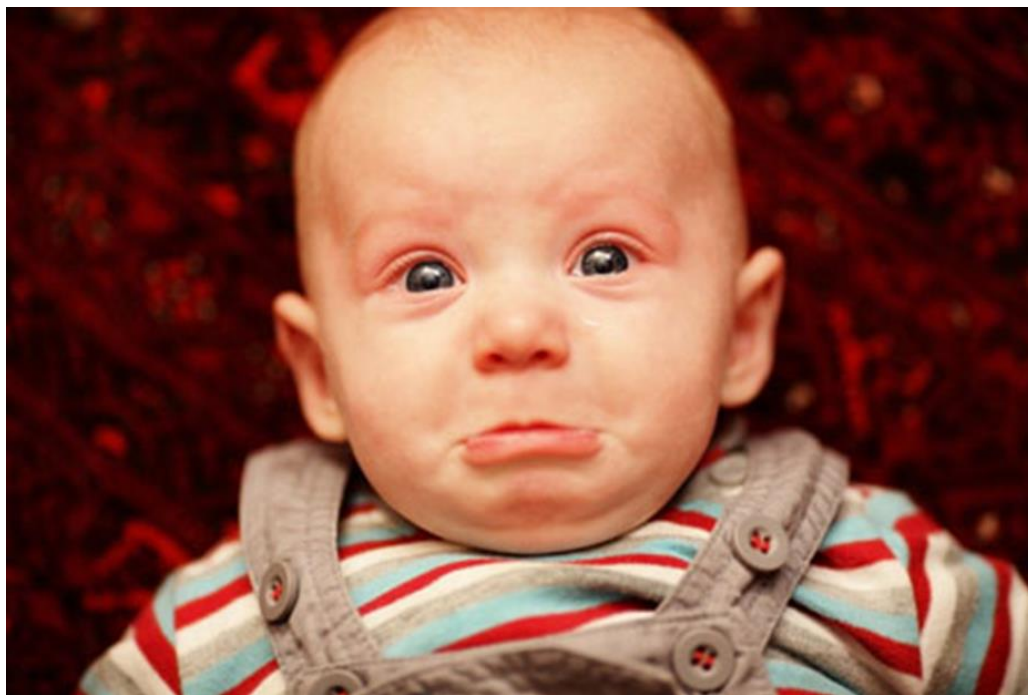


Pracownia badawcza K2



dr Łukasz Okruszek

@ClinLabIP PAN
lokruszek@psych.pan.pl

Poznanie Społeczne

- Social cognition consists of several skills which allow us to interact with other humans. (Billeke & Aboitiz, 2013)



Available online at www.sciencedirect.com

ScienceDirect

Journal homepage: www.elsevier.com/locate/cortex



Research report

Seeing Jesus in toast: Neural and behavioral correlates of face pareidolia



Most Downloaded Articles

ScienceDirect



1. Seeing Jesus in toast: Neural and behavioral correlates of face pareidolia

Jiangang Liu | Jun Li | ...

2. A brain basis for musical hallucinations

Sukhbinder Kumar | William Sedley | ...

3. Different impressions of other agents obtained through social interaction uniquely modulate dorsal and ventral pathway activities in the social human brain

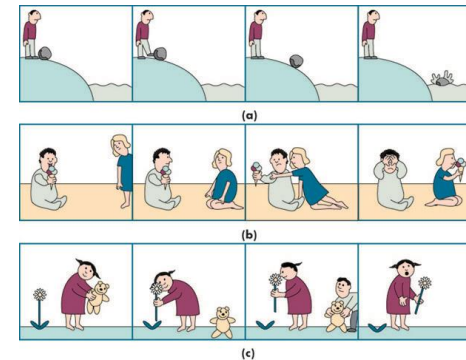
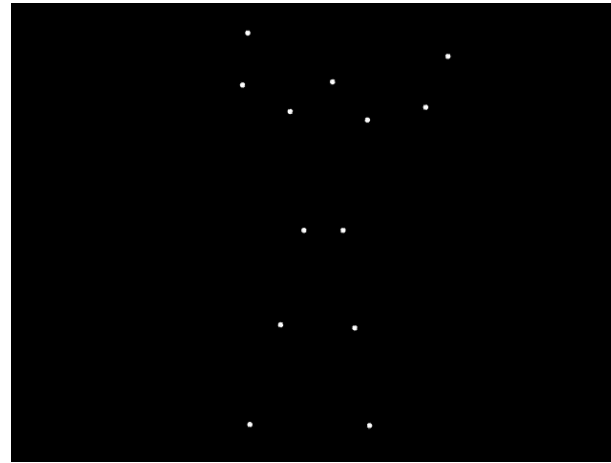
Hideyuki Takahashi | Kazunori Terada | ...

VIEW ALL

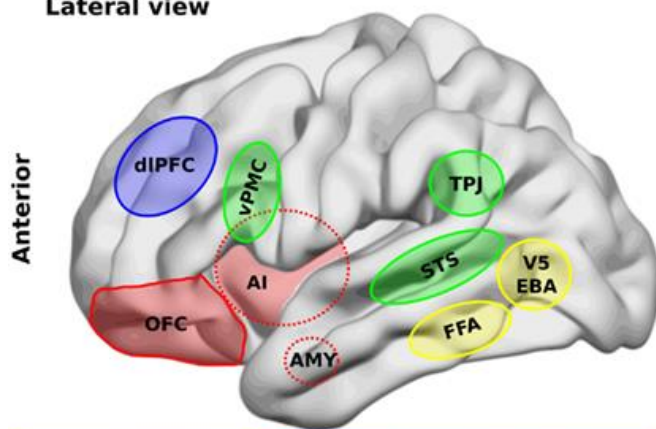


Poznanie społeczne

1. Percepcja (i wiedza) społeczna
2. Rozpoznawanie i przetwarzanie emocji
3. Teoria umysłu
4. Styl atrybucji



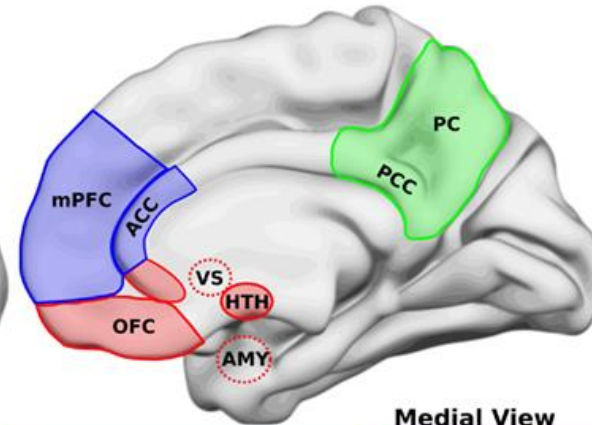
Lateral view



Social Perception

Emotion & Motivation

Behavioral Adaptations



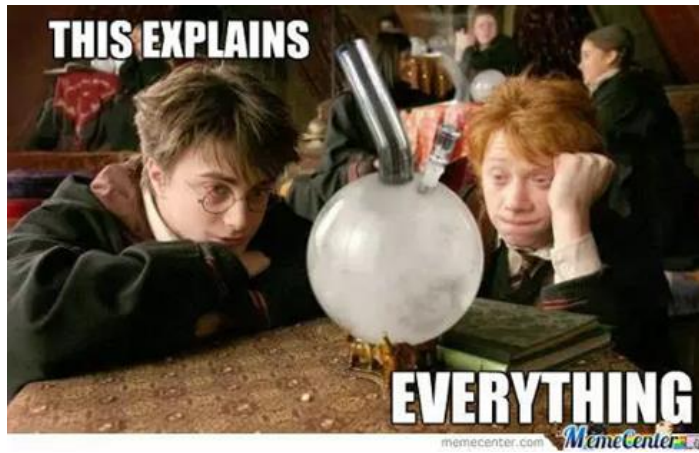
Medial View

Social Attribution



Schizofrenia

- Idiopatyczna choroba ośrodkowego układu nerwowego, w której obserwować można objawy wytwórcze i ubytkowe



- Złożone objawy, których nie można wytłumaczyć w kontekście dysfunkcji pojedynczej struktury czy sieci mózgu
- Trzecia co do częstości przyczyna trwałej niepełnosprawności osób przed 45 r.ż.
- Wczesne badania: obserwowalne aspekty zachowania
- Aktualnie: badanie procesów poznawczych leżących u podstaw funkcjonowania społecznego
- Redukcja klasycznych objawów choroby -> na przywrócenie pacjentom zdolności funkcjonowania w społeczeństwie

Deficyty poznania społecznego w schizofrenii

Deficits in Domains of Social Cognition in Schizophrenia: A Meta-Analysis of the Empirical Evidence

Gauri N. Savla^{a,1}, Lea Vella², Casey C. Armstrong¹, David L. Penn³, and Elizabeth W. Twamley^{1,4}

