Assessment and Rehabilitation of Pragmatics

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“Don’t overdo it”

Pragmatics studies the relationship between linguistic content and information given by the context. It also studies the general rules that guide communication.

"You are a fox!"

Meaning depends on context

My views are strongly influenced by the perspective of **Cognitive Pragmatics**, in particular of **Relevance Theory** (Sperber & Wilson, 2005).

Pragmatic in clinical assessment

Sign		Assessment
Abrupt topic shifts	→	Discourse Analysis
Literal use of language	→	Figurative Language Tasks (e.g., Metaphors)

Performance tasks may be the key to evidence communication problems

Communication and Pragmatics

I will often use the term “communication”, in the view of pragmatic of communication (i.e., focus on pragmatic aspects, rather than other, as syntactic, lexical, or articulatory)

How important is pragmatics for a patient?

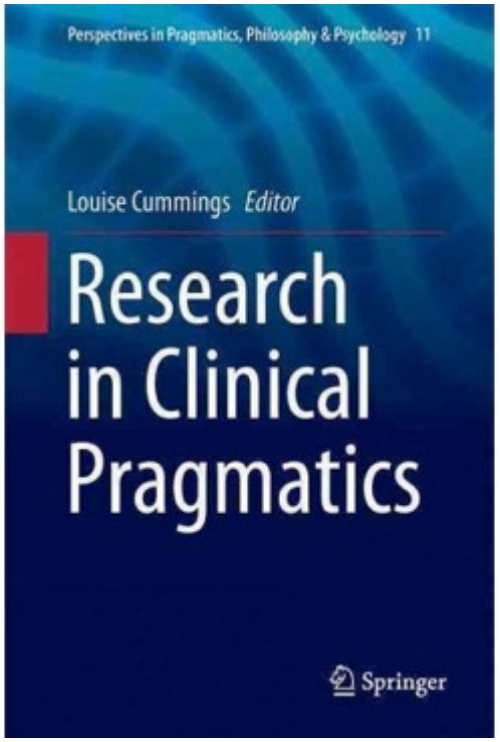
Several clinical conditions may be associated with pragmatic impairment

Impairment in pragmatic abilities is associated with worse quality of life. (Cummings, 2014; 2016; Bambini et al., 2016)

Short history of pragmatic disorder

Aphasia

Pragmatic disorder



Louise Cummings (ed) Springer, 2016

Clinical pragmatics today

Table 12.1 Examples of cognitive and sensorimotor processes/elements involved in pragmatics. Adapted from Perkins (2005)

Pragmatics			
Cognitive elements		Sensorimotor elements	
Linguistic	Nonlinguistic	Sensory input	Motor output
Phonology	Inference	Auditory perception	Voice
Prosody	Memory	Visual perception	Gesture
Morphology	Attention		Gaze
Syntax	Social cognition		
Discourse	Executive function		
Lexis	Affect		
	Conceptual knowledge		

From (Turkstra & Politis, 2016)

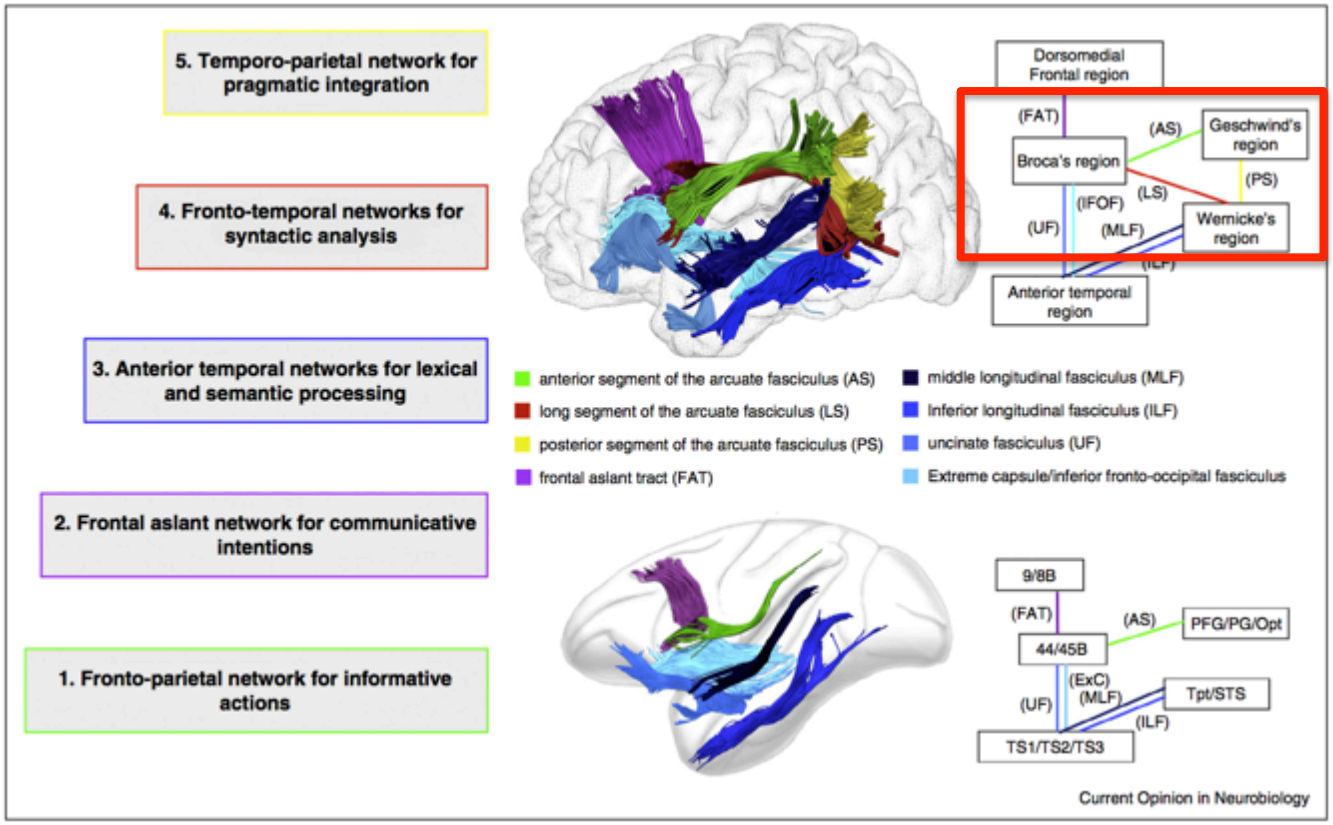
Pragmatics in the brain

But…

maybe pragmatics is not just a “consequence” of Theory of Mind or Executive Functions.

It’s the ability to detect specific intentions (communicative intentions), and to integrate language with the context.

Pragmatics in the brain (network)



SCALED (Bambini & Catani, 2014)

APACS

Assessment of Pragmatic Abilities and Cognitive Substrates

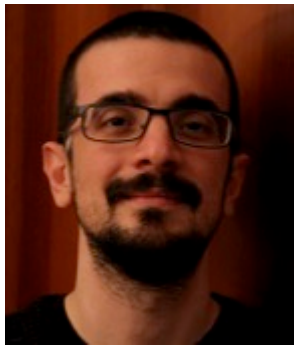
IRCCS

San Camillo Hospital, Venice

NEtS

IUSS Center for Neurocognition, Epistemology and Theoretical Syntax

University Institute for Advanced Studies, Pavia

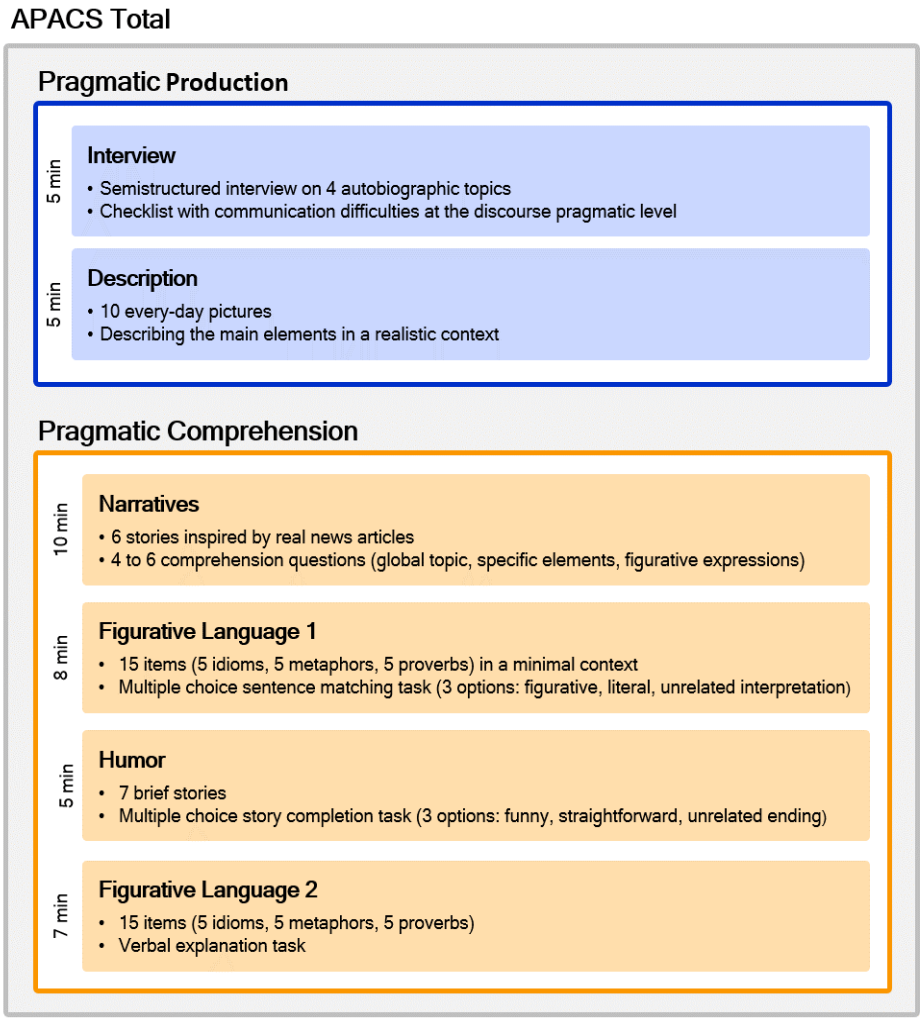


Giorgio Arcara

Valentina Bambini

APACS

Assessment of Pragmatic Abilities and Cognitive Substrates



(Arcara & Bambini, 2016)

6 tasks and 3 composite scores

Normative data from 120 healthy subjects

Cut-offs adjusted for age and education

Tables to investigate change over time

Interview

Circonlocuzioni				
Eloquio				
Ripetizioni / Espressioni passepartout				
Frasi incomplete				
Ecolalia				
Coprolalia				
Informatività				
Difficoltà nelle risposte sì/no				
Tendenza ad essere sotto-informativo				
Tendenza ad essere sovra-informativo				
Mancanza di iniziativa verbale				
Flusso dell'informazione				
Assenza o uso errato di legami coesivi				
Assenza di referenti				
Ordine errato degli elementi				
Cambio di argomento ingiustificato				
Dimensione paralinguistica				
Velocità di eloquio alterata				
Intonazione alterata				
Mancanza contatto visivo				
Espressione facciale fissa				
Abuso gesti compensativi				

Description

Description – Item 9

	Italian Elementi attesi: • Giardini • Bambini • Giocare
	English Expected elements: • Playground • Children • Playing

Narratives

Story 1

The passion for gardening is widespread in our country. About 2 million Italians have a green thumb and they spend Sundays taking care of plants and flowers. University research has shown the benefits of gardening for health. and gardens of the house are often an oasis from work and daily worries.

