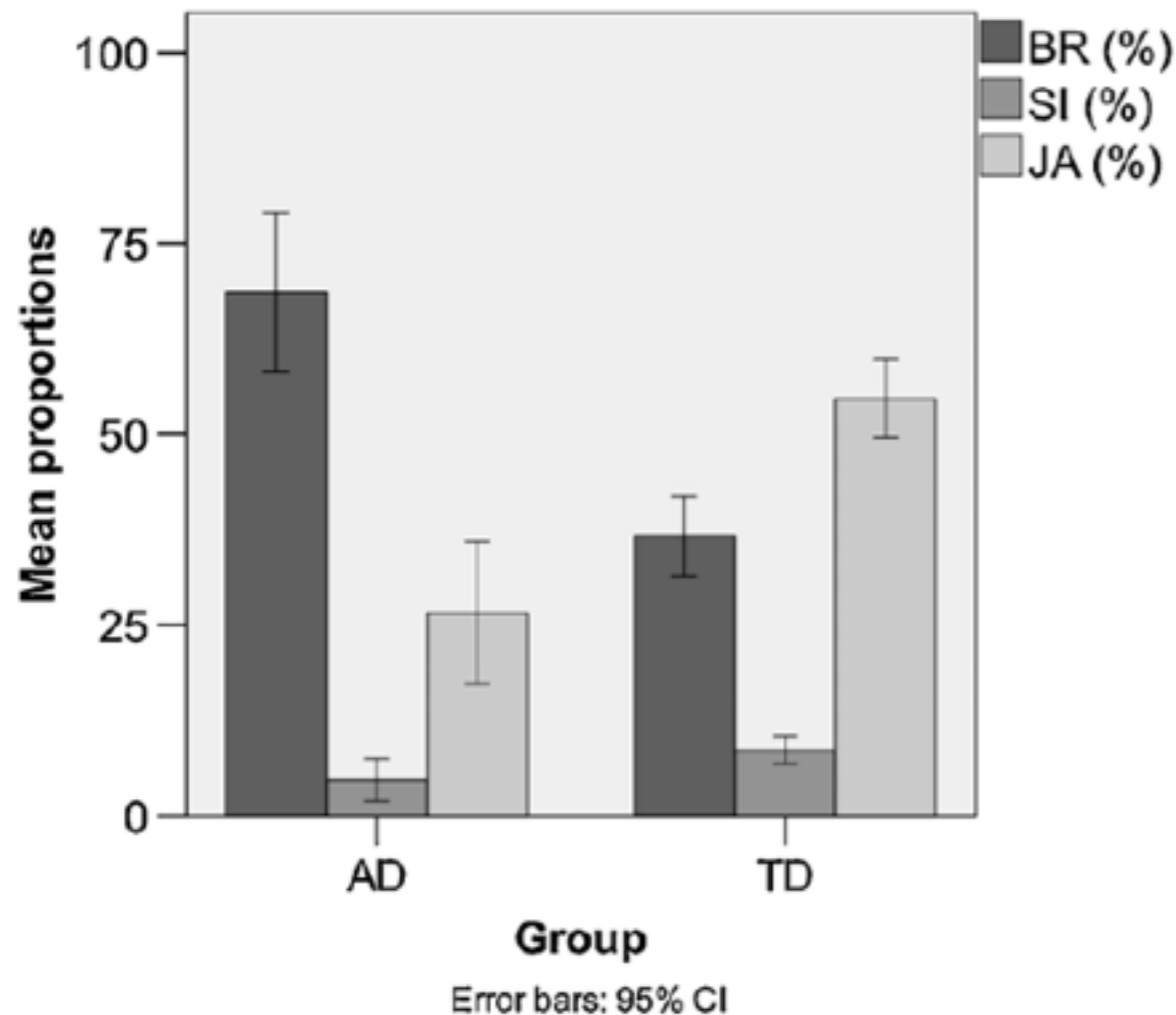
Summary

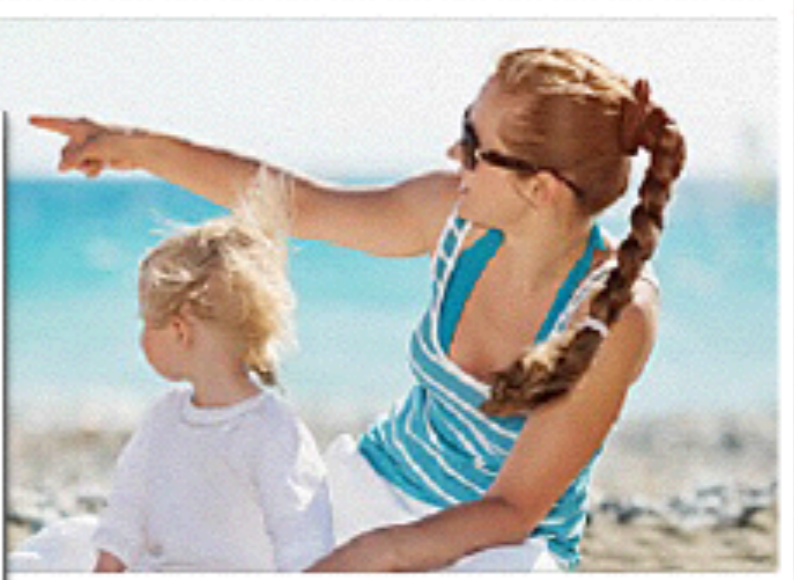
- Take language out of the equation, and we see no obvious problems in:
 - ‘communication’
 - ‘turn-taking’
 - ‘Perspective-taking’
 - (self-) reference
 - the lexicon (indeed, a relative strength)
- The problem lies with the relational meaning of **Person** and the use of **language-specific** forms of the above.

So-called 'non-verbal' communication

Intentional communication in nonverbal and verbal low-functioning children with autism

Jarymke Maljaars^{a,*}, Ilse Noens^b, Rianne Jansen^b, Evert Scholte^a, Ina van Berckelaer-Onnes^a





A Longitudinal Study of Joint Attention and Language Development in Autistic Children¹

Peter Mundy,² Marian Sigman, and Connie Kasari

Table IV. Predictors of Language Development in the Autistic and Language-Matched MR Samples

Initial testing	Follow-up Language age scores	
	Autistic children	Language-matched MR children
Joint attention	.61^a	.49
Social	-.10	.16
Request	.09	.19
Language	.37	.81 ^b
Mental	.22	.60 ^a
Chronological age	.17	-.06
IQ	.03	.47

^a $p < .05$ (two-tailed).

^b $p < .01$ (two-tailed).

Pointing and grammar are correlated

(Mattos & Hinzen, 2015; Cartmill et al., 2014)

- ‘Reinforced’ declarative gestures predict the onset of D+NP constructions.
- ‘Supplemented’ gestures predict sentences.