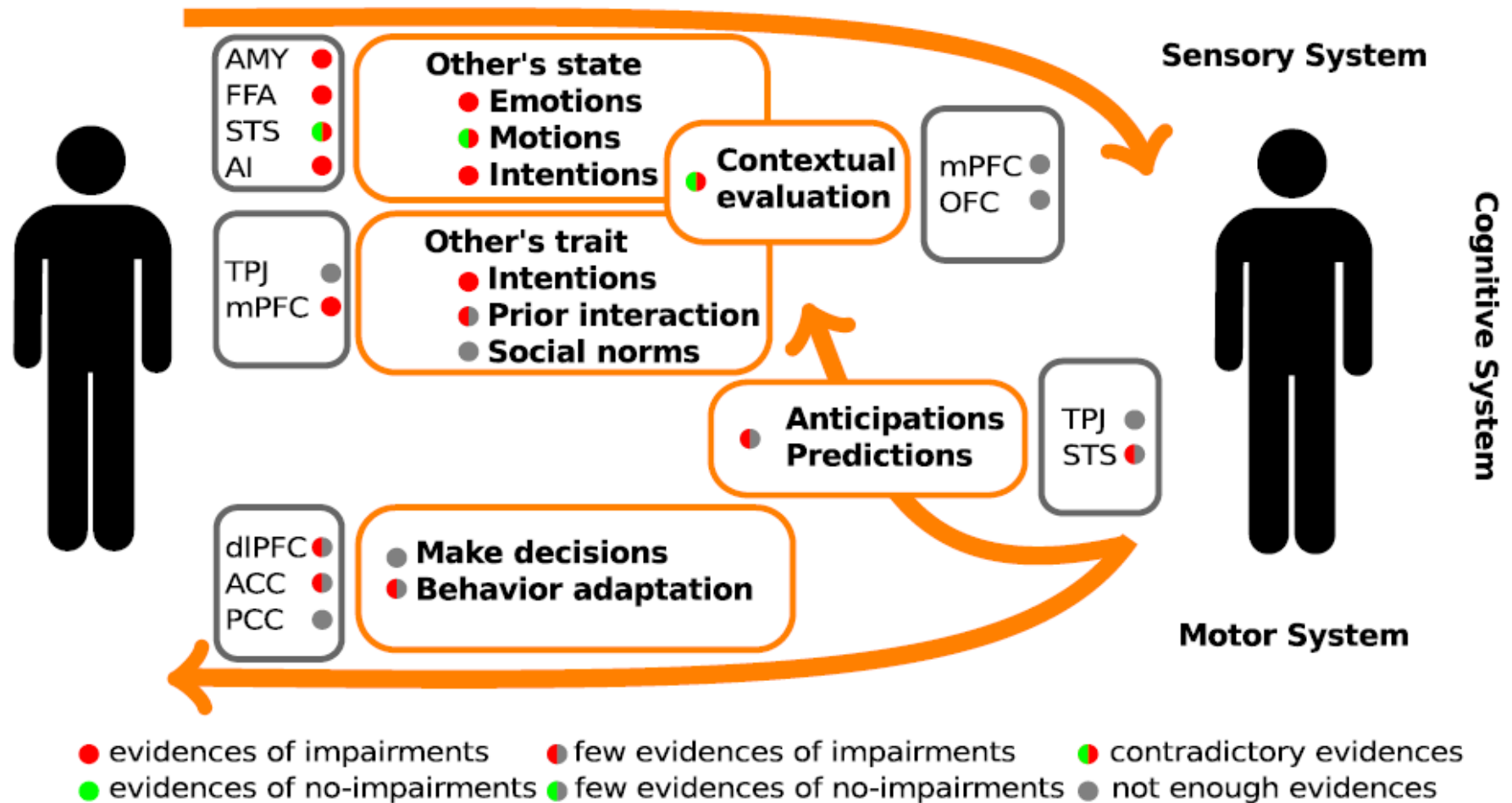
Domain	k	ES (g)	CI	P	Q	df	P	n (NC)	n (SC)
Theory of mind	50	0.96	±13	<0.001	146.19	49	<0.001	1536	1760
Social perception	13	1.04	±25	<0.001	37.91	12	<0.001	450	503
Emotion perception	62	0.89	±17	<0.001	324.63	61	<0.001	1715	1935
Emotion processing	12	0.88	±30	<0.001	54.56	11	<0.001	638	574

The relationship between neurocognition and social cognition with functional outcomes in schizophrenia: A meta-analysis

Anne-Kathrin J. Fett^{a,c,d}, Wolfgang Viechtbauer^b, Maria-de-Gracia Dominguez^a, David L. Penn^e, Jim van Os^{a,d}, Lydia Krabbendam^{c,d,*}

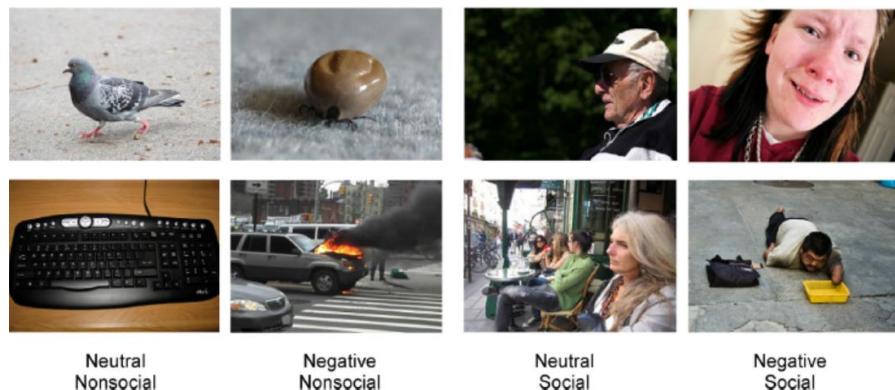
Outcome domain		Cognitive domain											
		Reasoning & problem solving	Processing speed	Attention & vigilance	Working memory	Verbal learning & memory	Visual learning & memory	Verbal comprehension	Verbal fluency	Overall neurocognition	Theory of mind	Emotion perception & processing	Social perception & knowledge
Community functioning	k	16	8	9	7	17	6	–	6	9	3	5	3
	$\hat{\mu}_p$	0.19	0.25	0.16	0.22	0.26	0.20		0.32	0.25	0.48	0.31	0.41
	Q	16.19	12.36	13.13	16.89	69.34	2.90		20.01	4.38	0.81	1.67	16.83
	$\hat{\tau}^2$	0	0.02	0.01	0.04	0.04	0		0.05	0	0	0	0.06
	I ² %	9.95	42.94	38.17	69.30	71.65	0.00		75.90	0	0	0	86.59
	H ²	1.11	1.75	1.62	3.26	3.53	1		4.15	1	1	1	7.46
	CI lb	0.12	0.13	0.04	0.05	0.15	0.07		0.10	0.18	0.32	0.21	0.14
	CI ub	0.26	0.37	0.27	0.38	0.37	0.33		0.51	0.31	0.61	0.40	0.63
	p	<0.001	<0.001	0.01	0.01	<0.001	0.003		0.004	<0.001	<0.001	<0.001	0.004

Deficyty poznania społecznego w schizofrenii

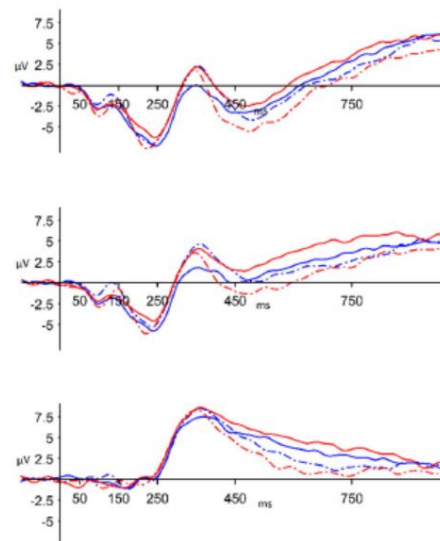


Social and nonsocial affective processing in schizophrenia – An ERP study

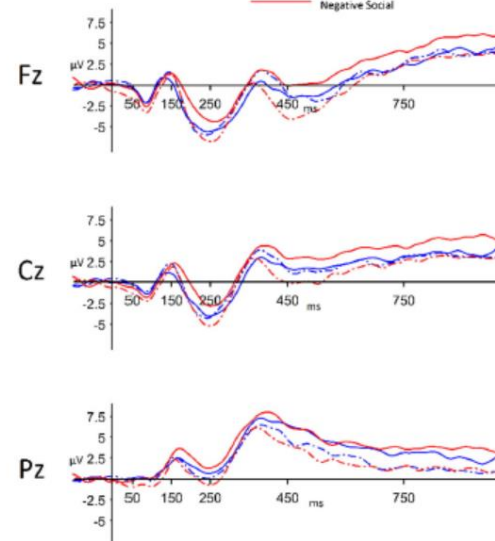
Ł. Okruszek^{a,*}, A. Wichniak^{b,c}, M. Jarkiewicz^b, A. Schudy^a, M. Gola^{d,e}, K. Jednoróg^f, A. Marchewka^g, E. Łojek^a



Controls



Patients



Journal of the International Neuropsychological Society (2017), 00, 1–5.
Copyright © INS. Published by Cambridge University Press, 2017.
doi:10.1017/S1355617717000960

BRIEF COMMUNICATION

Affective and Cognitive Verbal Theory of Mind in Schizophrenia: Results From a Novel Paradigm