Figurative Language 1

Figurative Language 1 – Item 6 (metaphor)

Italian	English
Ho appena visto una corsa di formula uno. Certe automobili sono frecce. Opzioni: • Interpretazione figurata (corretta) *Certe automobili sono veloci* • Interpretazione non relata (scorretta) *Certe automobili sono lussuose* • Interpretazione letterale (scorretta) *Certe automobili sono appuntite*	*I have just seen a F1 match. Some cars are arrows.* Options: • Figurative interpretation (correct) *Some cars are fast* • Unrelated interpretation (incorrect) *Some cars are luxurious* • Literal interpretation (incorrect) *Some cars are pointy*

Humor

Humor – Item 6

Italian	English
La signora Rossi visita la casa di un'amica. Di fronte ad un bellissimo mobile antico, esclama: "Che magnifico mobile! Di che epoca è?" E l'amica risponde: Opzioni: • Finale umoristico (corretto) *Dell'epoca in cui avevamo i soldi* • Finale coerente ma non umoristico (scorretto) *Del settecento inglese* • Finale non relato (scorretto) *Le tarme del legno sono un bel problema*	*Mrs Rossi calls on a friend of hers. One seeing a beautiful piece of antique furniture, she exclaims: "What a splendid piece! When does it date back to?" And her friend replies:* Options: • Funny ending (correct) *To when we used to have money* • Straightforward ending (incorrect) *To the eighteenth century* • Unrelated ending (incorrect) *Woodworm is such a problem*

Figurative Language 2

“That student had his heads in the clouds”

APACS in neurological diseases (our project)

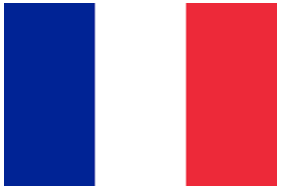
Performance tasks may be the key to evidence communication problems

Some phenomena are not only interesting *per se* (e.g. metaphors)

APACS - Translations and adaptations

English

Russian

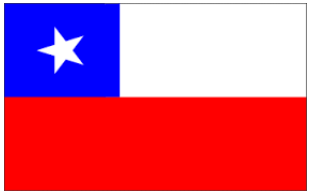


Flemish

French*

Persian*

Spanish (Chile) *



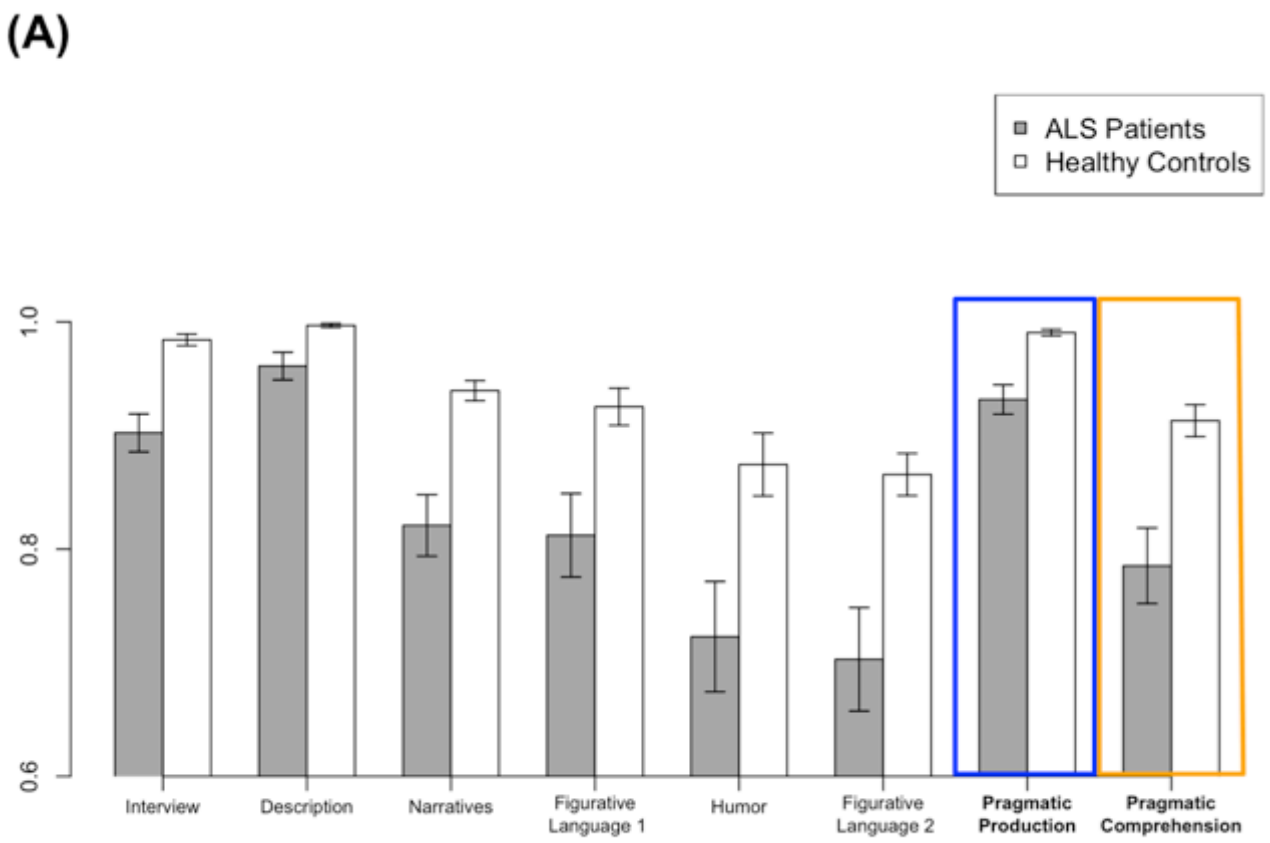
Our research Agenda: Pragmatic disorder in Neurological diseases

Goals

To study and characterize pragmatic-communicative disorder in neurological diseases

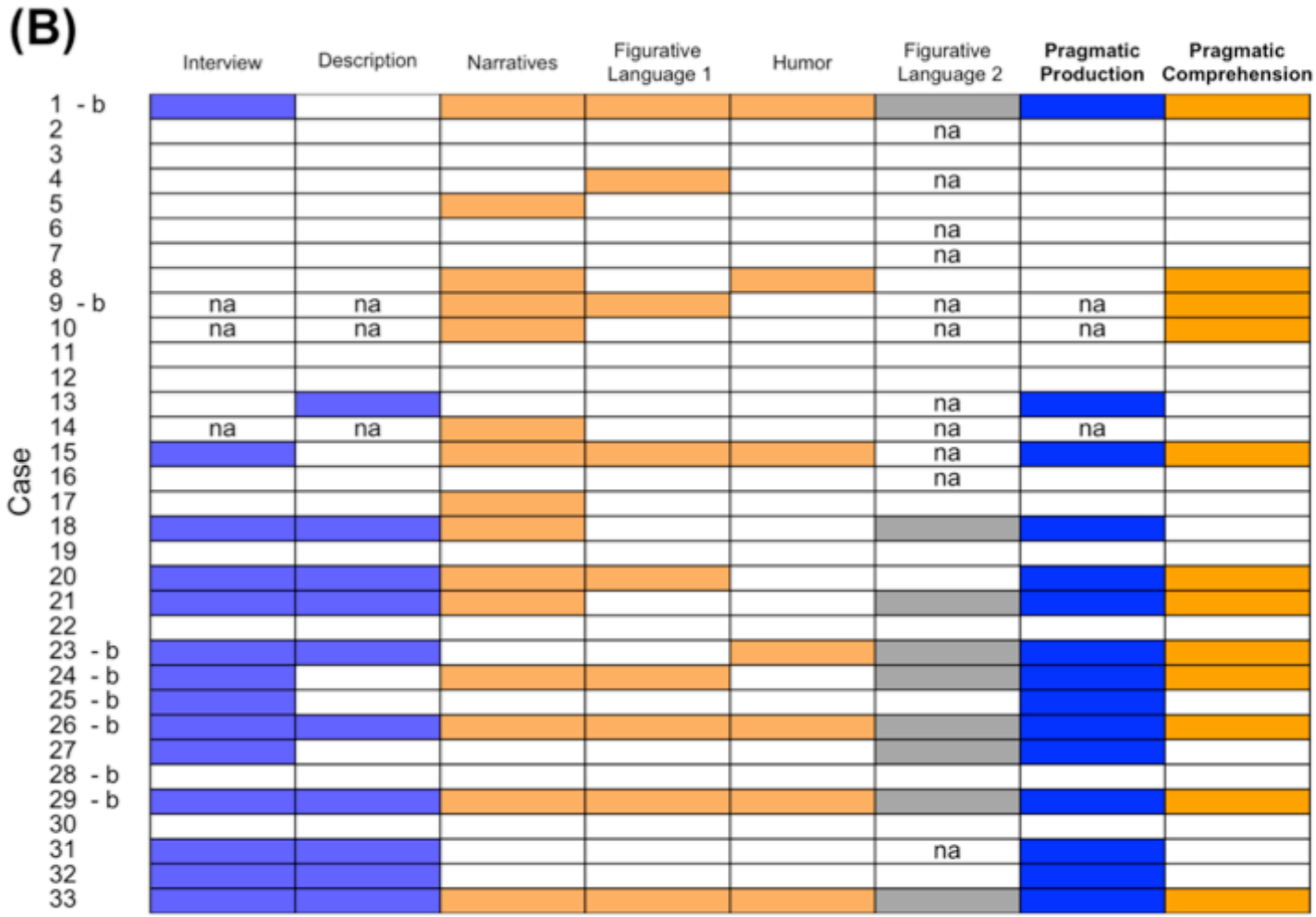
To study the relationship between pragmatic disorder and other cognitive impairments

ALS



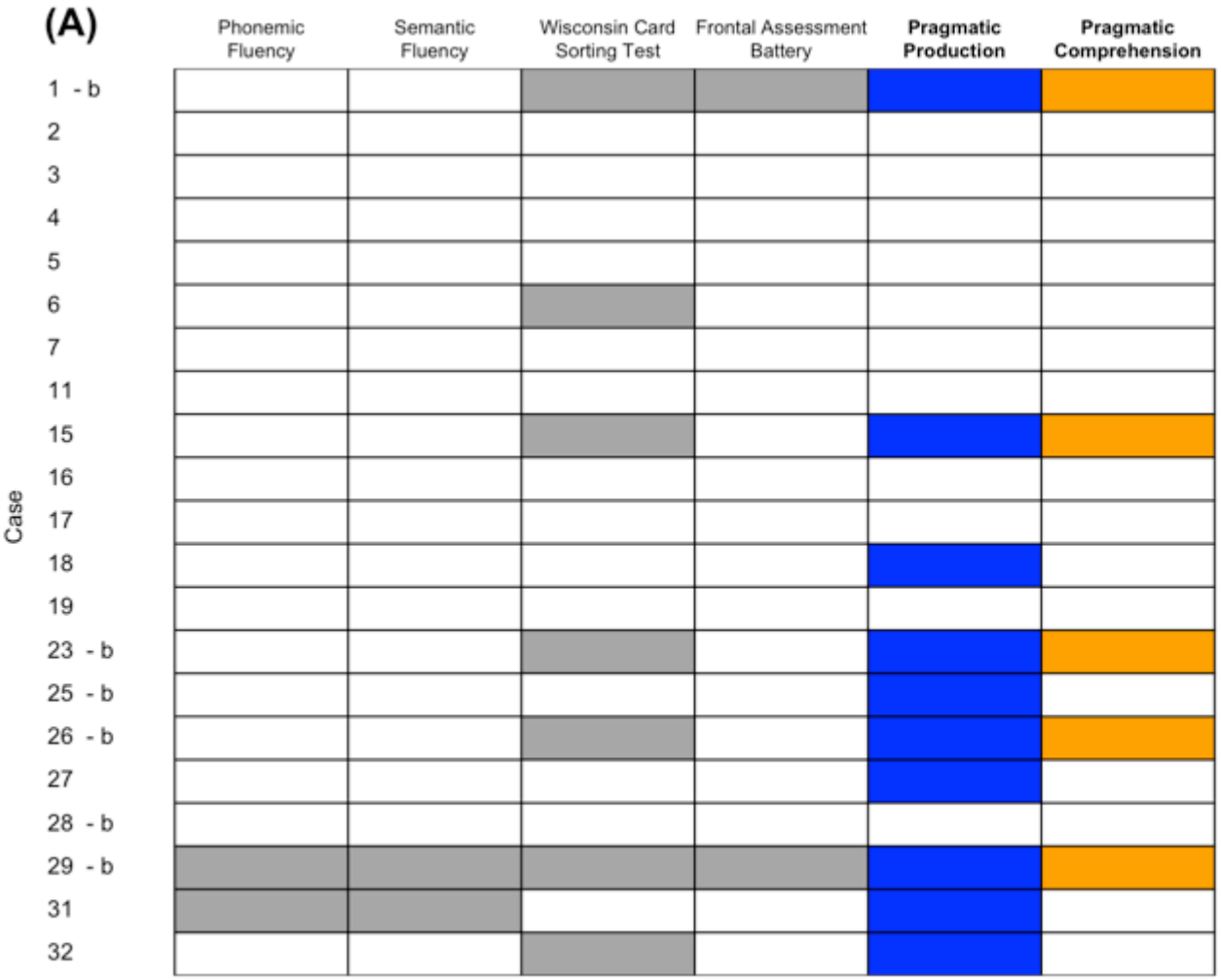
(Bambini et al., 2016)

ALS



(Bambini et al., 2016)