Pointing in ASD

Foundations for self and other: a study in autism

R. Peter Hobson and Jessica A. Meyer

Developmental Psychopathology Research Unit, Tavistock Clinic, London and Institute of Child Health, University College London, UK

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 $2\frac{1}{2}$ 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

R. Peter Hobson · Rosa M. García-Pérez ·
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

Children with ASD **‘show no knowledge of definite articles’** (Modyanova, 2015)

introductory page



test page, example of ‘another’ response

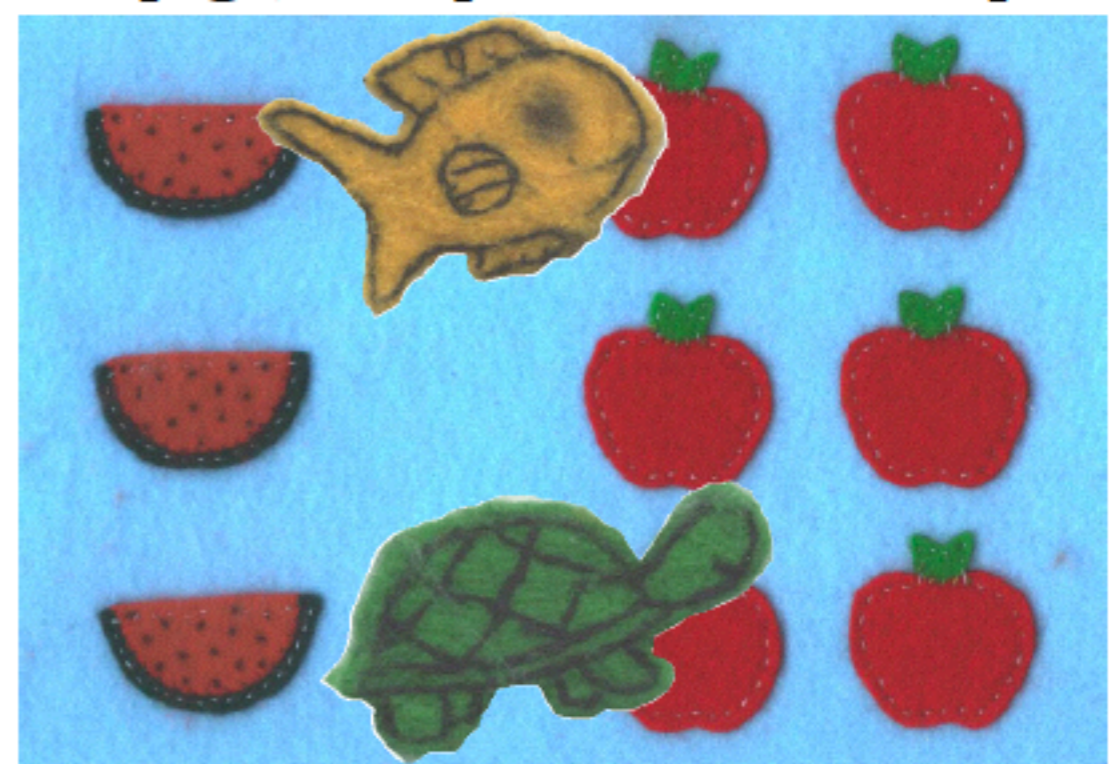


Figure 5.1. Experimental set-up

‘Fishy touches an apple.’
‘Turtle touches a/another/the/that apple.’

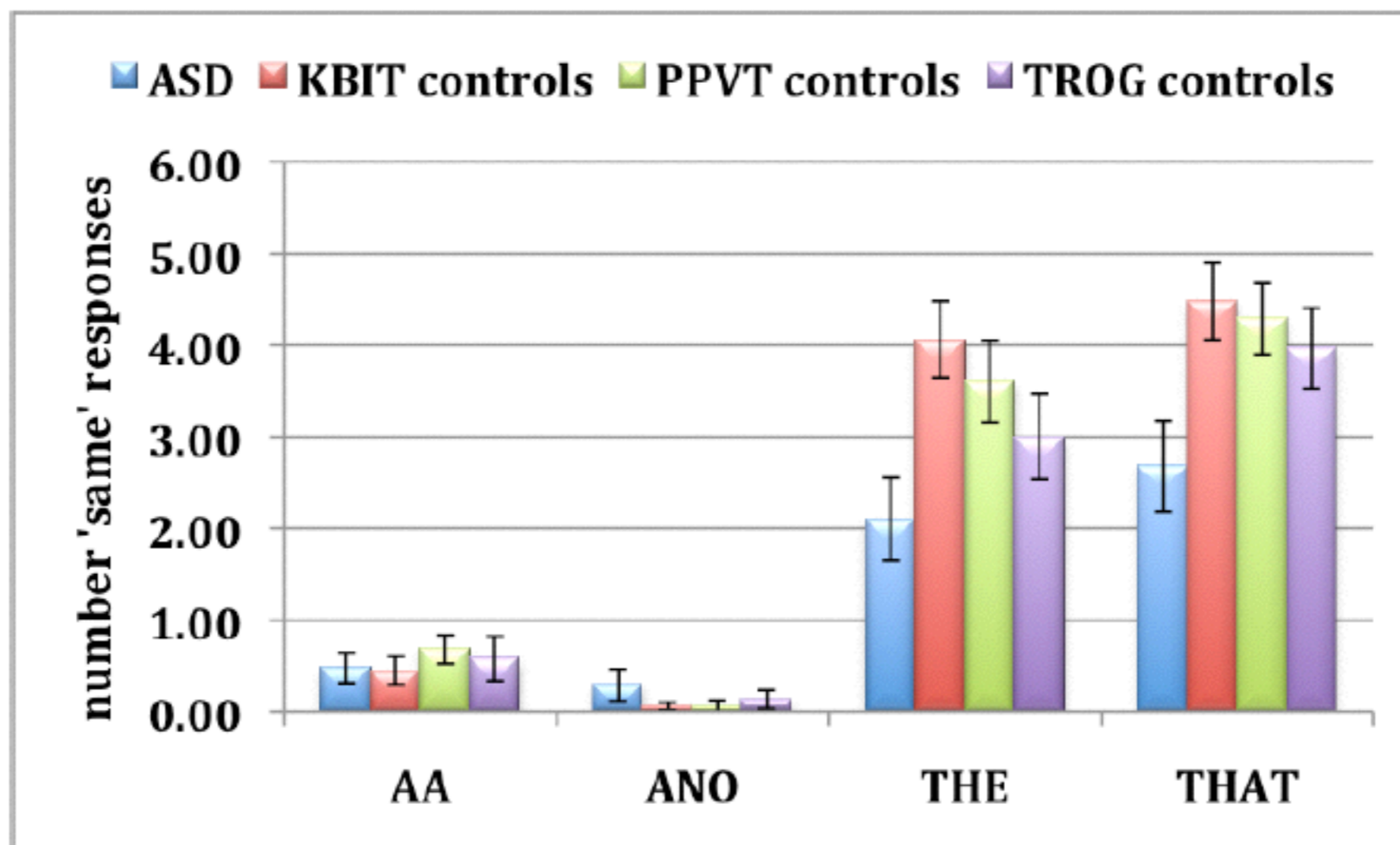


Figure 5.3. Number 'same' responses (out of 6) as a measure of knowledge of determiners in all ASD and their TD controls (error bars represent +/- 1 SE)