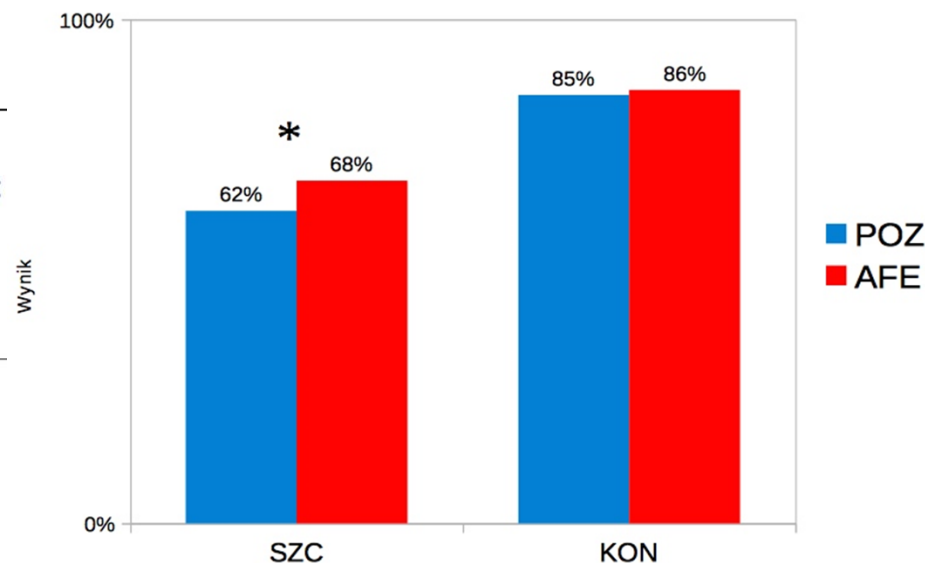
Łukasz Okruszek,¹ Aleksandra Piejka,² Ewa Szczepocka,³ Adam Wysokiński,³ AND Agnieszka Pluta²

¹Clinical Neuroscience Lab, Institute of Psychology, Polish Academy of Science, Warsaw, Poland

²Faculty of Psychology, University of Warsaw, Warsaw, Poland

³Department of Old Age Psychiatry and Psychotic Disorders, Medical University of Łódź, Łódź, Poland

Interakcja grupy i rodzaju pytań



SCIENTIFIC REPORTS

OPEN Social cognition in neuropsychiatric populations: a comparison of theory of mind in schizophrenia and mesial temporal lobe epilepsy

Łukasz Okruszek¹, Aleksandra Bala², Małgorzata Wordecha¹, Michał Jarkiewicz³, Adam Wysokiński⁴, Ewa Szczepocka⁴, Aleksandra Piejka², Oliwia Zaborowska², Marta Szantroch⁵, Andrzej Rysz² & Andrzej Marchel⁵

ad: 26 September 2016

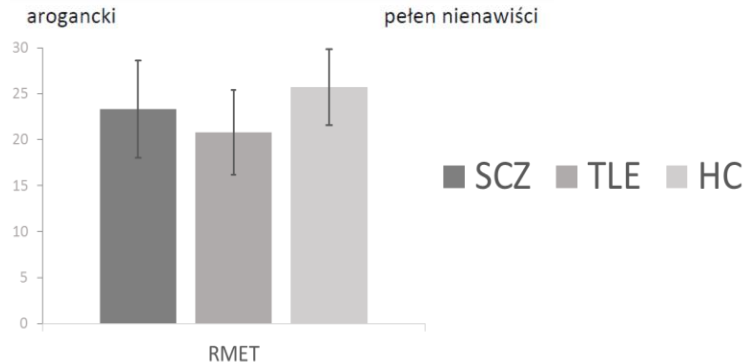
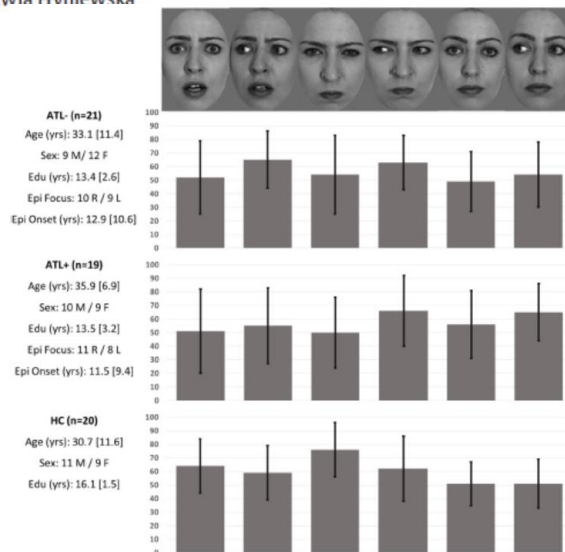
ad: 1 March 2017

ed online: 28 March 2017

Brief Communication

Gaze matters! The effect of gaze direction on emotional enhancement of memory for faces in patients with mesial temporal lobe epilepsy

Łukasz Okruszek^{a,*}, Aleksandra Bala^b, Marcela Dziekan^b, Marta Szantroch^c, Andrzej Rysz^c, Andrzej Marchel^c, Sylwia Hwniewska^d



SOCIAL NEUROSCIENCE, 2016
<http://dx.doi.org/10.1080/17470919.2016.1244113>

Routledge
Taylor & Francis Group

The beat of social cognition: Exploring the role of heart rate variability as marker of mentalizing abilities

Łukasz Okruszek^{a,b}, Kirsty Dolan^b, Megan Lawrence^b and Matteo Cella^b

^aInstitute of Psychology, Polish Academy of Sciences, Warsaw, Poland; ^bDepartment of Psychology, Institute of Psychiatry, King's College London, London, UK



Contents lists available at ScienceDirect

Schizophrenia Research

journal homepage: www.elsevier.com/locate/schres



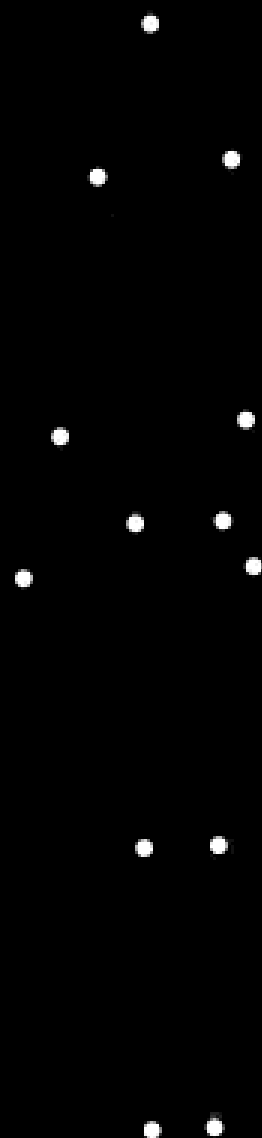
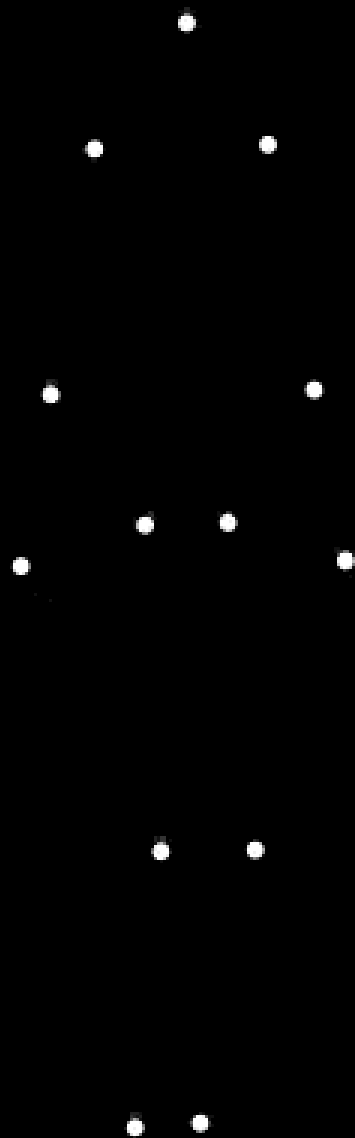
Using wearable technology to detect the autonomic signature of illness severity in schizophrenia

Matteo Cella^{a,*}, Łukasz Okruszek^{a,b}, Megan Lawrence^a, Valerio Zarlinga^a, Zhimin He^a, Til Wykes^a

Kodowanie predykcyjne w sferze społecznej

- „Predictive processing can refer to any psychological or neural process that utilizes estimations about the future. The proposal of the “predictive brain” broadly states that we are constantly generating mental representations to predict future states of the world around us, and about our own future internal mental state” (Brown & Brune, 2012)







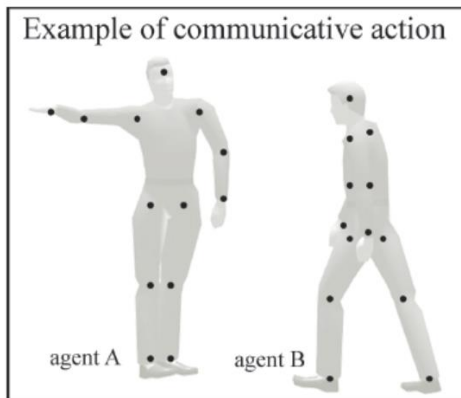
Czy oni się komunikowali?