ALS



(B) Pragmatic Production deficit

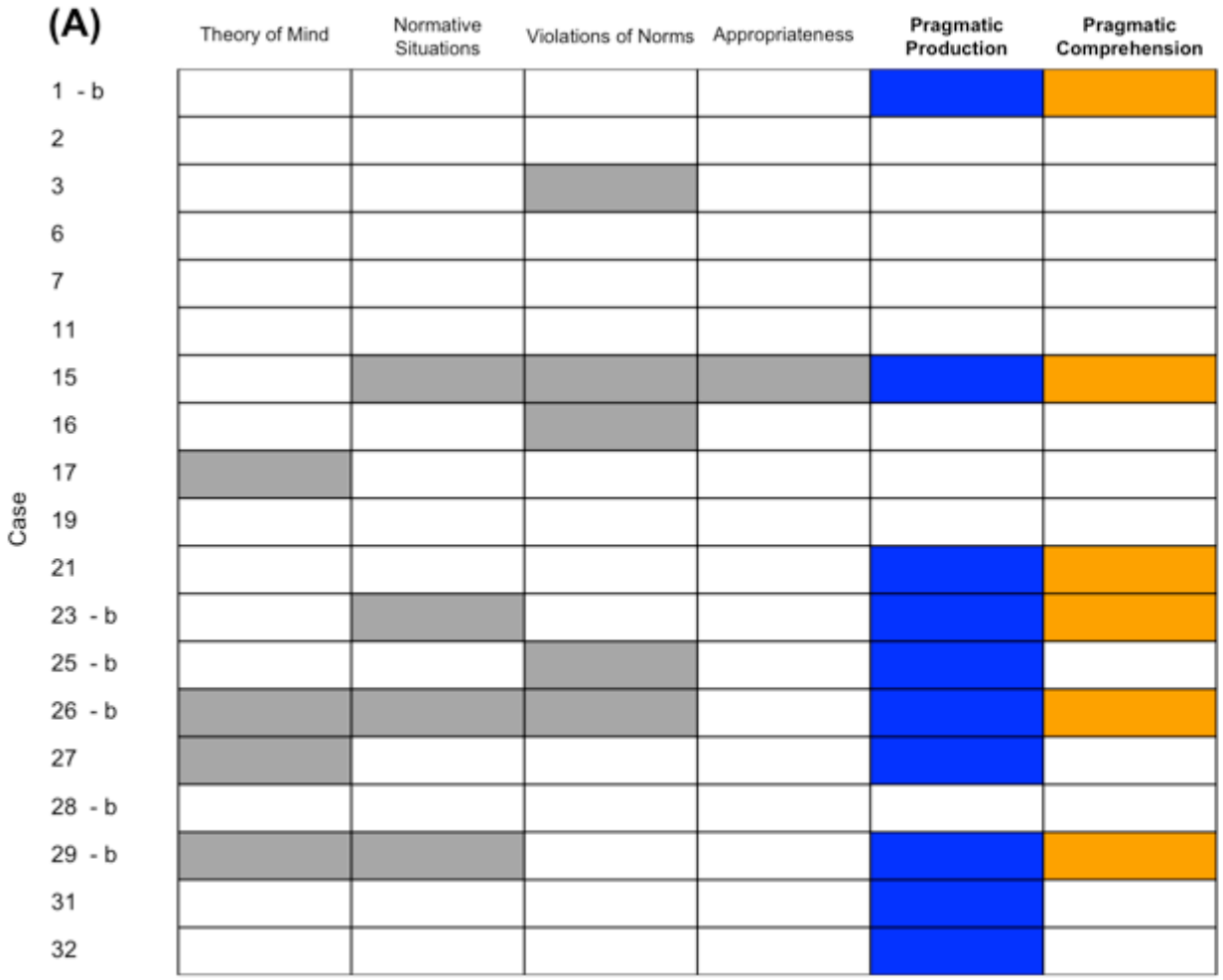
Executive deficit	Present	Absent	Total
Present	3 (14%)	0 (0%)	3 (14%)
Absent	7 (33%)	11 (52%)	18 (85%)
Total	10 (47%)	11 (52%)	21 (99%)

(C) Pragmatic Comprehension deficit

Executive deficit	Present	Absent	Total
Present	2 (10%)	1 (5%)	3 (15%)
Absent	3 (14%)	15 (71%)	18 (85%)
Total	5 (24%)	16 (76%)	21 (100%)

(Bambini et al., 2016)

ALS



(B) Pragmatic Production deficit

Sociocognitive deficit	Present	Absent	Total
Present	6 (32%)	3 (16%)	9 (47%)
Absent	4 (21%)	6 (32%)	10 (53%)
Total	10 (53%)	9 (47%)	19 (100%)

(C) Pragmatic Comprehension Deficit

Sociocognitive deficit	Present	Absent	Total
Present	4 (21%)	5 (26%)	9 (47%)
Absent	2 (11%)	8 (42%)	10 (53%)
Total	6 (32%)	13 (68%)	19 (100%)

(Bambini et al., 2016)

ALS

Amyotrophic Lateral Sclerosis and Frontotemporal Degeneration, 2016; 1–22

Taylor & Francis
Taylor & Francis Group

RESEARCH ARTICLE

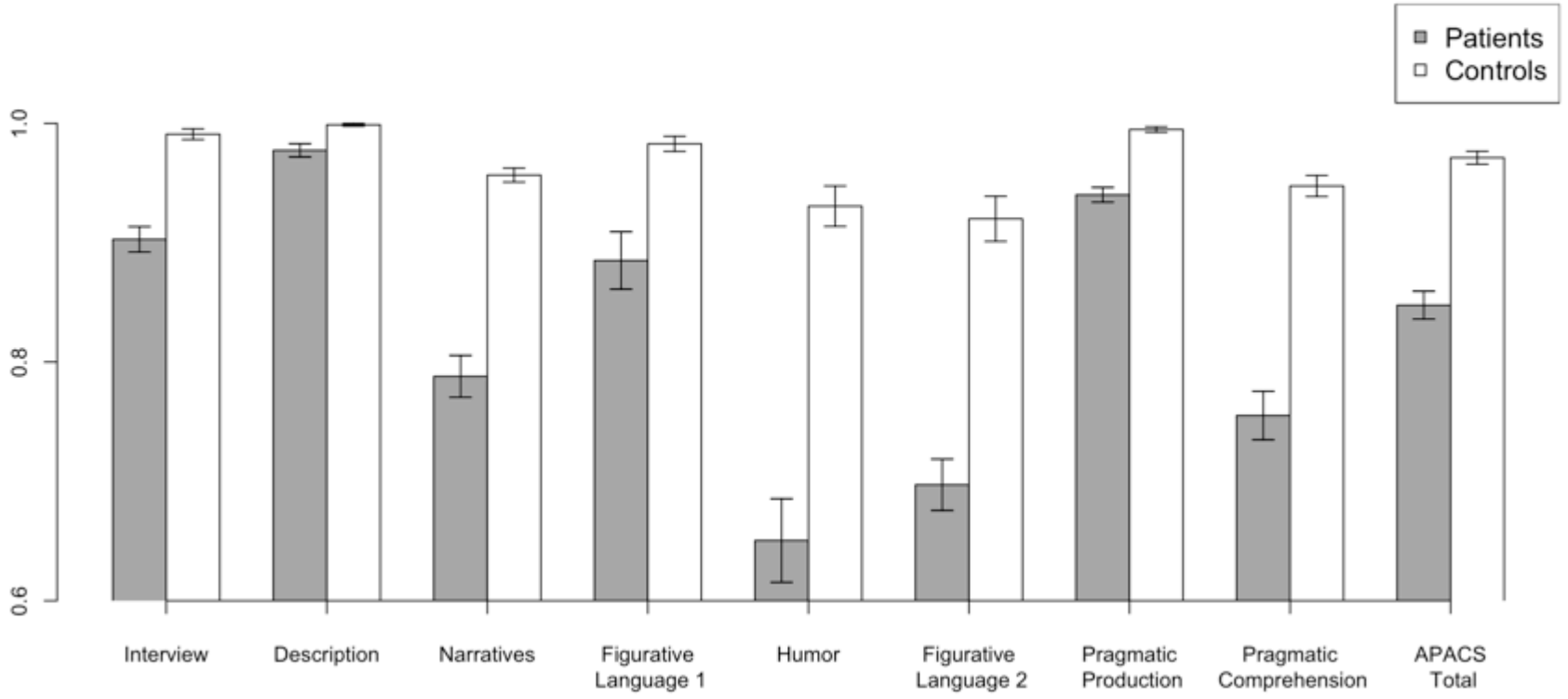
Amyotrophic lateral sclerosis - frontotemporal spectrum disorder (ALS-FTSD): Revised diagnostic criteria

MICHAEL J. STRONG[1], SHARON ABRAHAMS[2], LAURA H. GOLDSTEIN[3], SUSAN WOOLLEY[4], PAULA MCLAUGHLIN[5], JULIE SNOWDEN[6], ENEIDA MIOSHI[7], ANGIE ROBERTS-SOUTH[8], MICHAEL BENATAR[9], TIBOR HORTOBÁGYI[10], JEFFREY ROSENFELD[11], VINCENZO SILANI[12], PAUL G INCE[13] & MARTIN R. TURNER[14]

Language					
		Assessment of Pragmatic Abilities and Cognitive Substrates (APACS) (12)			X

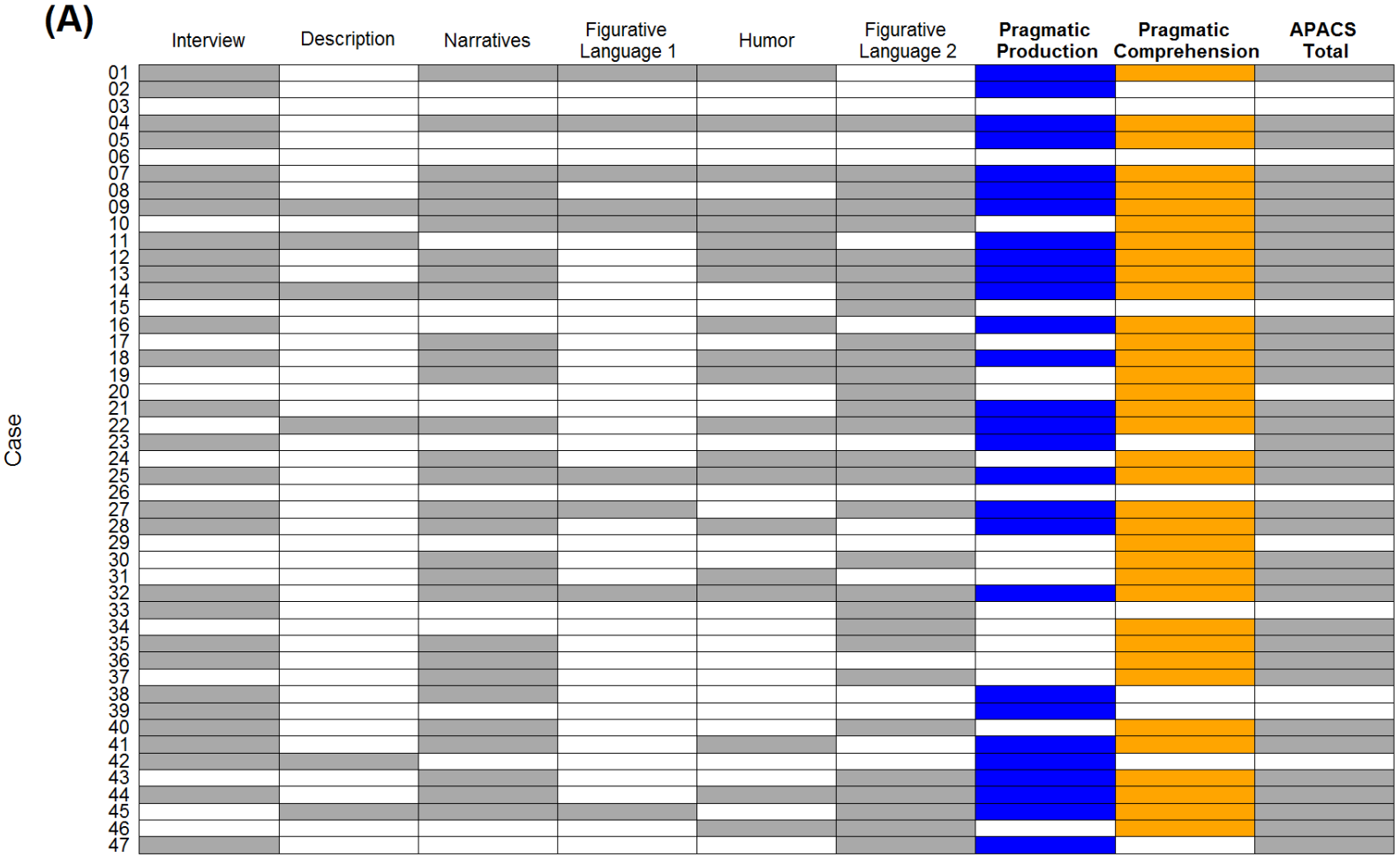
(Strong et al., 2016)