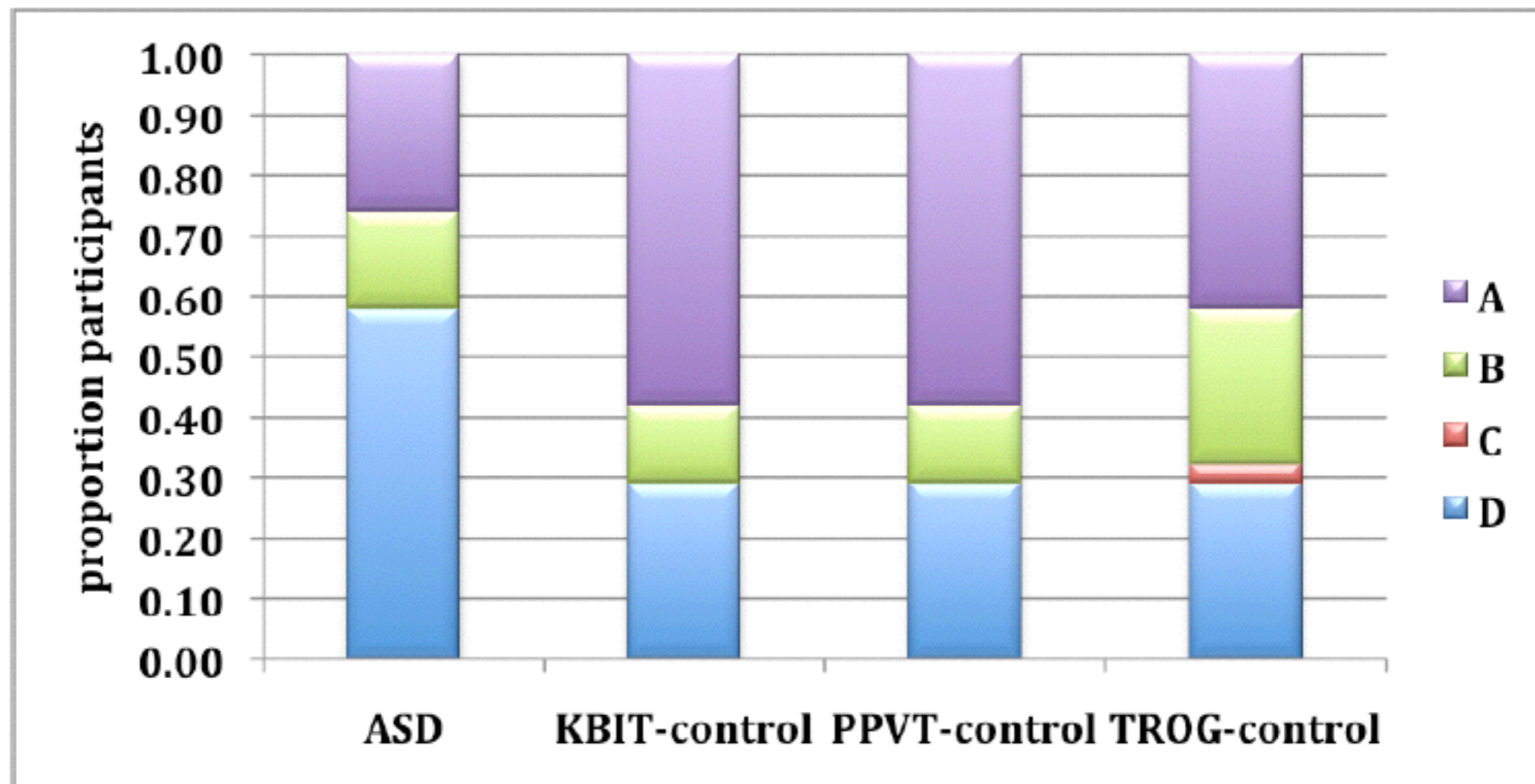


Figure and Table 5.4. Proportion of all ASD participants showing adult like (A), semantic deficit (B), pragmatic deficit (C) or null knowledge (D) patterns.

- TROG-performance as significant co-variate and predictor of article knowledge.
- No ASD child does worse on 'that' than on 'the'.