- A siada. B robi przysiad.
- A robi przysiad i prosi B by go naśladował. B robi przysiad.
- A daje coś B. B robi przysiad.
- A kładzie coś na ziemi. B robi przysiad.
- A prosi B by podszedł bliżej. B robi przysiad.

The Multilingual CID-5: A New Tool to Study the Perception of Communicative Interactions in Different Languages

Valeria Manera¹, Francesco Iani², J  r  my Bourgeois¹, Maciej Haman³,
  ukasz P. Okruszek³, Susan M. Rivera⁴, Philippe Robert^{1,5}, Leonhard Schilbach^{6,7},
Emily Sievers⁴, Karl Verfaillie⁸, Kai Vogeley^{6,9}, Tabea von der L  he¹⁰, Sam Willems⁹ and
Cristina Becchio^{2,11*}

Language	Intention classification Mean (SD)	Intention identification Mean (SD)
Chinese	88% (6%)	71% (7%)
Dutch	90% (6%)	72% (12%)
English	92% (4%)	78% (10%)
German	90% (9%)	80% (9%)
French	90% (8%)	81% (8%)
Italian	89% (8%)	77% (11%)
Polish	89% (9%)	74% (12%)



Task A

Were A and B communicating
or
acting independently of each other?

COM IND

Task B

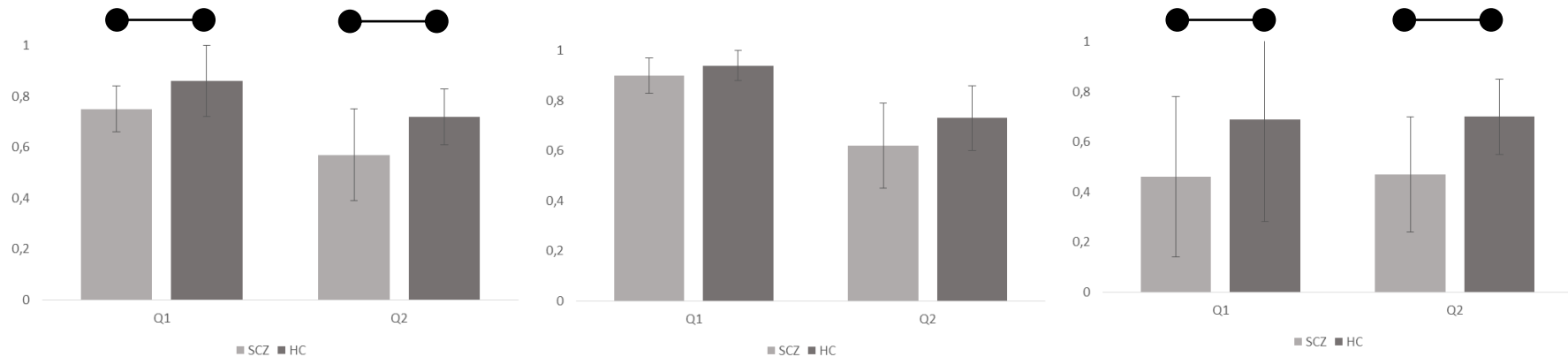
What is the correct action description?

1. A asks B to walk away.
B takes some steps
2. A opens the door for B.
B takes some steps
3. A asks B to move something.
B takes some steps
4. A stretches. B takes some steps
5. A draws a line. B takes some steps

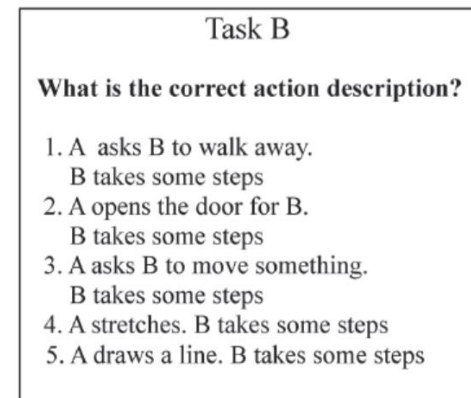
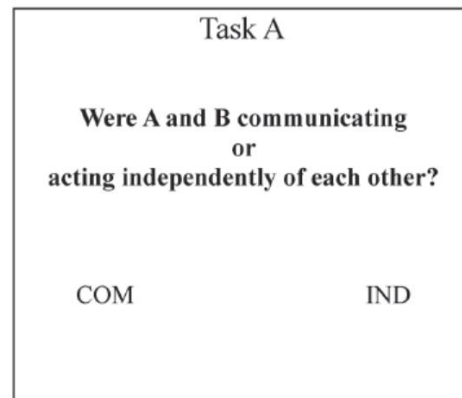
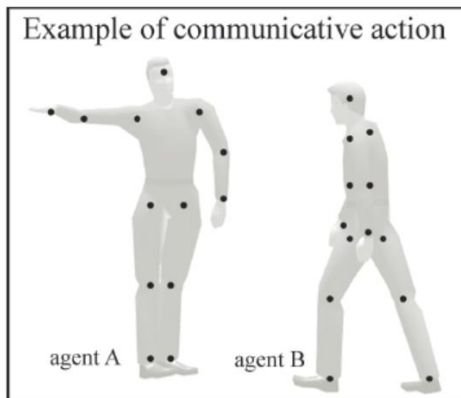
RESEARCH ARTICLE

Impaired Recognition of Communicative Interactions from Biological Motion in Schizophrenia

Lukasz Okruszek^{1*}, Maciej Haman¹, Kasper Kalinowski¹, Monika Talarowska², Cristina Becchio^{3,4}, Valeria Manera⁵

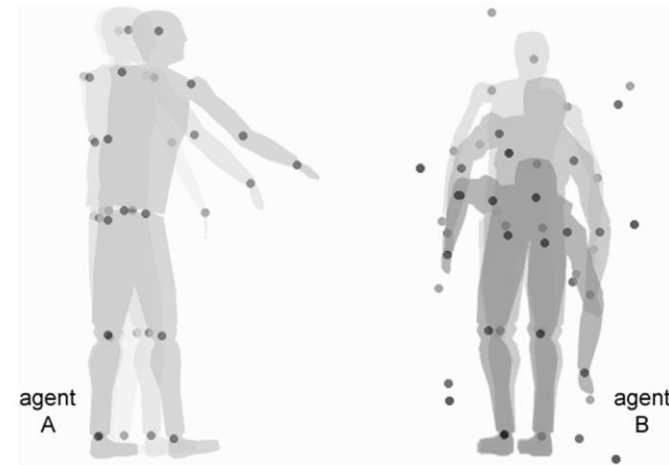
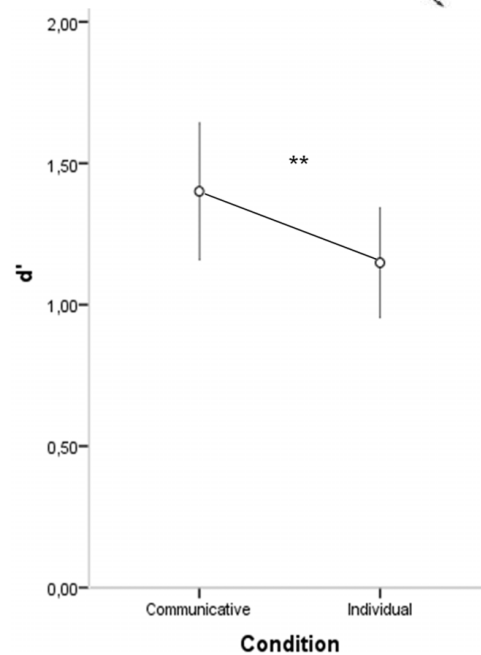
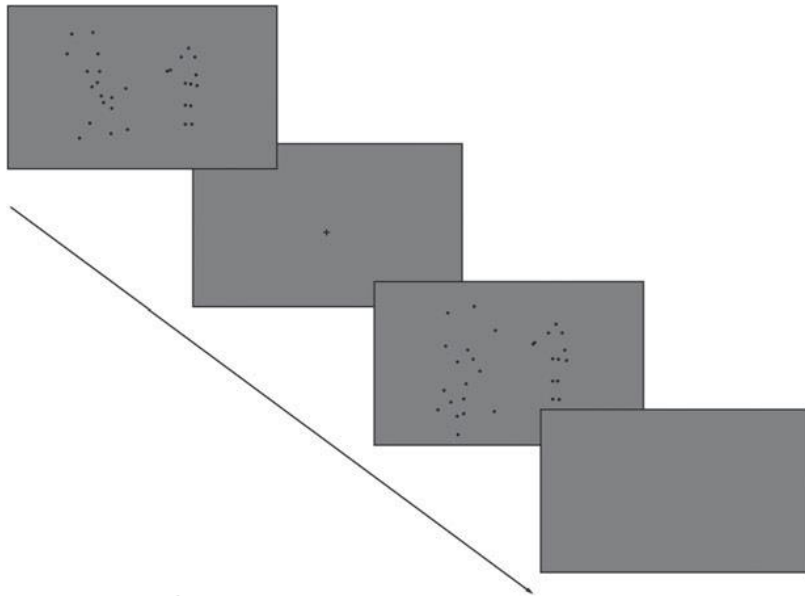