People with Schizophrenia



(Bosia et al., 2016)

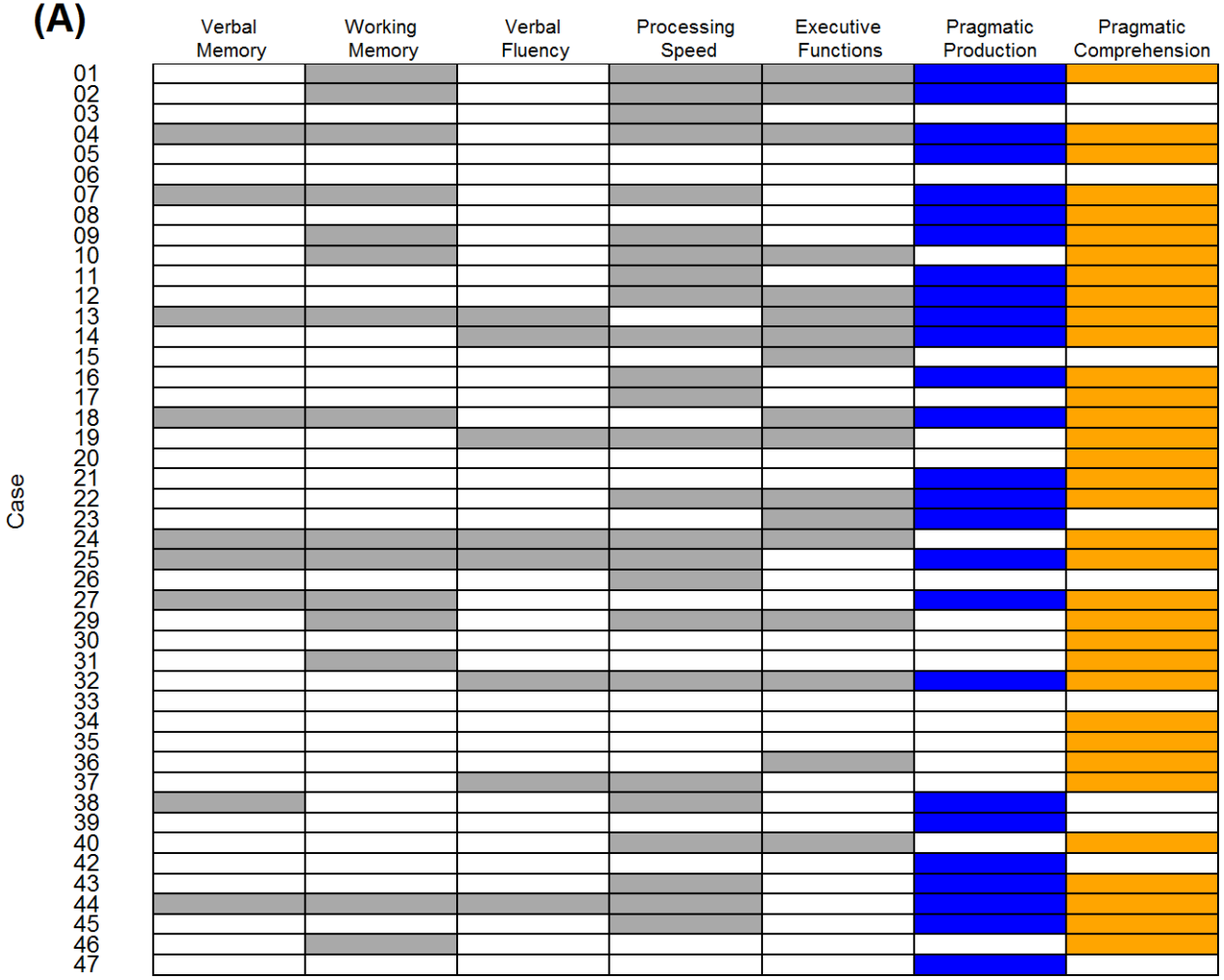
People with Schizophrenia



(Bosia et al., 2016)

People with Schizophrenia: Pragmatics and other cognitive functions

(A)



(B) Pragmatic Production deficit

Cognition deficit	Present	Absent	Total
Present	15 (33%)	6 (13%)	21 (46%)
Absent	11 (24%)	13 (29%)	24 (53%)
Total	26 (57%)	19 (42%)	45 (99%)

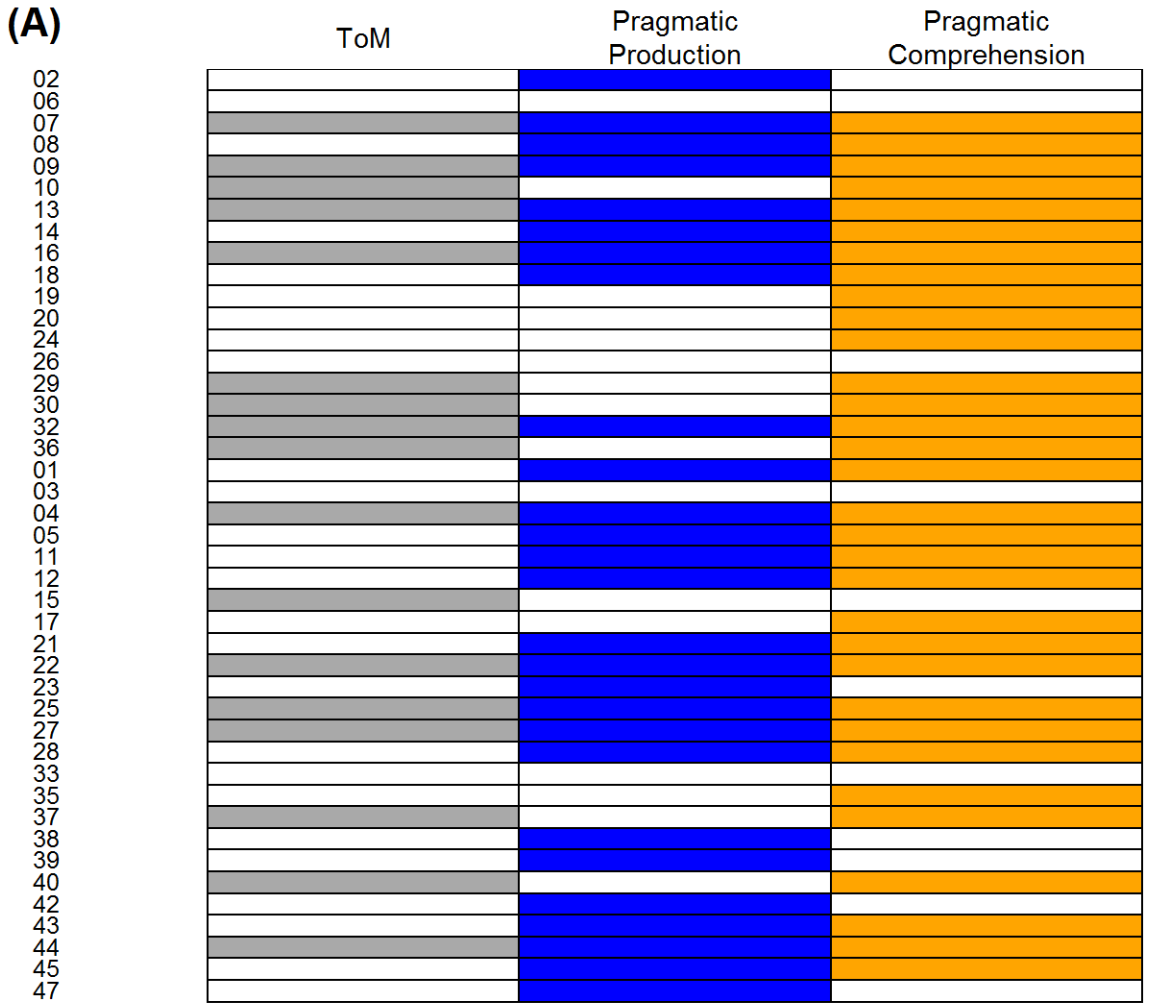
(C) Pragmatic Comprehension deficit

Cognition deficit	Present	Absent	Total
Present	19 (42%)	2 (4%)	21 (46%)
Absent	15 (33%)	9 (20%)	24 (53%)
Total	34 (75%)	11 (24%)	45 (99%)

(Bambini et al., 2016)

People with Schizophrenia: Pragmatics and theory of Mind

(A)



(B) Pragmatic Production deficit

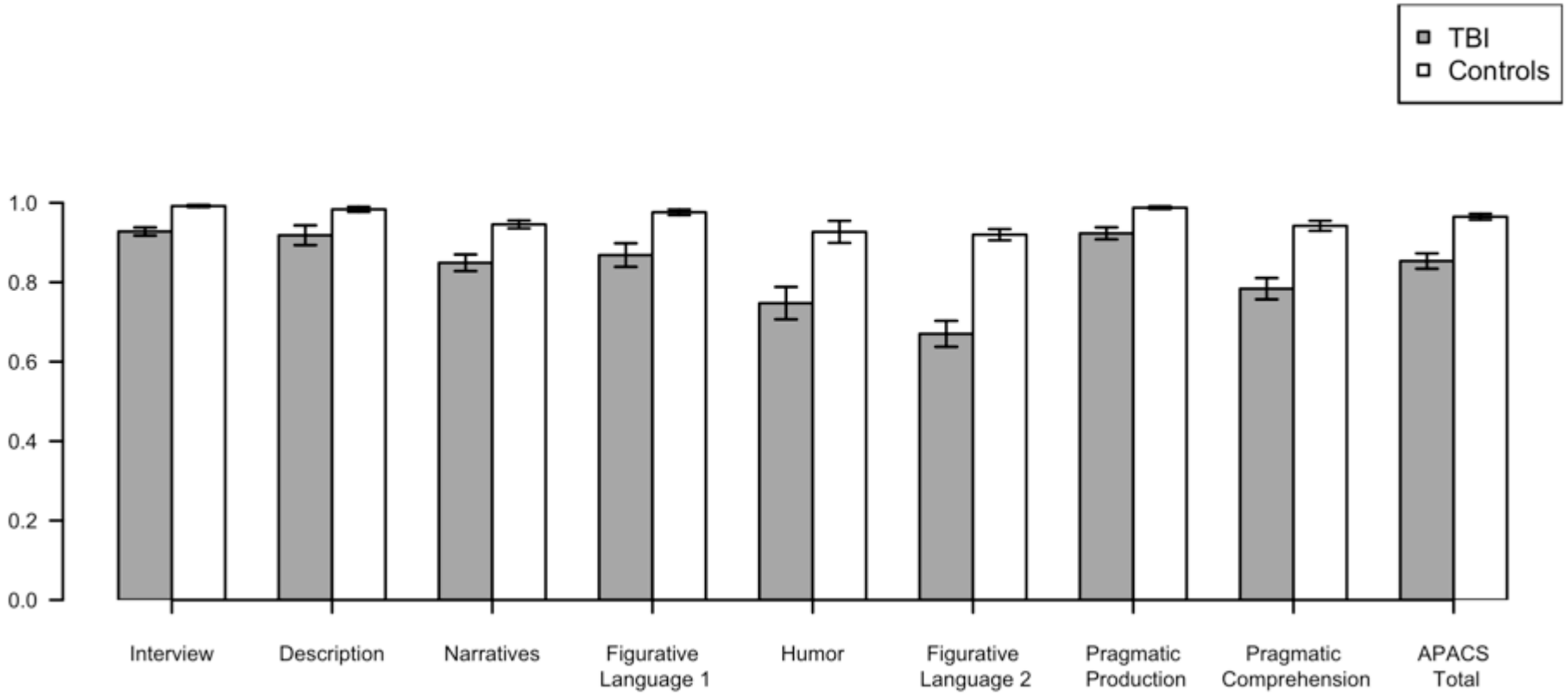
ToM deficit	Present	Absent	Total
Present	10 (23%)	7 (16%)	17 (39%)
Absent	17 (40%)	9 (21%)	26 (61%)
Total	27 (63%)	16 (37%)	43 (100%)