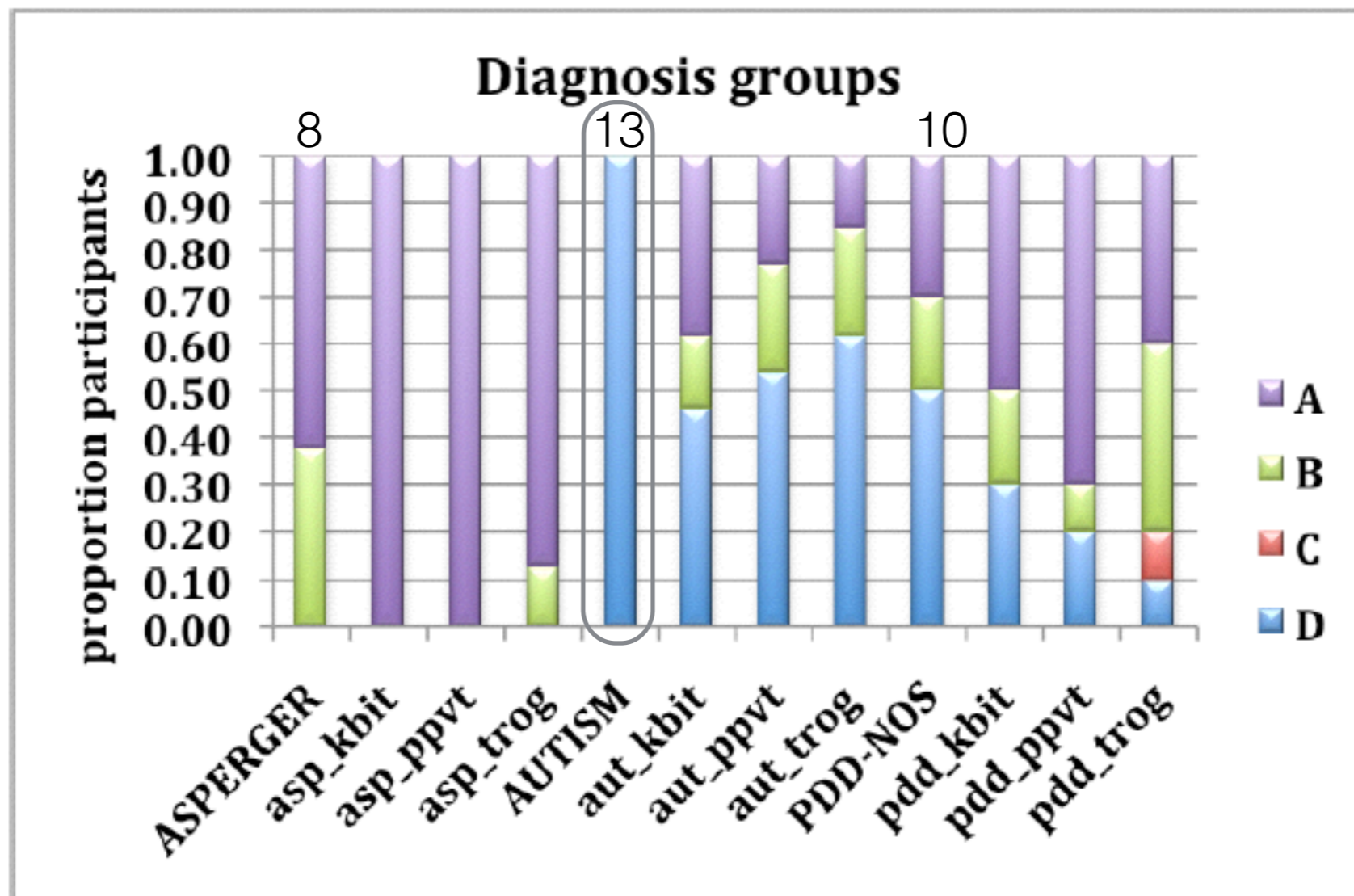


Figure and Table 5.11. Article endophenotypes within clinical diagnosis subgroups and their TD controls

Monitoring the mind

- One use we make of language:
 - [S [S]]
 - [John believes [I like him]]

Read this mind



- A language-**independent** ToM mechanism:
 - would not explain why we think **propositionally** about either the world or our own and other minds.
 - Would need to **replicate** structural aspects of language, such as clausal embedding or Person distinctions.
 - Appears to be **unnecessary** as a mechanism separate from language.
- ToM is highly correlated with language in development (DeVilliers, 2007).

The influence of language on theory of mind: a training study

Courtney Melinda Hale¹ and Helen Tager-Flusberg²

1. Department of Anatomy and Neurobiology, University of Massachusetts at Boston, USA

2. Department of Psychiatry, Children's Hospital, Harvard Medical School, USA

Abstract

This study investigated the role of language in the development of theory of mind. It was hypothesized that the acquisition of the syntactic and semantic properties of sentential complements would facilitate the development of a representational theory of mind. Sixty preschoolers who failed false belief and sentential complement pretests were randomly assigned to training on false belief, sentential complements or relative clauses (as a control group). All the children were post-tested on a set of different theory of mind tasks, sentential complements and relative clauses. The main findings were that the group trained on sentential complements not only acquired the linguistic knowledge fostered by the training, but also significantly increased their scores on a range of theory of mind tasks. In contrast, false belief training only led to improved theory of mind scores but had no influence on language. The control group, trained on relative clauses, showed no improvement on theory of mind post-tests. These findings are taken as evidence that the acquisition of sentential complements contributes to the development of theory of mind in preschoolers.

Conclusions

There is a well-documented **Person** shift in autistic speech is part of larger **grammatical** disturbance in the declarative and definite-specific and deictic **referential** use of language.



Language, self and mental health, III: The linguistics of schizophrenia

Wolfram Hinzen

ICREA/Universitat de Barcelona/Durham University

www.grammar.cat



Grammar & Cognition Group



Eugen Bleuler's **primary and fundamental** symptom of 'schizo-phrenia'

- '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.

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 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)

- Bleuler's own experimental methods were **word association experiments** carried out with his assistant C. G. Jung, who theorized that:

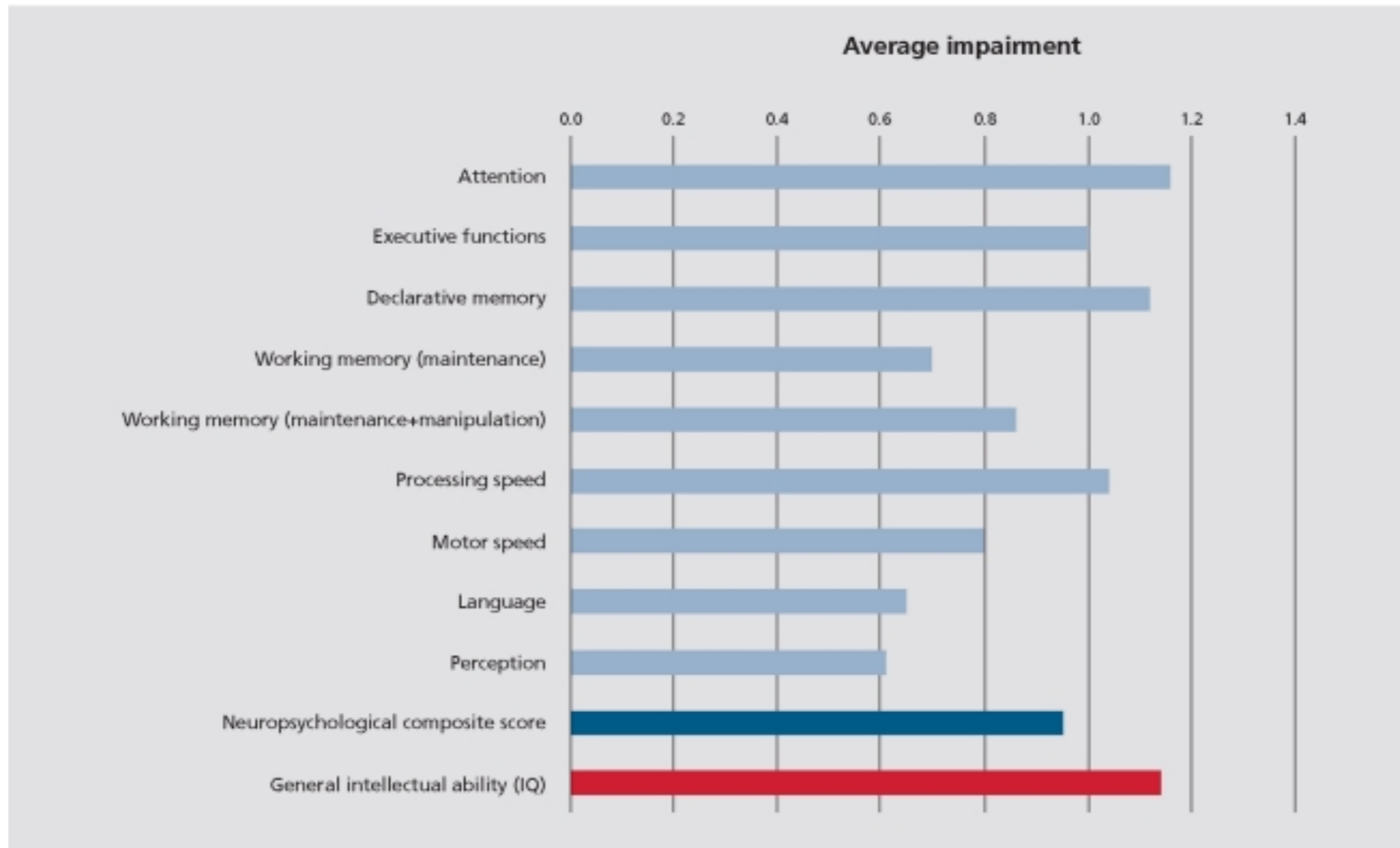
'words are really something like condensed action, situations and things. [They are] linguistic substitutes for reality' (Jung, 1910:223)