- Obniżona zdolność rozpoznawania działań dwóch osób w grupie pacjentów.
- Różnice związane z problemami w zakresie poprawnej interpretacji sytuacji, w których dwie osoby się nie komunikowały.
- Zbliżony wzorzec u pacjentów z padaczką skroniową (Bala i in., resubmitted)

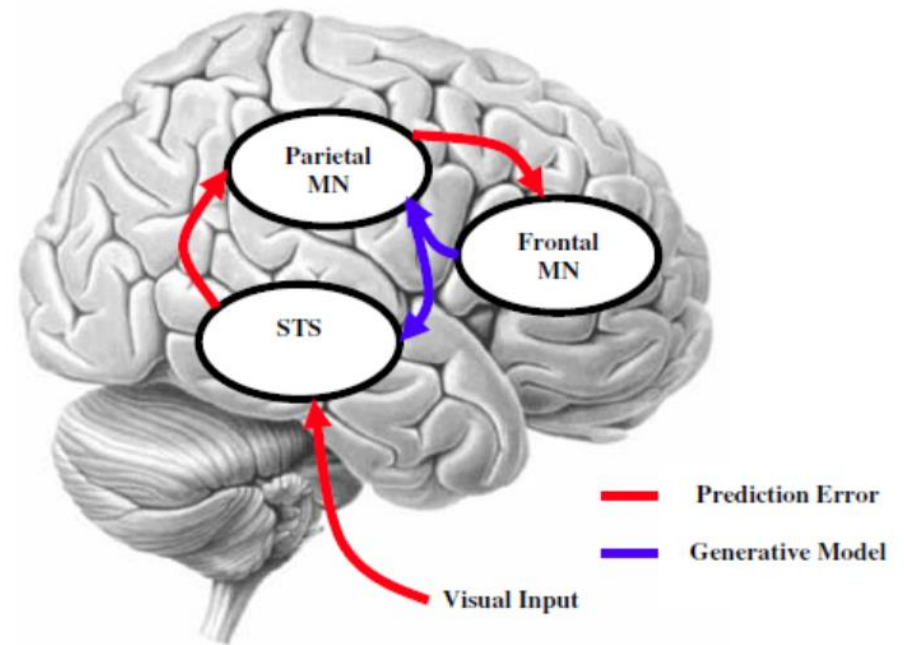


Communicative Interactions Improve Visual Detection of Biological Motion

Valeria Manera^{1,2*}, Cristina Becchio¹, Ben Schouten², Bruno G. Bara¹, Karl Verfaillie²

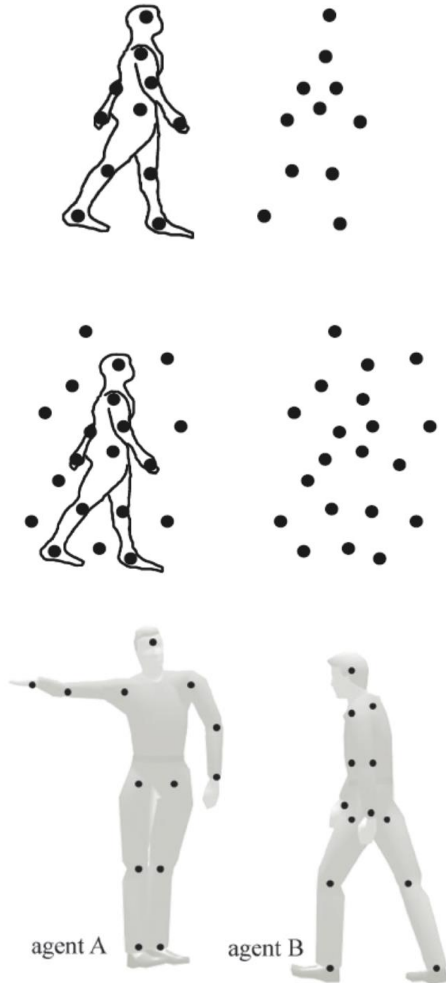


b) The MNS as a predictive coding model

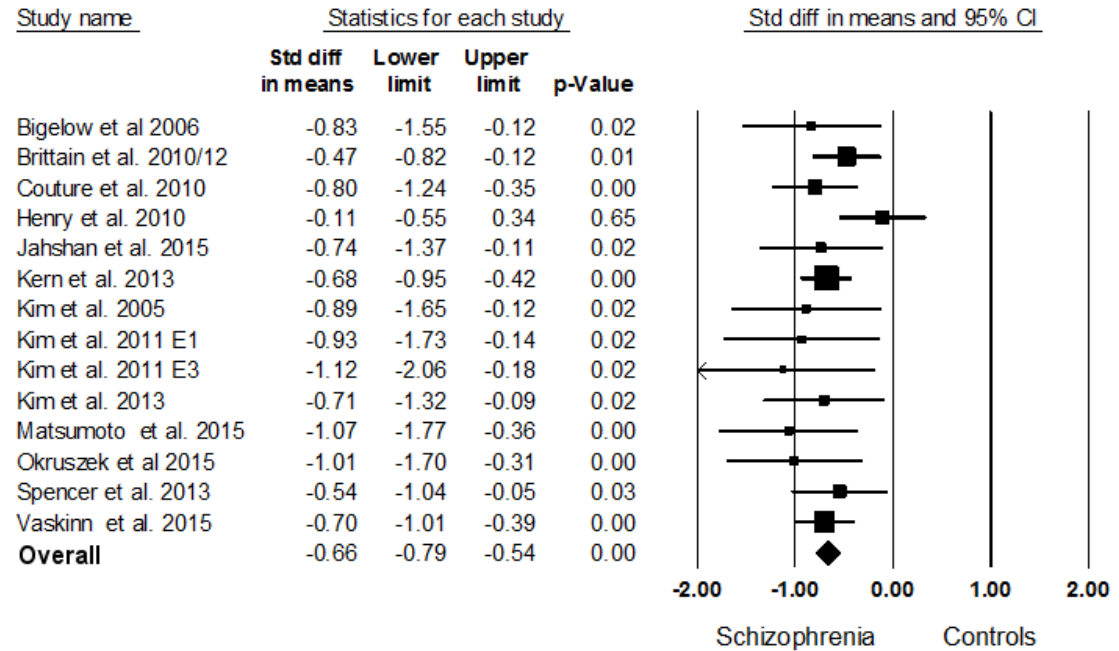


Biological motion processing in schizophrenia – Systematic review and meta-analysis

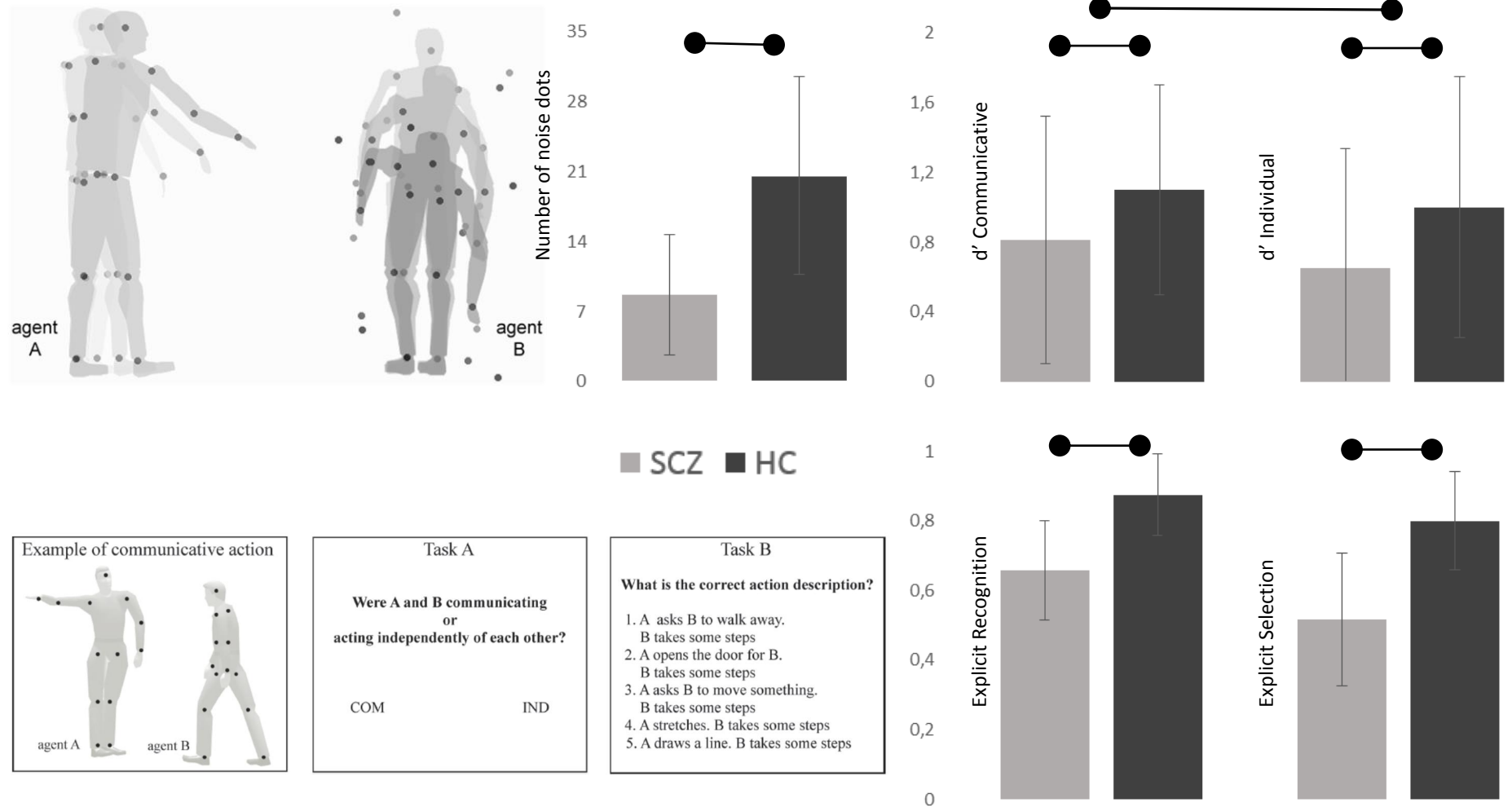
Łukasz Okruszek^{a,*}, Izabela Pilecka^b