(C) Pragmatic Comprehension deficit

ToM deficit	Present	Absent	Total
Present	16 (37%)	1 (2%)	17 (39%)
Absent	16 (37%)	10 (23%)	26 (60%)
Total	32 (74%)	11 (25%)	43 (99%)

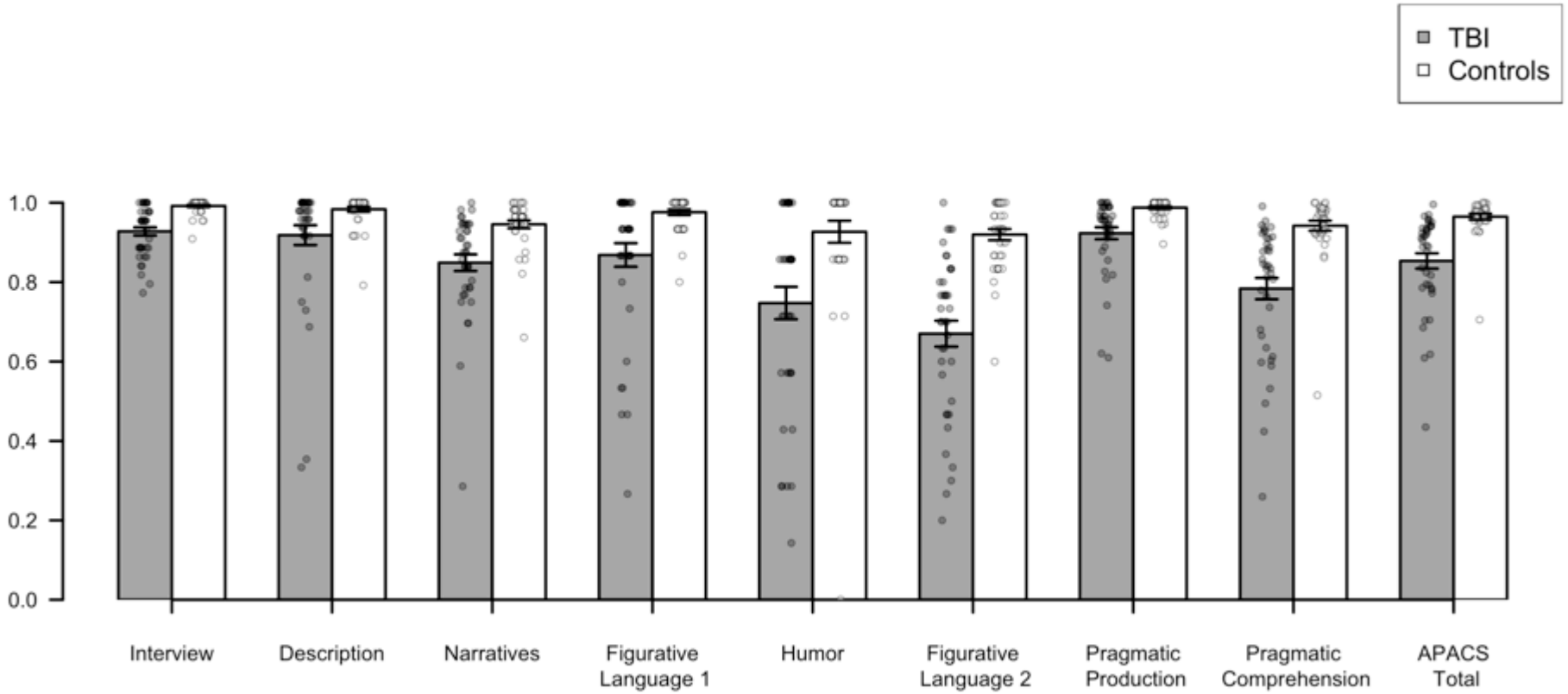
(Bambini et al., 2016)

Traumatic Brain Injury



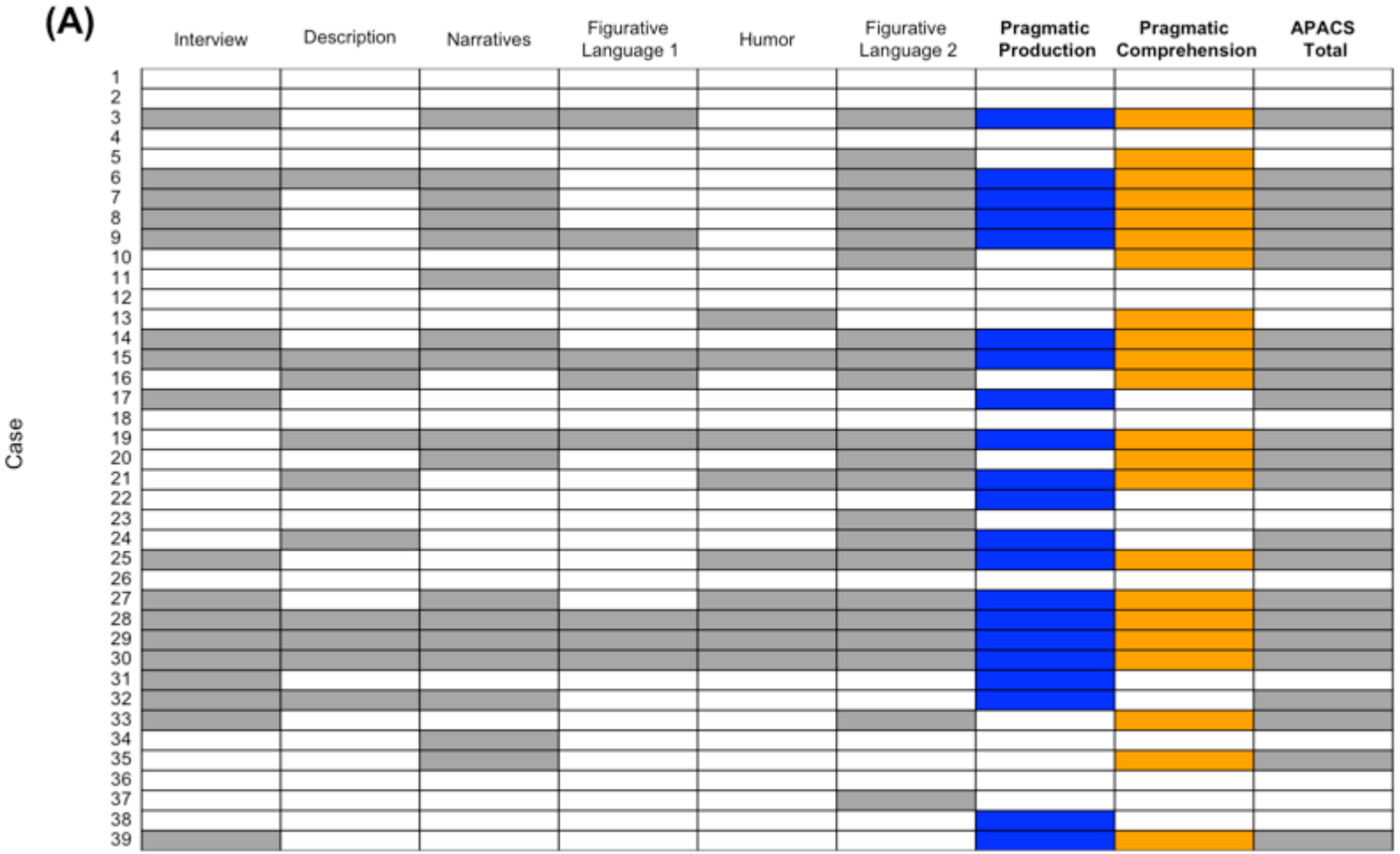
(Arcara et al., 2019)

Traumatic Brain Injury



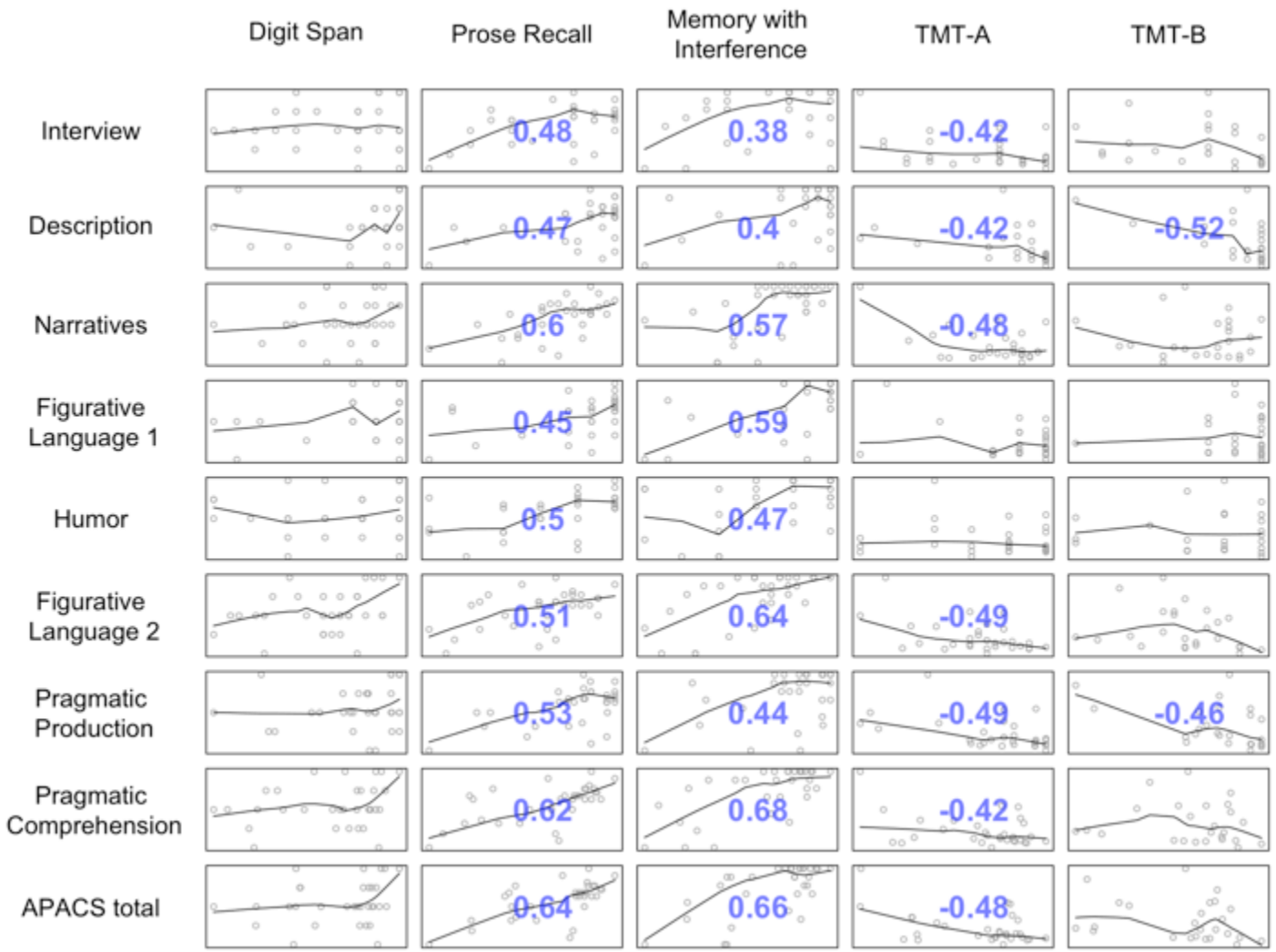
(Arcara et al., 2019)