- Aim: discover “objective complex indicators” (Jung/Eder 1919, p.396) of unconscious complexes and measure their effects.

An Example of a Normal Reaction Type

Stimulus word	Reaction Time Unit 0.2 second	Reaction	Reproduction
head	9	foot	part of the body
green	11	blouse	
water	14	clear	light
to sing	6	children	
dead	11	do not like	
long	6	short	I, tall
ship	7	forth	
to pay	9	bills	
window	9	room	
friendly	10	children	
table	9	chair	room
to ask	10	all kinds	
cold	7	warm	

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.

'Schizo-phrenia' seen through a linguistic lens (Hinzen & Rossello, 2015)

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** production.
3. Delusions:
 - False and bizarre **utterances/assertions** that cannot be true.
 - 'Negative' symptoms: **alogia, ambivalence.**

Breaking the language frame

Speech **content** (Delusions)

Thought

Speech **production**
FTD

Speech **perception**
AVH

Predictions

General:

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

Specific:

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

Some well-known symptoms

- **Neologisms**, word associations in thought disorder.
- Patients with schizophrenia ‘frequently fail to use **pronominal reference** correctly’ (Frith, 1992:99).
- Failure to **locate the self** in deictic space:
 - *‘I am Jesus’*
 - *‘The Mafia is trying to kill me.’*
 - *‘This cloud formation refers to an impending disaster in my life.’*
- Becoming a **3rd or 2ndP** as own thoughts become speech acts directed to oneself.
- Non-standard forms of **self-reference**: Some patients refer to themselves only in the 3rd Person, some only in the 2nd (Bleuler, 1911); misuses of your own proper name.

Language changes in schizophrenia as a whole

Morice & Ingram (1982) achieved a diagnostic accuracy of 95% in discriminating schizophrenic, manic and non-patient control speakers on the basis of a syntactic profile:

- **Reduced syntactic complexity**
- **Fewer well-formed sentences**
- **More sentences with syntactic and semantic errors,**
- **Lesser fluency of speech.**

- Docherty et al. (2003), Docherty et al. (1996), Docherty et al. (1988) found that **confused references, structural ambiguities and ambiguous word meanings** can characterise psychotic states generally, but are over-represented in schizophrenia, with **referential disturbances** transpiring as a stable feature independent of symptom (or thought disorder) severity.

- **Idiosyncratic thinking** (Harrow & Marengo, 1986), **poverty of speech and content** (Andreasen, 1979b), and **disorganization** (Holzman et al., 1986) are more specific to schizophrenia, while derailment, tangential speech, illogicality, incoherence, and loss of goal are all found in mania (Andreasen, 1979b).
- However, peculiar use of language, disorganized and disconnected speech, verbal underproductivity are **state-dependent** in mania (Andreasen & Grove, 1986; Harrow & Marengo, 1986; Spohn et al., 1986), unlike in schizophrenia (also Harvey et al., 1984; Harvey et al., 1990; Marengo & Harrow, 1987)

Disordered speech (Formal thought disorder, FTD)

- Insofar as there are 'lexical-level' anomalies, 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.
- The uncontrolled intrusion of irrelevant aspects of **context** is a classical feature of discourse in FTD (Chaika, 1974).

Two kinds of 'the' and 'this' in FTD (courtesy Morteza Yazdani)

- (1) They assure me that all the bits inside are working quite well.
- (2) I've seen on the tele.
- (3) It's my dad who answers the phone all the time. †
- (4) Because of the lifestyle I have.
- (5) I don't trust the system.
- (6) In the past.
- (7) All the time.
- (8) That keeps you fit.
- (9) You know, it's all this, knock on effect, sitting on the settee and doing nothing.
- (10) This issue with this fella coming round here has been going on.
- (11) I just want to sort of lie in here and shut the door, close the curtains and turn me phone off. Now, that is my wellbeing.
- (12) I don't think these people know what they're talking about.
- (13) I built **a machine**. I got an engineering company to manufacture the core components that were necessary, and I built **the machine** around the components. . . .**The engineering company** was going 'Oh, wow, we want some of this.'

Pilot study

- Two patients in PaLS, SH and DA, one of the 'disorganized', one of the 'empty' type.

	SH 'disorganization'	DA 'poverty of content'
Total Utterances	221	221 (7 pages of 90)
"the" count (%) / definite	19 (%8.59) / 2	57 (%25.79) / 0
"this" count / definite	18 (%8.14) / 2	37 (%16.74) / 0

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

- (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)

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!