Biological Motion Processing



Okruszek, Piejka, Wysokiński, Szczepocka, Manera (resubmitted, *J Abn Psychol*):



Interpersonal predictive coding, not action perception, is impaired in autism

T. von der Lühе^{1,†}, V. Manera^{2,†}, I. Barisic³, C. Becchio^{4,5}, K. Vogeley^{1,6}
and L. Schilbach^{1,7}

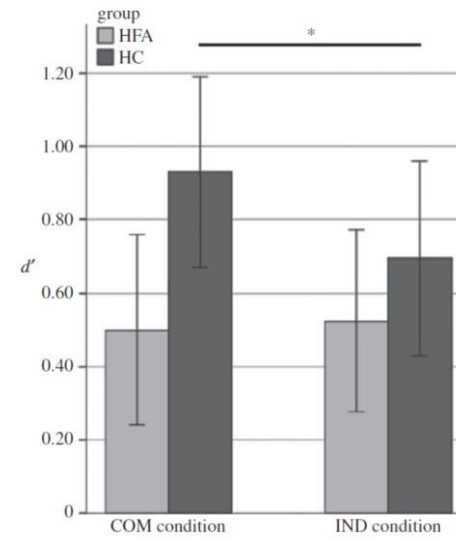
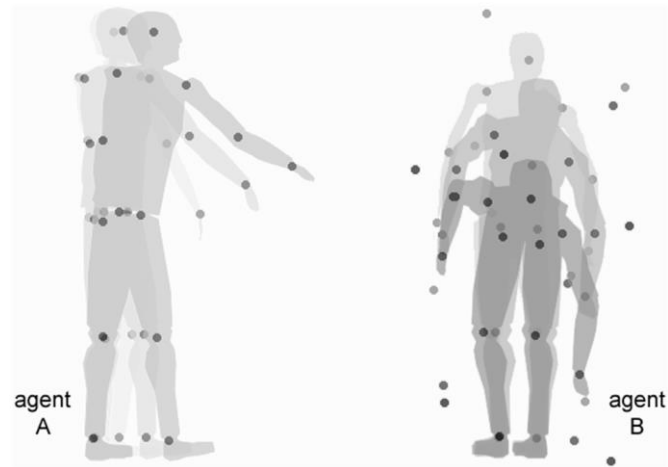


Figure 3. Mean sensitivity (d') across groups and conditions. Error bars depict 95% confidence intervals.

Example of communicative action

agent A

agent B

Task A

Were A and B communicating or acting independently of each other?

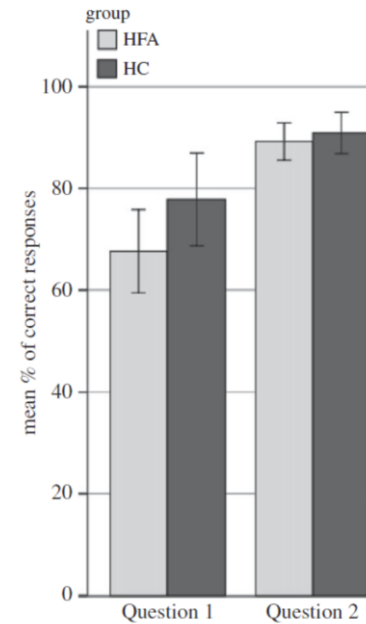
COM

IND

Task B

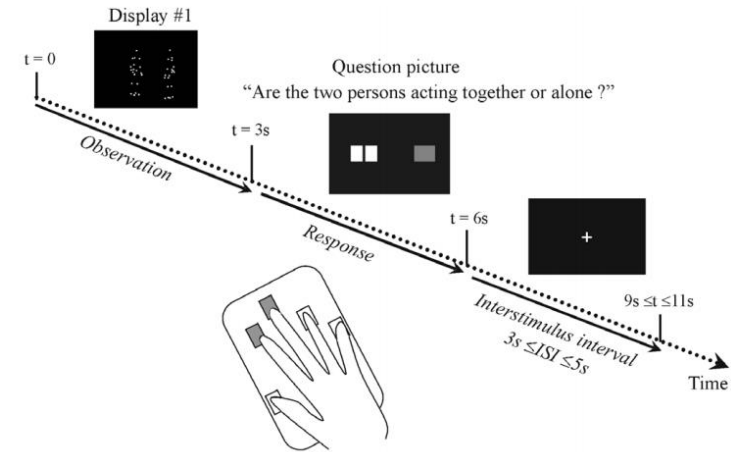
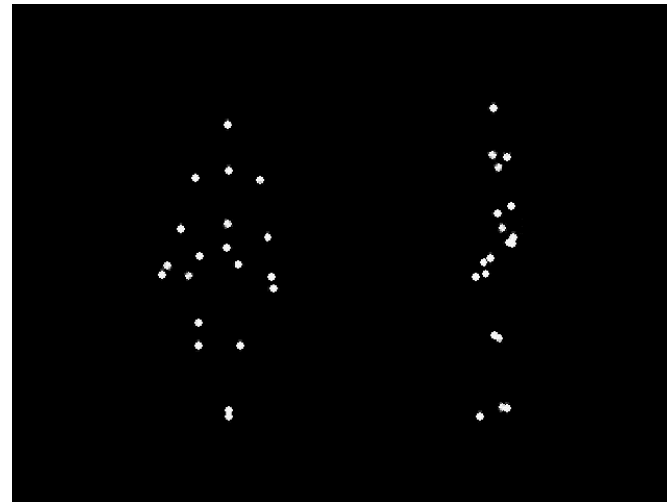
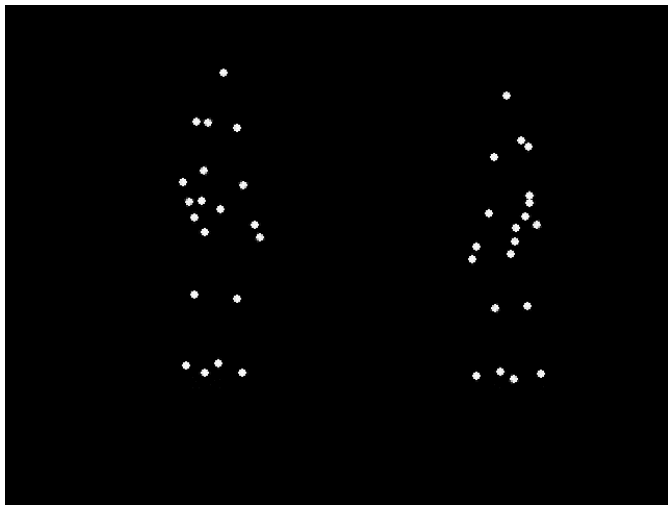
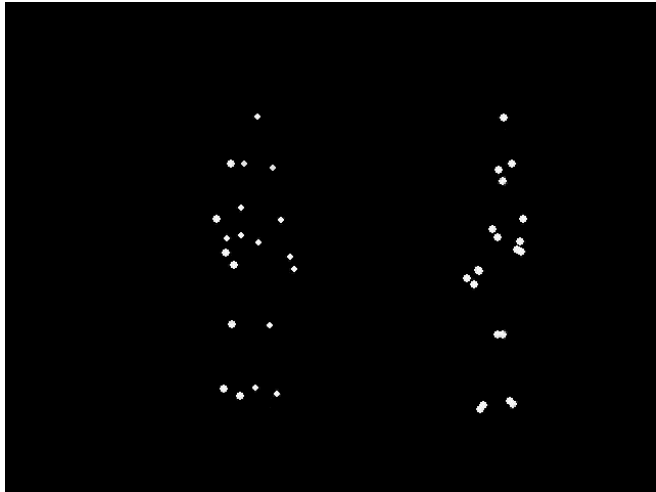
What is the correct action description?