Traumatic Brain Injury

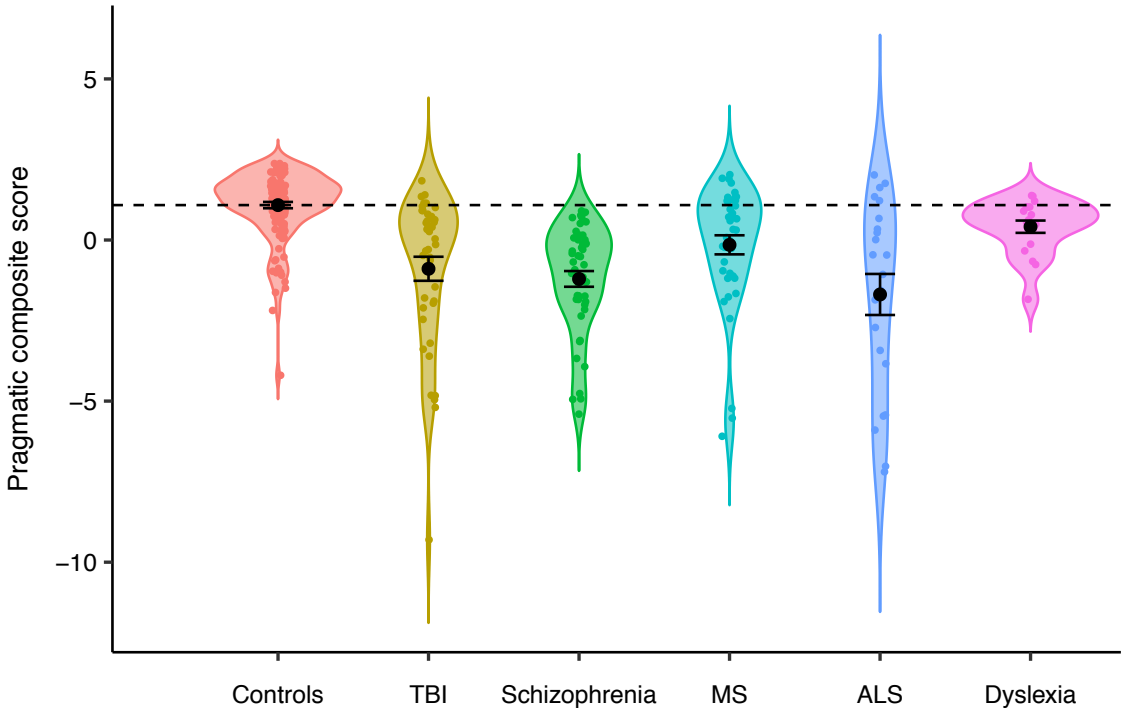


(Arcara et al., 2019)

Results


Digit Span
Prose Recall
Memory with Interference
TMT-A
TMT-B
Interview
Description
Narratives
Figurative Language 1
Humor
Figurative Language 2
Pragmatic Production
Pragmatic Comprehension
APACS total
0.48
0.38
-0.42
0.47
0.4
-0.42
-0.52
0.6
0.57
-0.48
0.45
0.59
0.5
0.47
0.51
0.64
-0.49
0.53
0.44
-0.49
-0.46
0.62
0.68
-0.42
0.64
0.66
-0.48

APACS in neurological diseases



But also impairment in production in Parkinson's Disease (Montemurro et al., 2019) and in Brain Tumor (Arcara et al., 2018, xPrag-it conference).

Pragmatics and Communication Multiple Sclerosis

OXFORD
UNIVERSITY PRESS

Archives
of
CLINICAL
NEUROPSYCHOLOGY

Communication in Multiple Sclerosis: Pragmatic Deficit and its Relation with Cognition and Social Cognition

Antonio Carotenuto[1,*], Giorgio Arcara[2], Giuseppe Orefice[1], Ilaria Cerillo[1], Valentina Giannino[1], Mario Rasulo[1], Rosa Iodice[1,†], Valentina Bambini[3,†]

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Editorial Decision 6 June 2017; Accepted 9 June 2017

UNIVERSITÀ DEGLI STUDI
DI NAPOLI FEDERICO II

Antonio Carotenuto

The sample of people with MS

42 consecutive patients assessed at the hospital

Both Relapsing remitting and Progressive MS

Neuropsychological Battery including Executive tests and Theory of Mind

The sample of people with MS

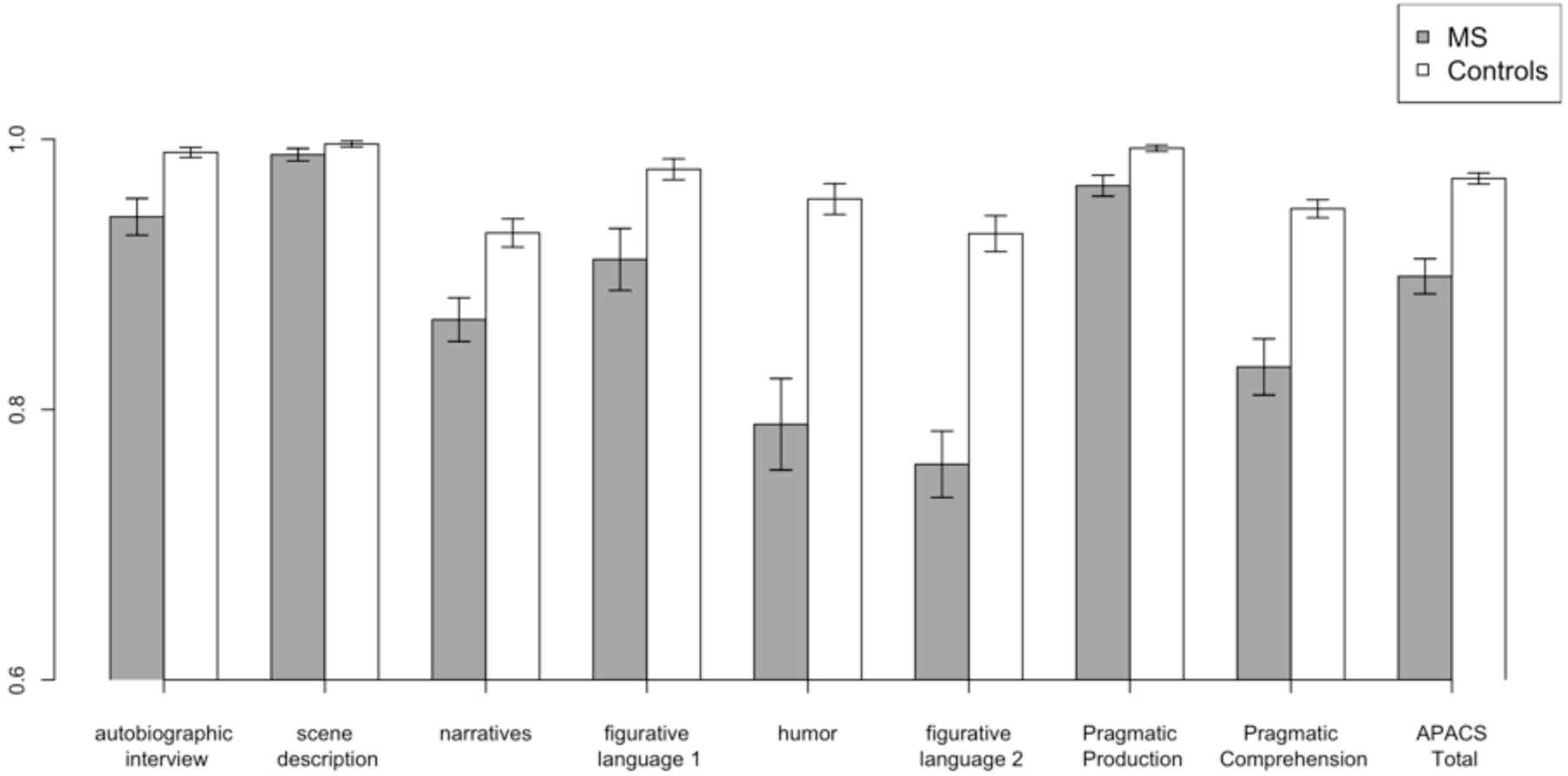
Demographic and clinical features	MS patients	
	M	*SD*
Age	42	10.8
Age at onset	33.4	10.7
EDSS	2.77	1.56
MSSS	4.22	2.62
	Median	Range
Years of education	13	5–19
Disease duration	7	1–34
	n	%
Female	27	64.3
Disease course		
Relapsing	31	75.6
Progressive	10	24.4
Treatment		
IFN-beta	17	40.5
other DMT	25	59.5
Cognition and psychosocial scores	*M*	*SD*
SRT-LTS	40	14
SRT-CLTR	28	15
SRT-D	8	3
10/36 SPART	16	5
10/36 SPART-D	6	2
SDMT	34	15
PASAT 3	36	15
PASAT 2	30	11
WLG	28	10
FSS	46.5	13.2
BDI-II	16.4	11.3
	Median	Range
SET-IA[d]	6	2–6
SET-CI[d]	4	1–6
SET-EA[d]	6	3–6
SET-Tot[d]	15	9–18

Performance of MS as compared to HC

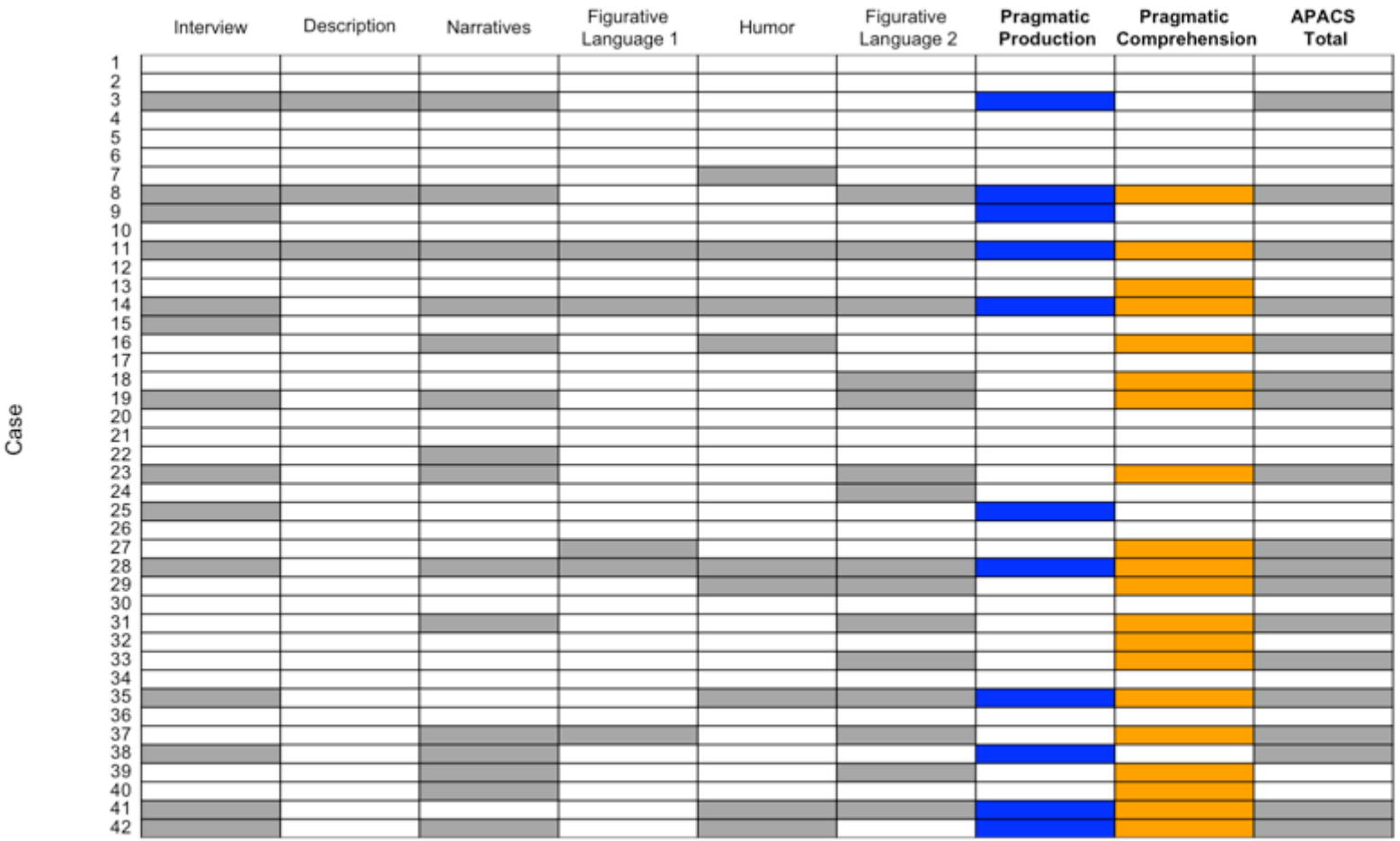
Table 2. APACS scores in multiple sclerosis (ms) patients and healthy controls (HCs).