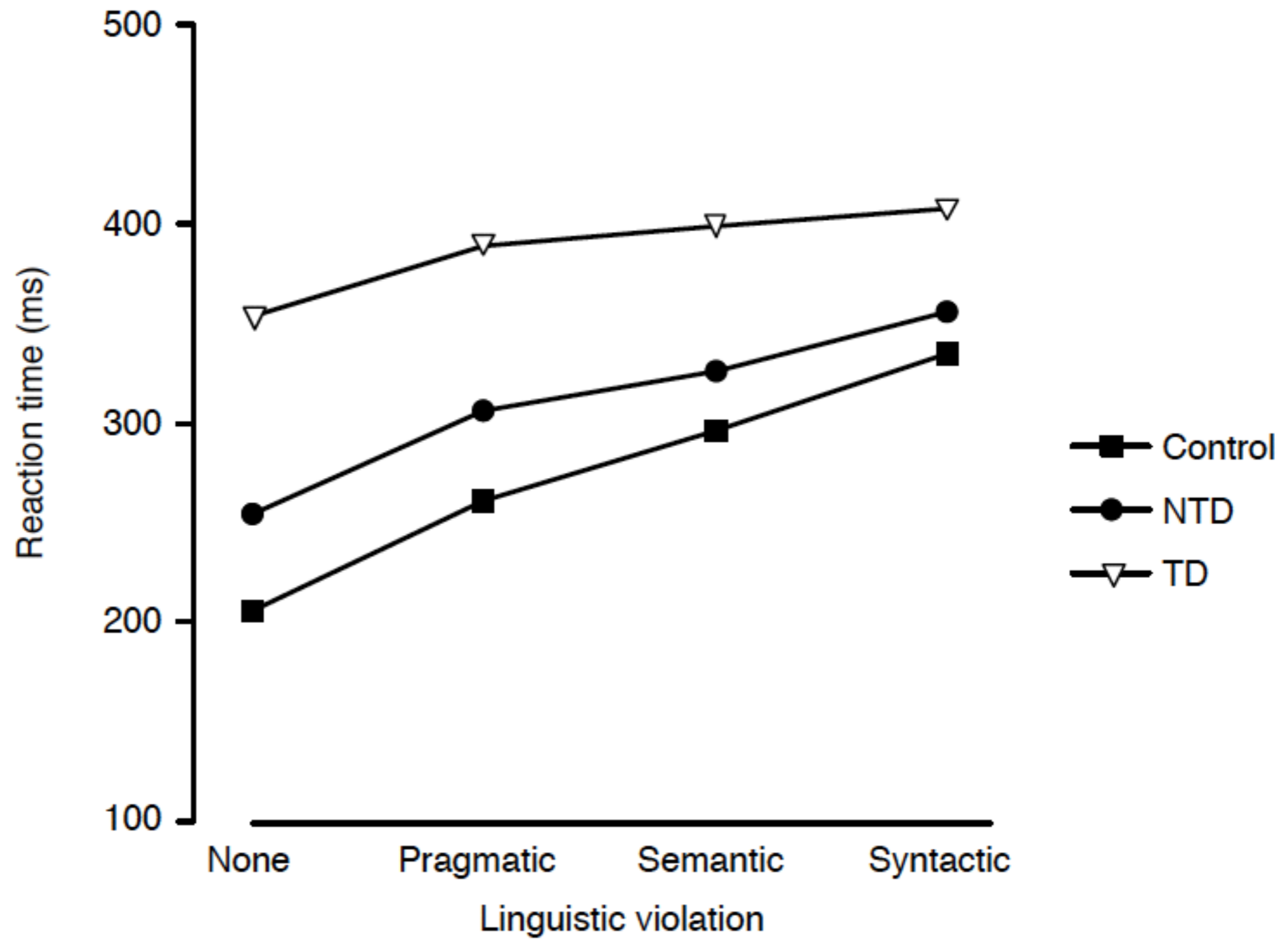
S: Before that, I was earning £6.00 a week in a barber shop.

(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’.

Kuperberg et al., 1998 word monitoring (reaction time) study

Pragmatic	The verb preceding the target is replaced by another verb of the same frequency. This makes the sentence pragmatically implausible with respect to our knowledge of real world events.	‘The crowd was waiting eagerly; the young man buried the guitar . . .’
Semantic	Verbs are selected so that their semantic properties are incompatible with the semantic properties of the noun.	‘The crowd was waiting eagerly; the young man drank the guitar . . .’
Syntactic*	Intransitive verbs are chosen that cannot be followed by a noun in direct object position.	‘The crowd was waiting eagerly; the young man slept the guitar . . .’



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.

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**.

Referential delusions

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

'Iipseity' disturbances

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

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.

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.

Mental disorders

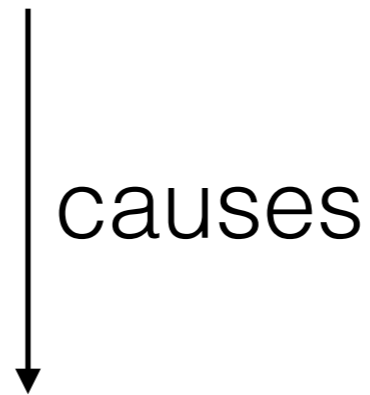
Principled **linguistic diversity**
affecting pronouns specifically.



Connected to a fundamental difference
in **cognitive type** or 'style'.

The deficit view

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



psychiatric **symptoms**



'pragmatic' deficits in **language**

Conclusion: a new vision

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



psychiatric **symptoms**



a breakdown of the **language frame**

Neural Correlates

- A recent reviewer of Hinzen & Rossello (2015): “**ToM neural substrates (i.e., ventromedial prefrontal cortex and TPJ) do NOT overlap with the neural substrates for ‘language’.**”
- There *should* be such overlap on the present view, insofar as mind-reading is conceptual.
- Some recent neurolinguistics *does* suggest such overlap, and between ‘concepts’ and ‘language’ more generally.

Language comprehension is sustained by an extensive left-lateralized network

- The 'extended language network' of Ferstl et al. 2008 includes the vmPFC (BA11) and ToM regions generally.

methods presented here for an objective comparison. However, the results presented strongly suggest an overlap between the ELN and the regions implicated for ToM processes in qualitative reviews [Frith and Frith, 2003]. Although in contrast to other reviews, specific contrasts testing for ToM using verbal materials were excluded, the aTL, TPJ, and dmPFC regions were clearly significant in several analyses. The most striking result was the network

Convergences

- Further findings indicate a convergence between the **ELN**, the ‘**language comprehension network**’ of Turken & Dronkers (2011), which in turn strongly overlaps with the ‘**(conceptual) semantic system**’ of Binder et al., 2009, who in turn sees the latter as ‘strikingly similar’ to the ‘**default state**’ of Binder et al., 1999 or Raichle et al., 2001, and the ‘**autobiographical memory retrieval system**’ of Maguire, 2001; Svoboda et al., 2006.
- Pomarol-Clotet et al. 2010 identify the **medial PFC** ‘as a prominent site of abnormality in schizophrenia’, connected to the **default state** through failures of deactivation, which the authors connect to over activation of conceptual activations mediating a **sense of ‘self’**.