1. A asks B to walk away. B takes some steps
2. A opens the door for B. B takes some steps
3. A asks B to move something. B takes some steps
4. A stretches. B takes some steps
5. A draws a line. B takes some steps



Recruitment of Both the Mirror and the Mentalizing Networks When Observing Social Interactions Depicted by Point-Lights: A Neuroimaging Study

Laurie Centelles^{1,2}, Christine Assaiante¹, Bruno Nazarian³, Jean-Luc Anton³, Christina Schmitz^{1*}



Recruitment of Both the Mirror and the Mentalizing Networks When Observing Social Interactions Depicted by Point-Lights: A Neuroimaging Study

Laurie Centelles^{1,2}, Christine Assaiante¹, Bruno Nazarian³, Jean-Luc Anton³, Christina Schmitz^{1*}

Psychological Medicine

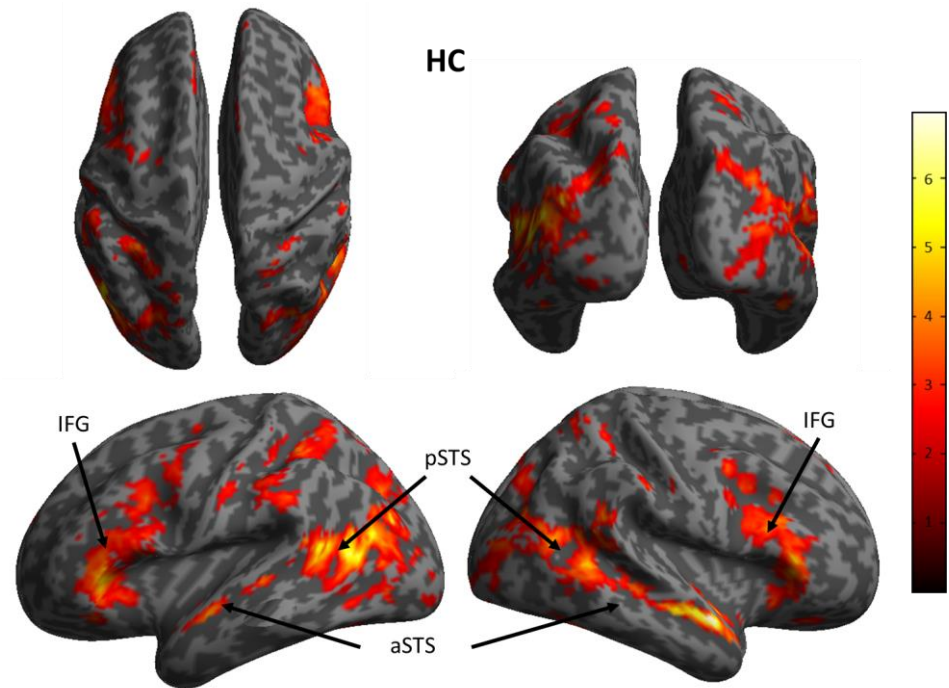
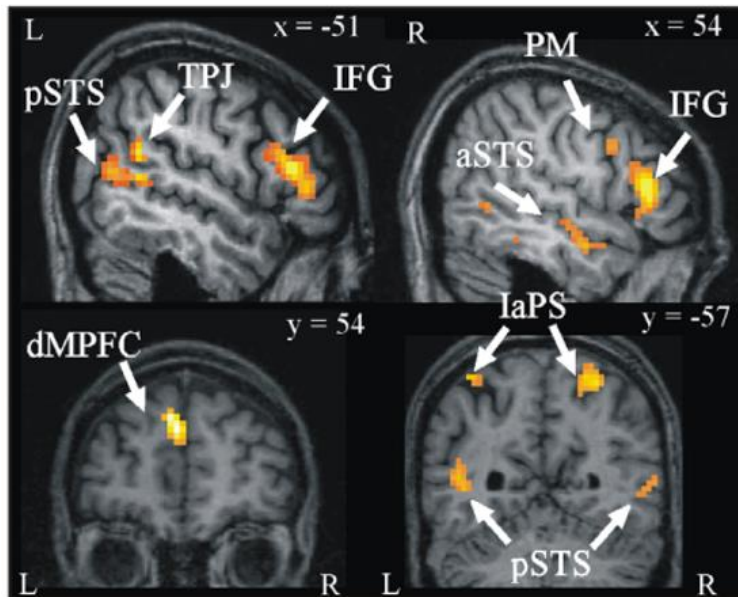
cambridge.org/psm

Original Article

Cite this article: Okruszek Ł., Wordecha M.,

Brain correlates of recognition of communicative interactions from biological motion in schizophrenia

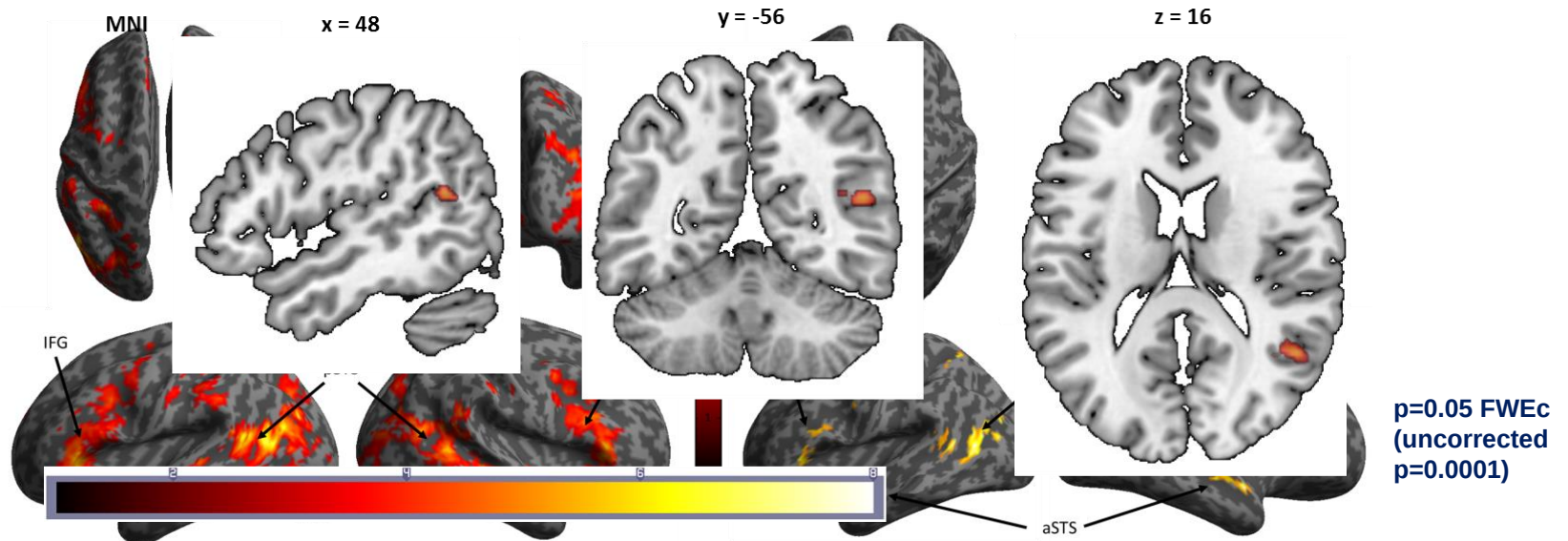
Ł. Okruszek¹, M. Wordecha^{1,2}, M. Jarkiewicz², B. Kossowski², J. Lee^{4,5} and A. Marchewka²



- KOM: HC (97%+/-4%)
- IND: HC (99%+/-1%)

- KOM: HC (99%+/-2%) - SCZ (95%+/-6%)
- IND: HC (99%+/-1%) - SCZ (98%+/-4%)

GLM:



Brain region		MNI coordinates			#BA	T-stat
		x	y	z		

Healthy controls

R	Superior Temporal Sulcus	54	0	-14	22	10.77
L	Superior Temporal Sulcus (<i>posterior</i>)	-52	-62	10	39	9.22
L	Inferior Frontal Gyrus	-44	26	-2	47	7.90
R	Inferior Frontal Gyrus	50	24	-4	47	7.70
L	Intraparietal Sulcus	-38	-44	52	7	6.70
L	Thalamus	-10	-18	10	-	6.65
L	Superior Temporal Sulcus (<i>anterior</i>)	-52	-10	-12	22	6.47
R	Fusiform Gyrus	40	-52	-14	39	6.29
L	Middle Frontal Gyrus	-38	12	28	8	6.24
L	Middle Temporal Gyrus	-52	-30	0	22	5.97
R	Extrastriate cortex	38	-82	16	19	5.95
L	Intraparietal Sulcus	-26	-74	28	39	5.73
L	Fusiform Gyrus	-42	-50	-10	37	5.63
L	Inferior Parietal Lobule	-58	-40	32	40	5.50
L	Middle Occipital Gyrus	-26	-88	0	18	5.20
R	Lingual Gyrus	22	-90	-8	18	5.16
R	Intraparietal Sulcus	26	-52	56	7	5.03
R	Somatosensory cortex	56	-20	40	1	4.96
L	Medial Prefrontal Cortex	-4	38	44	8	4.89
L	Premotor Cortex	-30	-8	50	6	4.72
R	Supplementary Motor Cortex	2	14	64	6	4.71