Test	MS patients		HCs		Wilcoxon rank-sum p value	MS patients performing below cut-off (%)
	Median	Range	Median	Range		
Interview	43	26–44	44	39–44	.001	12 /42 (28.6)
Description	48	41–48	48	44–48	.16	7/42 (16.7)
Narratives	50	33–56	54	46–56	.001	15/42 (35.7)
Figurative Language 1	14	5–15	15	11–15	.001	10/42 (23.8)
Humor	6	1–7	7	5–7	.001	15/42 (35.7)
Figurative Language 2	24	11–30	28	16–30	.001	19/42 (45.2)
Pragmatic Production	0.98	0.80–1	1	0.94–1	.001	8/42 (19.05)
Pragmatic Comprehension	0.86	0.36–1	0.96	0.77–1	.001	24/42 (57.14)
APACS Total	0.92	0.63–1	0.98	0.86–1	.001	23/42 (54.76)

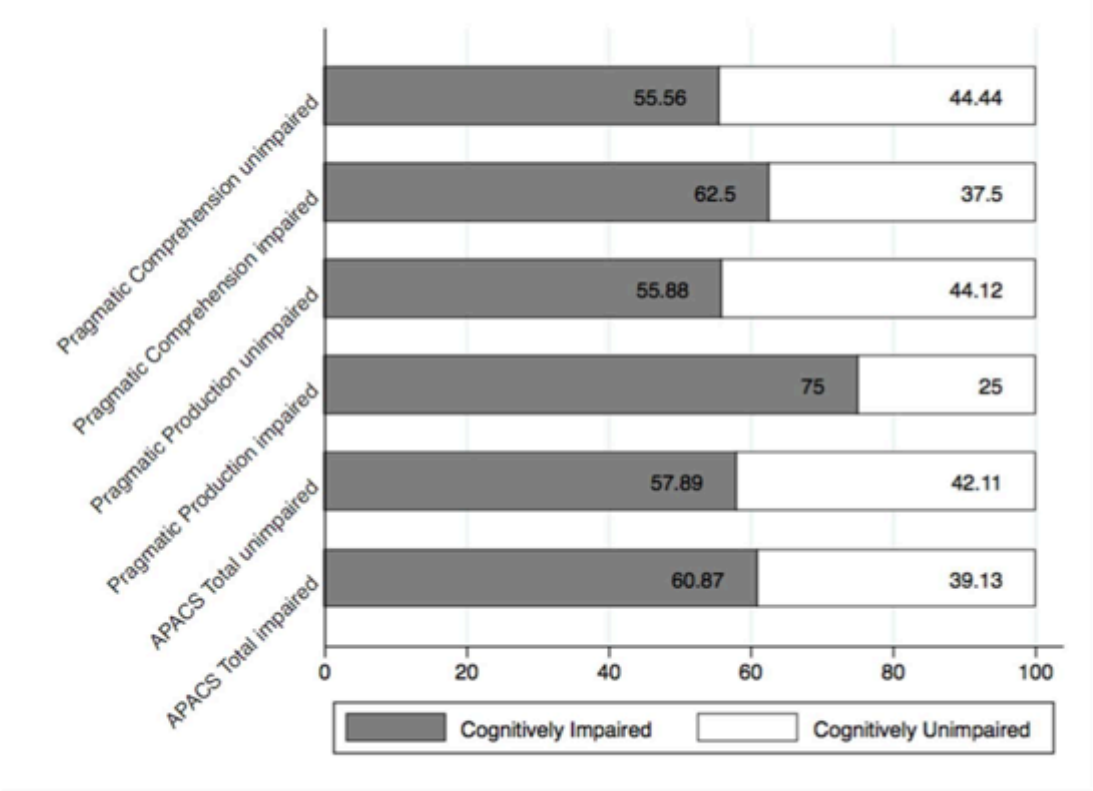
Performance of MS as compared to HC



Performance of MS as compared to HC



Relationship between Pragmatic and Cognitive Impairment



Cognitive Impaired as from BRB score.

Other Results

We found only low correlation with Executive Tests (word list generation)

And with Theory of Mind Tests (Story Empaty Test, Dodich et al., 2015).

Conclusions

Pragmatic Disorder may be diffuse in people with Multiple Sclerosis, Regardless of the cognitive impairment (further research is needed)

No evidence for a strict relationship between executive functions and pragmatic-communicative impairment

Neural correlates of pragmatic abilities in MS

Brain and Language 185 (2018) 47–53

Contents lists available at ScienceDirect

Brain and Language

journal homepage: www.elsevier.com/locate/b&l

Short communication

Pragmatic abilities in multiple sclerosis: The contribution of the temporo-parietal junction

Antonio Carotenuto[a,1], Sirio Cocozza[b,*,1], Mario Quarantelli[c], Giorgio Arcara[d], Roberta Lanzillo[a], Vincenzo Brescia Morra[a], Ilaria Cerillo[a], Enrico Tedeschi[b], Giuseppe Orefice[a], Valentina Bambini[e], Arturo Brunetti[b,2], Rosa Iodice[a,2]

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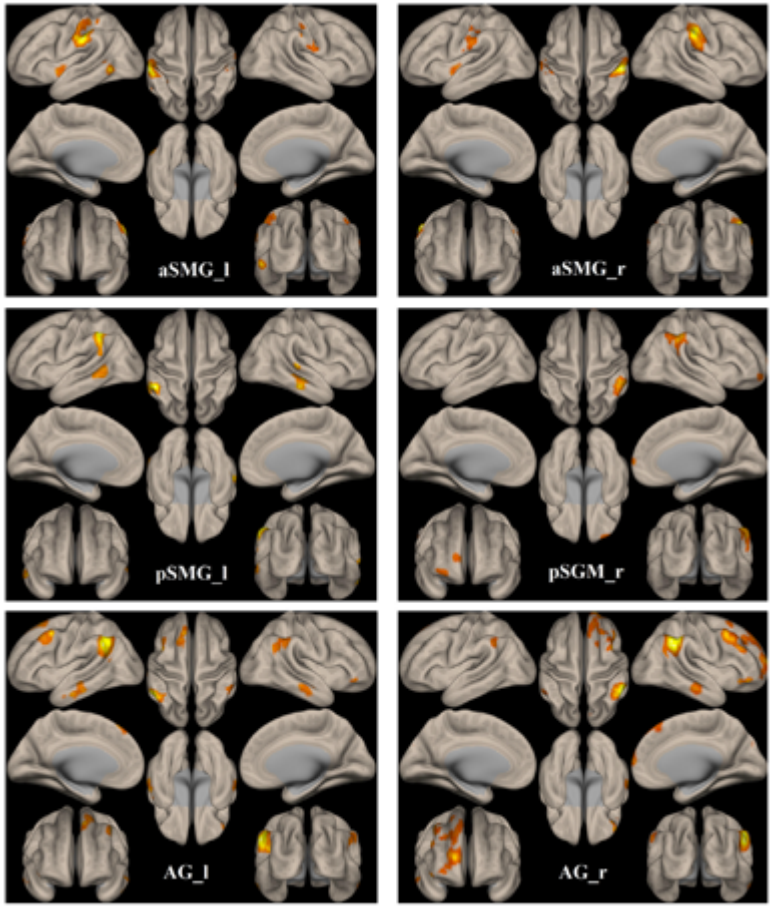
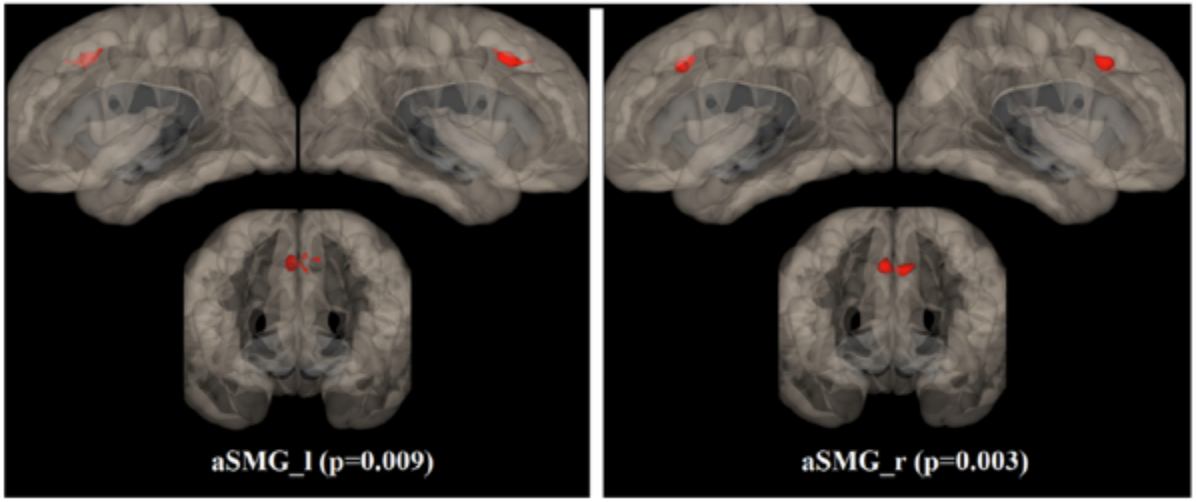
Neural correlates of pragmatic abilities in MS



Seed based connectivity with anterior and posterior portions of TPJ

Neural correlates of pragmatic abilities in MS



Correlation between seed based connectivity maps and APACS total score

Correlation with paracingulate cortex: fronto-parietal connections are associated with Pragmatic disorder in people with MS

Rehabilitation of Pragmatic-communicative disorder in MS

Pragmatic treatments seem promising (e.g, Bosco et al., 2015, Gabbatore et al., 2016)

None of these treatment has been designed for people with MS

Our research group developed a treatment (PRAGMACOM) for pragmatic disoder

PRAGMACOM

PRAGMACOM includes exercises on both production and comprehension, aiming at:

(a) Increasing awareness about discourse organization and social communication rules (e.g., avoiding off-topic speech);
(b) improving the ability to select and use world knowledge and contextual elements to interpret nonliteral language such as metaphors and humor.

The exercises, based also on ecological materials, combine individual practice and active group conversations led by the trainer, who uses positive and corrective feedback.

PRAGMACOM is accompanied by a manual for trainers to ensure treatment fidelity

PRAGMACOM

PRAGMACOM items are focused

Starting from short stories (like in Narratives in APACS), a **metacognitive** approach is used, Starting from the comprehension of the participant, and elaborating the intended meaning.

During the interactions, the therapist/experimenter guide the interactions with the patient to be pragmatically appropriate (respecting turn-taking, etc.)

Current Funded Projects related to APACS

P.I. Valentina Bambini

Ministero dell'Istruzione dell'Università e della Ricerca

Dipartimento per la formazione superiore e per la Ricerca
Direzione Generale per il Coordinamento, la promozione e la valorizzazione della Ricerca

PRIN: PROGETTI DI RICERCA DI RILEVANTE INTERESSE NAZIONALE – Bando 2015
Prot. 201577HA9M

PART A

1 - Research Project Title

The interpretative brain: Understanding and promoting pragmatic abilities across lifespan and in mental illness

Investigating efficacy and effectiveness of a treatment on pragmatics in aging and schizophrenia

Current Projects related to APACS

P.I. Giorgio Arcara

Ministero della Salute Direzione Generale della Ricerca Sanitaria e Biomedica e della Vigilanza sugli Enti **BANDO RICERCA FINALIZZATA 2018** **esercizio finanziario anni 2016-2017**	**Project Title:** Assessment and treatment of communicative pragmatic abilities in neurological and psychiatric disorders: feasibility and clinical efficacy
Project Code: GR-2018-12366092	**Principal Investigator:** Arcara Giorgio

Investigating the efficacy of treatment in neurological disease
(Right hemisphere Damage, Traumatic Brain Injury), develop a short version of APACS, investigate neurophysiological correlates of Pragmatic abilities

IMPORTANT: a side project with the same aims on people with MS is ongoing.

IRCCS San Camillo Hospital

IRCCS San Camillo Hospital

Resarch hospital funded by Italian Ministry of Health for translational research

109 beds

More than 500 people treated each year as inpatients

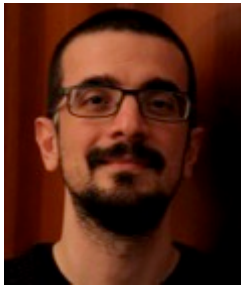
Each year about 100 people with MS are treated as in patients
(1-2 months)

Current Team at San Camillo Hospital, Venice

Francesca De Biagi
Speech Therapist

Francesca Bevilacqua
Neuropsychologist

Maria Rosaria Stabile
Neurologist



Giorgio Arcara
Researcher/Neuroscientist

Sara Lago
Trainee in Psychology

Future directions

To Better understand the pragmatic disorder in people with MS (larger sample are needed)

To study the impact of pragmatic disorder in quality of life of patients and their families

To better adapt existing treatment for pragmatic disorder in MS
(e.g. taking into account fatigue, and other characteristics specific of MS)

Our proposal

Find synergies for future research on rehabilitation in MS

First step: adapt APACS to new languages for cross-sectional studies (Finnish, or other)

We have already experience on adaptation and we are willing to share our expertise in data analysis and the programming code developed.

Second step: assess if existing projects and data collections may benefit by inter-site collaborations (e.g., Rehabilitation studies, EEG studies for biomarkers of recovery in MS).