Auditory understanding of linguistic meaning (Turken & Dronkers, 2004)

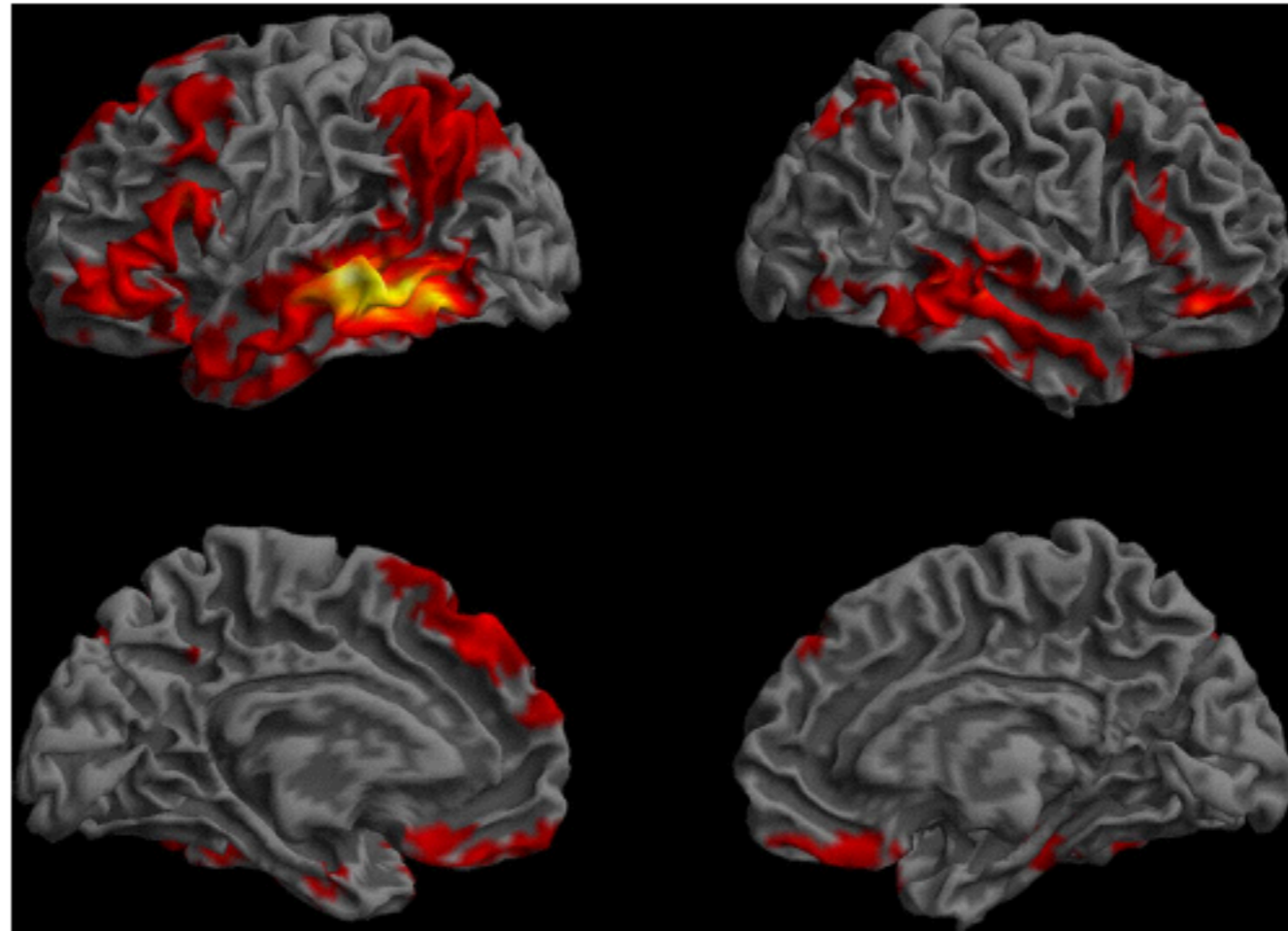


FIGURE 5 | Functional connectivity profile of the left posterior middle temporal region that was previously found to be critical for the core processes supporting sentence comprehension (Dronkers et al., 2004). The regions that showed highly correlated ($p < 0.01$, corrected, cluster extent $> 100 \text{ mm}^3$) spontaneous activity with the left MTG seed are shown on a semi-inflated view of the cortical surface. The left and right hemispheres are

Large-scale semantic network (concepts vs. percepts in 'task-unrelated thoughts')
vs.
resting functional connectivity of left posterior MTG

Binder et al. (2009)
Turken & Dronkers (2011)