We already have started some projects, but round table can improve the PRAGMACOM treatment to the needs of people with MS.

PROPOSAL

To adapt APACS in Finnish to foster new collaborations and to increase the numerosity of our samples, to corroborate (or refine) our conclusions.

Thank you

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https://hsancamillo.it/

IRCCS

Grice's Maxims

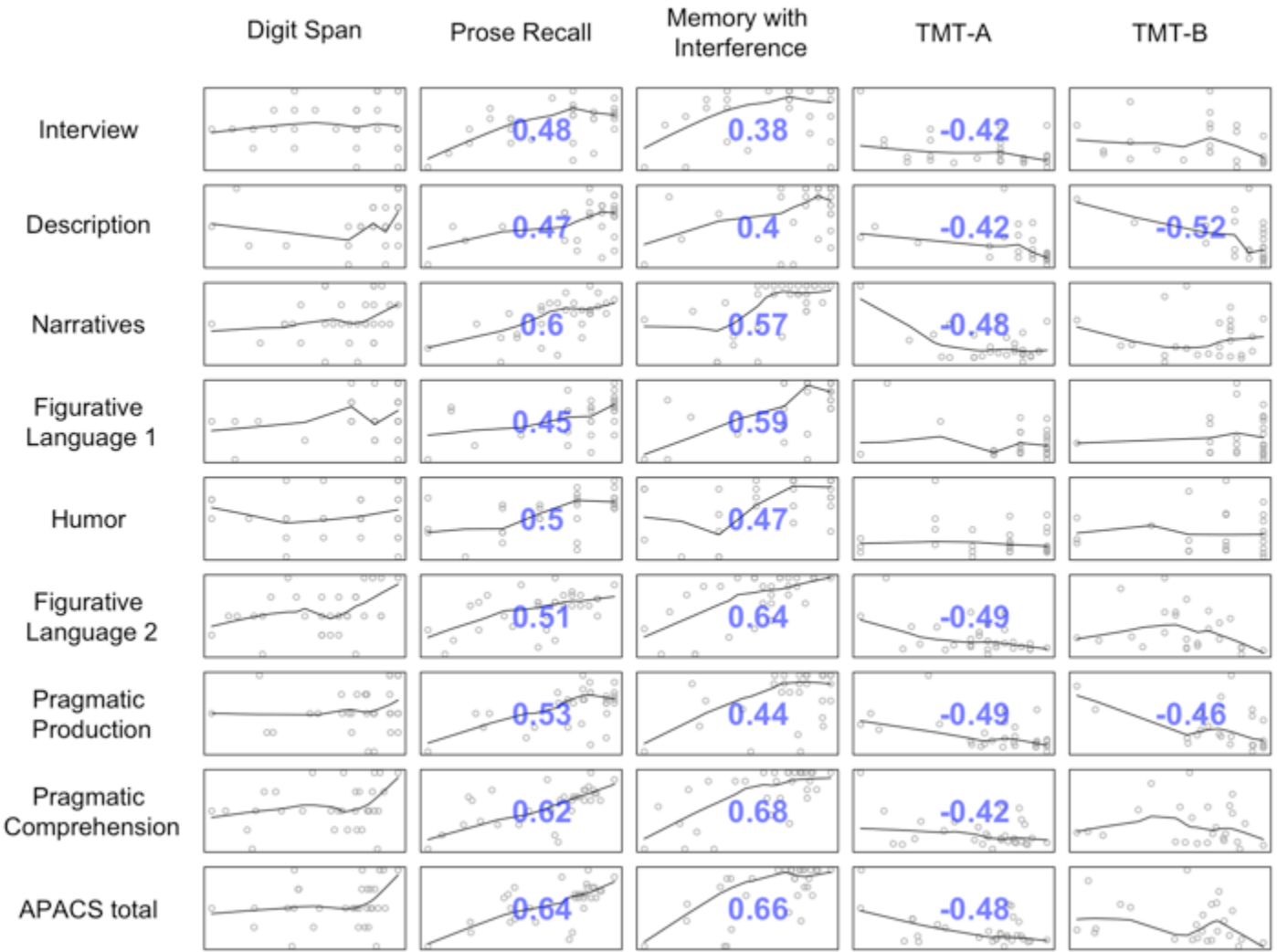
1. **The maxim of quantity**, where one tries to be as informative as one possibly can, and gives as much information as is needed, and no more.

2. **The maxim of quality**, where one tries to be truthful, and does not give information that is false or that is not supported by evidence.

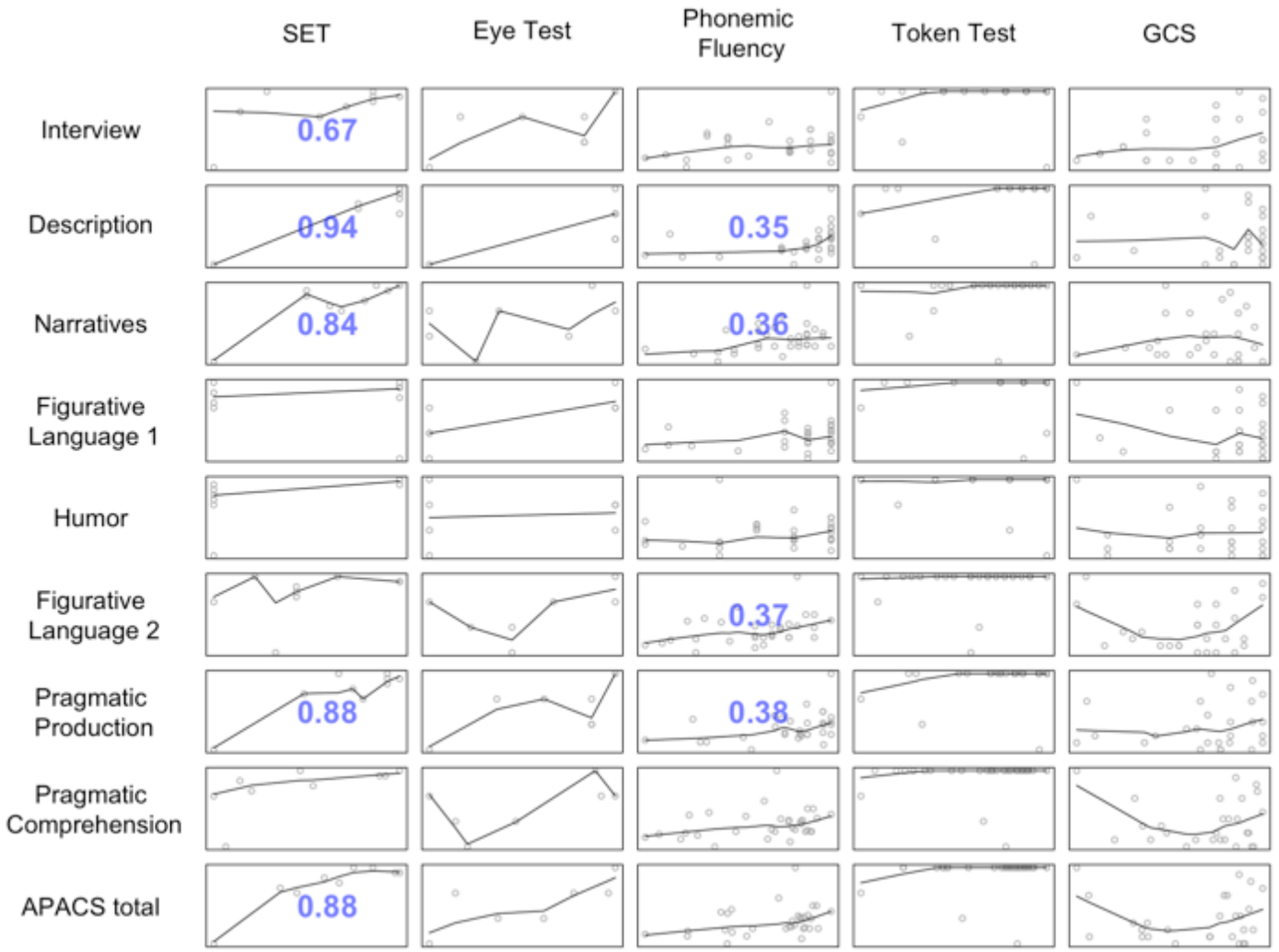
3. **The maxim of relation**, where one tries to be relevant, and says things that are pertinent to the discussion.

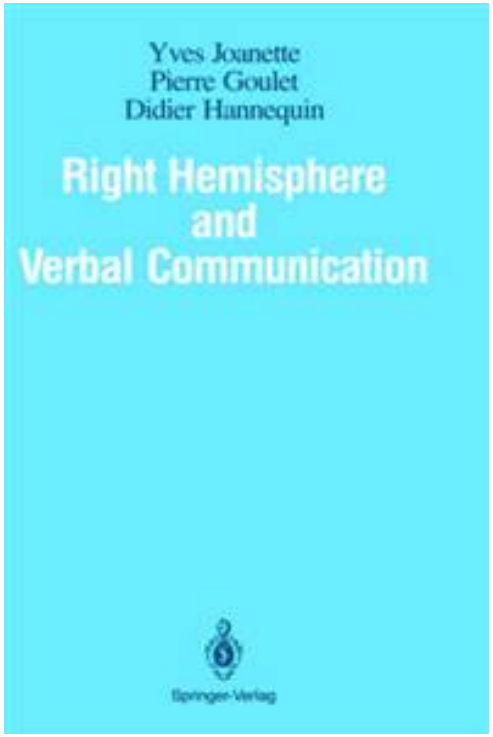
4. **The maxim of manner**, when one tries to be as clear, as brief, and as orderly as one can in what one says, and where one avoids obscurity and ambiguity.

Results


Digit Span
Prose Recall
Memory with Interference
TMT-A
TMT-B
Interview
0.48
0.38
-0.42
Description
0.47
0.4
-0.42
-0.52
Narratives
0.6
0.57
-0.48
Figurative Language 1
0.45
0.59
Humor
0.5
0.47
Figurative Language 2
0.51
0.64
-0.49
Pragmatic Production
0.53
0.44
-0.49
-0.46
Pragmatic Comprehension
0.62
0.68
-0.42
APACS total
0.64
0.66
-0.48

Results


SET
Eye Test
Phonemic Fluency
Token Test
GCS
Interview
Description
Narratives
Figurative Language 1
Humor
Figurative Language 2
Pragmatic Production
Pragmatic Comprehension
APACS total
0.67
0.94
0.35
0.84
0.36
0.37
0.88
0.38
0.88



Clinical Pragmatics in the 90s

Joanette, Goulet, Hannequin, (1990), Springer

Table 2. Sociodemographic and clinical characterization of TBI partecipants

Partecipants	Sex	Age*	Education*	Type of lesion	Time post-onset (months)	GCS °
TBI 1	M	28	8	L frontal	2	5
TBI 2	M	49	8	BIL frontal+parietal	5	3
TBI 3	F	75	8	BIL frontal+parietal	4	4
TBI 4	M	64	13	BIL frontal	31	-
TBI 5	M	17	11	R frontal	8	7
TBI 6	M	22	13	R frontal	8	4
TBI 7	M	31	13	R frontal+ temporal+parietal	26	4
TBI 8	M	21	8	L frontal	25	5
TBI 9	M	57	10	L frontal	16	6
TBI 10	M	33	13	L frontal	37	7
TBI 11	M	31	13	L frontal	20	5
TBI 12	M	36	13	R temporal	23	12
TBI 13	F	36	18	L frontal	32	4
TBI 14	F	58	13	BIL frontal	67	-
TBI 15	F	50	18	L temporal+ parietal	21	-
TBI 16	M	78	2	++	7	-
TBI 17	M	20	13	R posterior	43	-
TBI 18	M	60	22	L frontal+temporal	31	13
TBI 19	F	73	3	L frontal	10	14
TBI 20	M	38	13	+++	+++	-
TBI 21	F	21	13	L frontal+temporal+parietal	58	3
TBI 22	M	46	11	R temporal	6	3
TBI 23	M	32	13	L frontal	8	7
TBI 24	F	27	16	BIL temporal	23	<10
TBI 25	F	25	16	L frontal+R temporal T	5	6
TBI 26	M	35	13	R posterior	1	-
TBI 27	M	17	10	BIL frontal	1	4
TBI 28	M	43	13	L frontal	1	3
TBI 29	M	71	22	R temporal	18	10
TBI 30	M	50	16	L temporal	4	3

R: right; L: left; TBI: traumatic brain injury; *in years; ++ missing lesion site; +++ missing lesion site and missing data. °TBI severity, Glasgow Coma Scale: 3-8 severe TBI, 9-12 moderate TBI, 13-15 mild TBI.