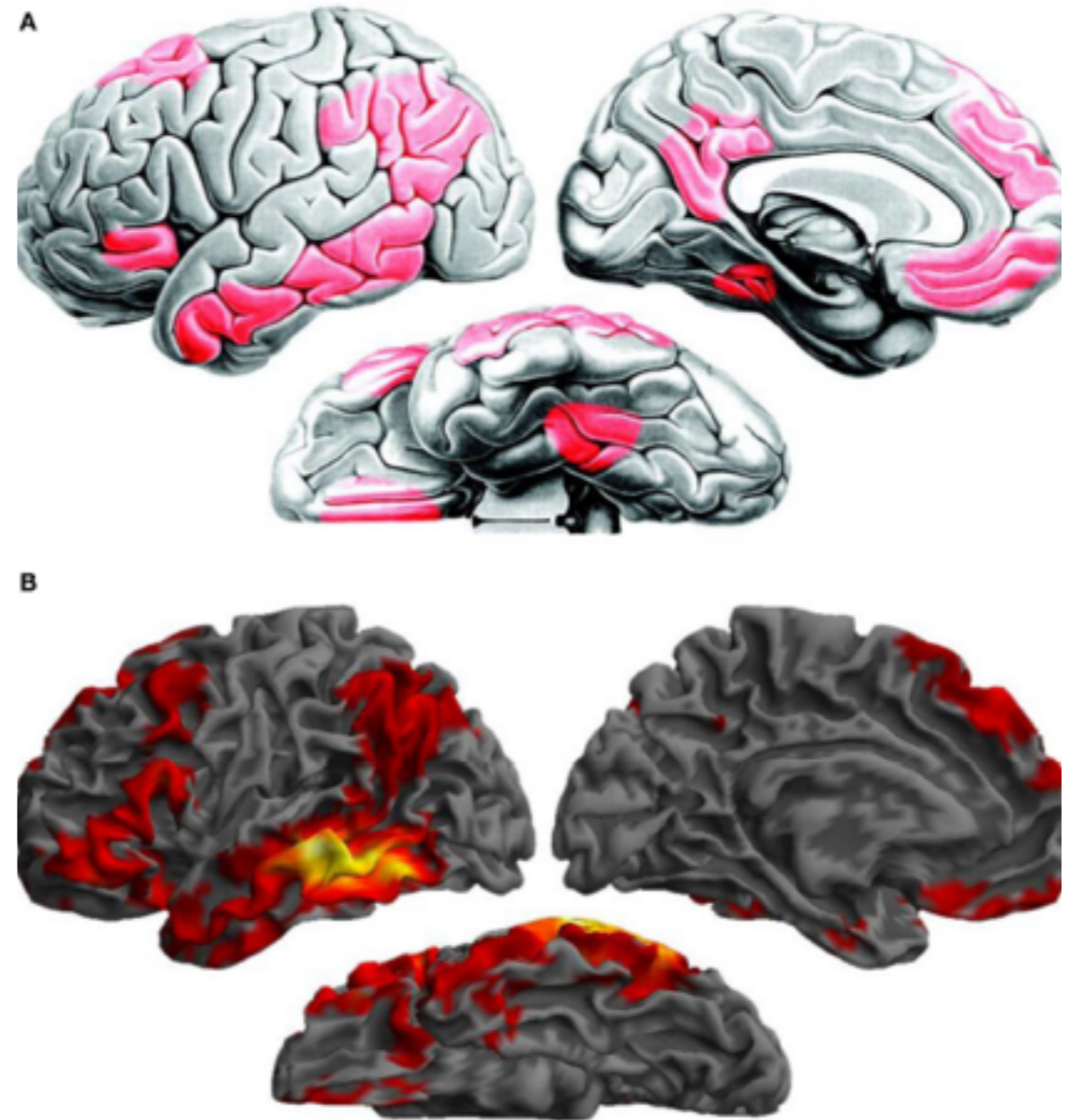


FIGURE 16 | (A) A large-scale network for verbal semantic processing identified by a meta-analysis of 120 functional neuroimaging studies, and the underlying structural connections inferred from tracing studies of the homologous regions in the macaque from (Reprinted with permission from Binder et al., 2009, page 2779, Figure 7). **(B)** Resting functional connectivity pattern for the left posterior MTG ROI, assessed in the present investigation, is largely consistent with the meta-analysis findings.

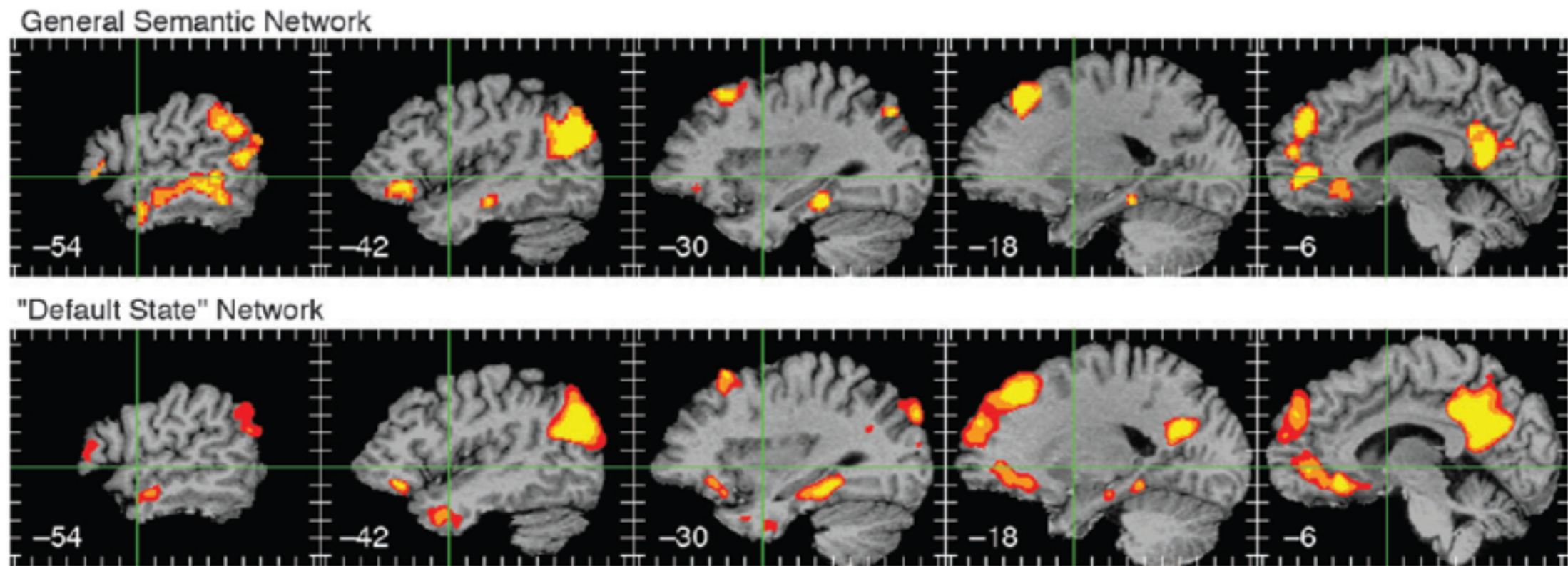


Figure 8. Comparison of the left-hemisphere general semantic network indicated in the present ALE meta-analysis (top) and the “default network” (bottom). The latter map represents brain areas that showed task-induced deactivation during performance of a tone discrimination task, that is, higher BOLD signal during a conscious resting baseline compared with the tone task (see Binder et al. 2008 for details). In both types of studies, effects are observed in the AG, posterior cingulate gyrus, DMPFC, VMPFC, ventral temporal lobe, anterior MTG, and ventral IFG. Although effects are stronger in the left hemisphere for both kinds of studies, task-induced deactivation is typically more symmetrical in posterior cingulate and medial prefrontal regions (Shulman et al. 1997; Binder et al. 1999; Mazoyer et al. 2001; Raichle et al. 2001; McKiernan et al. 2003).

‘strikingly similar’: Binder et al., 2009

Disturbance on language-circuitry in the schizophrenia brain generally

- Sans-Sansa et al. (2013): association of FTD with grey matter volume reductions in both Broca's and superior temporal gyrus along with ventromedial prefrontal and orbitofrontal cortices.
- Horn et al. (2010) found that FTD severity was negatively correlated with grey matter volume within the left temporal lobe.
- Aberrant patterns in fronto-temporal networks across schizophrenia in response to a range of tasks with linguistic demands (Kircher et al., 2005; Kuperberg et al., 2007; Kuperberg et al., 2008; Ngan et al., 2003; Dollfus et al., 2008; Weinstein et al., 2006; Borofsky et al., 2010; Weinstein et al., 2007).
- Vigneau et al., 2011): individuals across the schizophrenia spectrum show more bilateral and right-lateralized activity during speech processing, verbal fluency, and lexical discrimination tasks (Li et al., 2007; Weiss et al., 2005; Diederer et al., 2010; Angrilli et al., 2009).
- Plaze et al., 2006: 'Auditory hallucinations compete with normal speech for processing sites within the temporal cortex in schizophrenia'.

Summary

- Independently of schizophrenia, and at a neural level too, we cannot easily distinguish between 'language' and 'concepts' or 'mentation', 'theory of mind', thought, etc.
- Via failure of deactivation in mPFC in schizophrenia, we seem to get a neural connection between language, the default state, and psychopathology.

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