Brain region		MNI coordinates			#BA	T-stat
		x	y	z		

Patients with schizophrenia

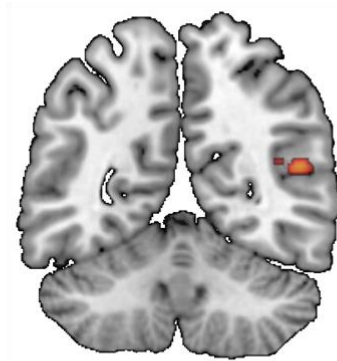
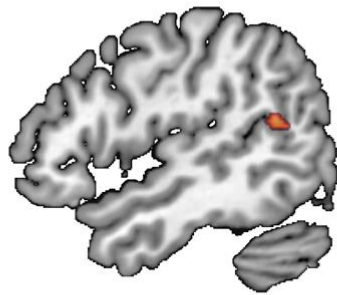
L	Superior Temporal Sulcus (<i>posterior</i>)	-58	-62	10	39	7.26
R	Superior Temporal Sulcus (<i>anterior</i>)	54	0	-14	22	7.04
L	Inferior Frontal Gyrus (<i>pars triangularis</i>)	-50	22	2	45	6.20
L	Inferior Frontal Gyrus (<i>pars triangularis</i>)	-48	26	20	44	5.52
L	Intraparietal Sulcus	-26	-60	58	7	5.39
L	Premotor Cortex	-44	4	52	6	5.37
L	Superior Temporal Sulcus	-50	-6	-14	22	5.01
R	Superior Temporal Sulcus (<i>posterior</i>)	56	-44	8	22	4.57

MNI

x = 48

y = -56

z = 16



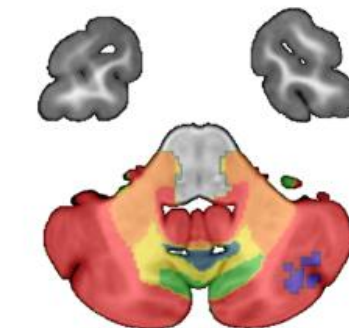
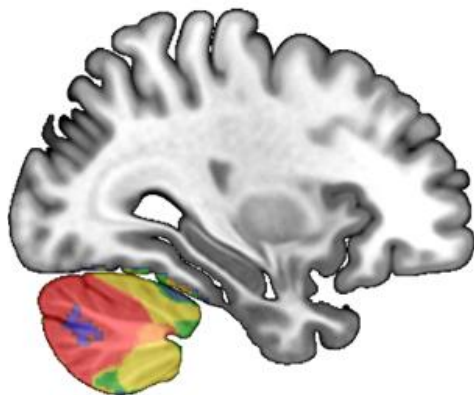
PPI:

MNI

x = 32

y = -74

z = -42



Healthy controls > Patients with schizophrenia

R Cerebellum Crus 2

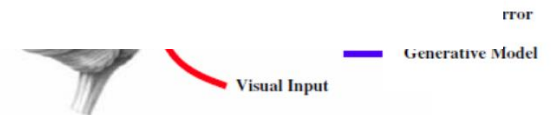
32

-74

-42

-

5.26





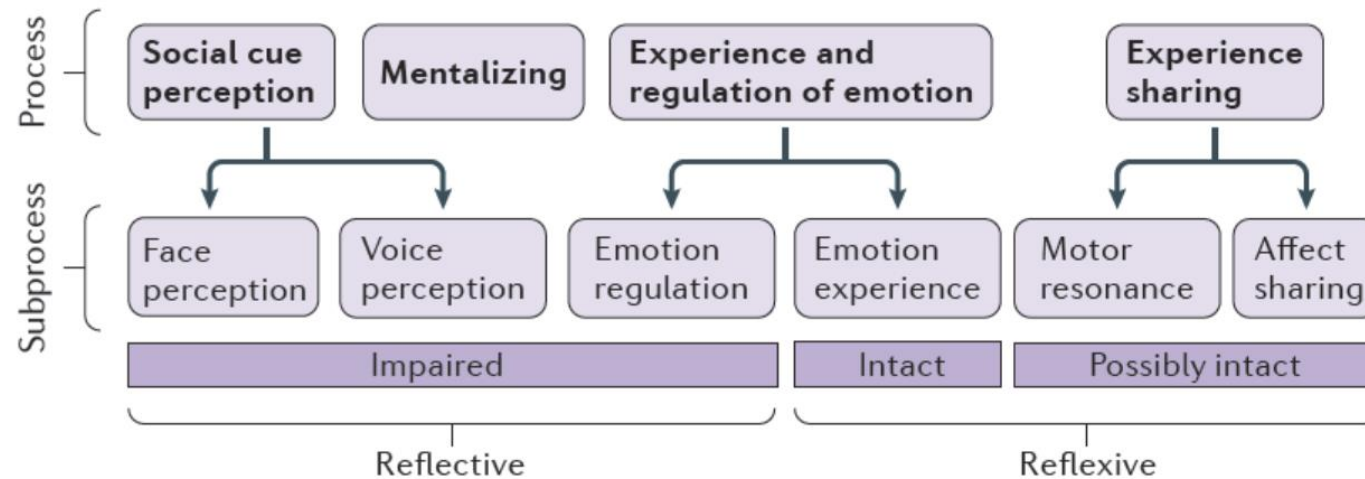
Just a reminder...

- Badanie 1: różnice w zakresie rozpoznawania indywidualnych działań, ale zachowane rozpoznawanie interakcji
- Badanie 2: obniżona percepcja społeczna, ale zachowane kodowanie predykcyjne
- Badanie 3: obniżona aktywność i łączność funkcjonalna pSTS ale brak różnic w aktywności MNS

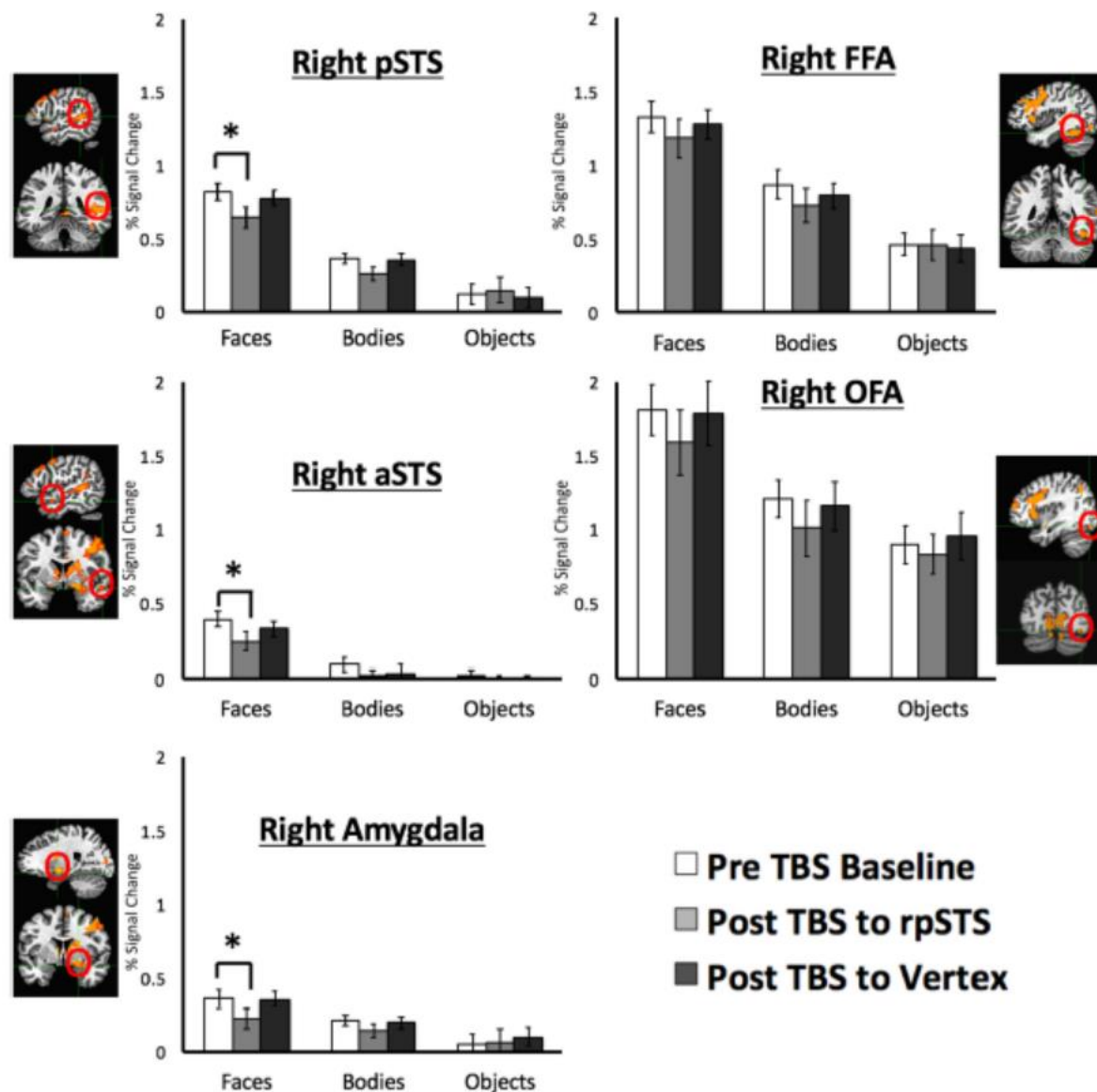
=> zachowane odruchowe (*reflexive*) ale nie refleksyjne (*reflective*) poznanie społeczne?

Social cognition in schizophrenia

Michael F. Green, William P. Horan and Junghee Lee

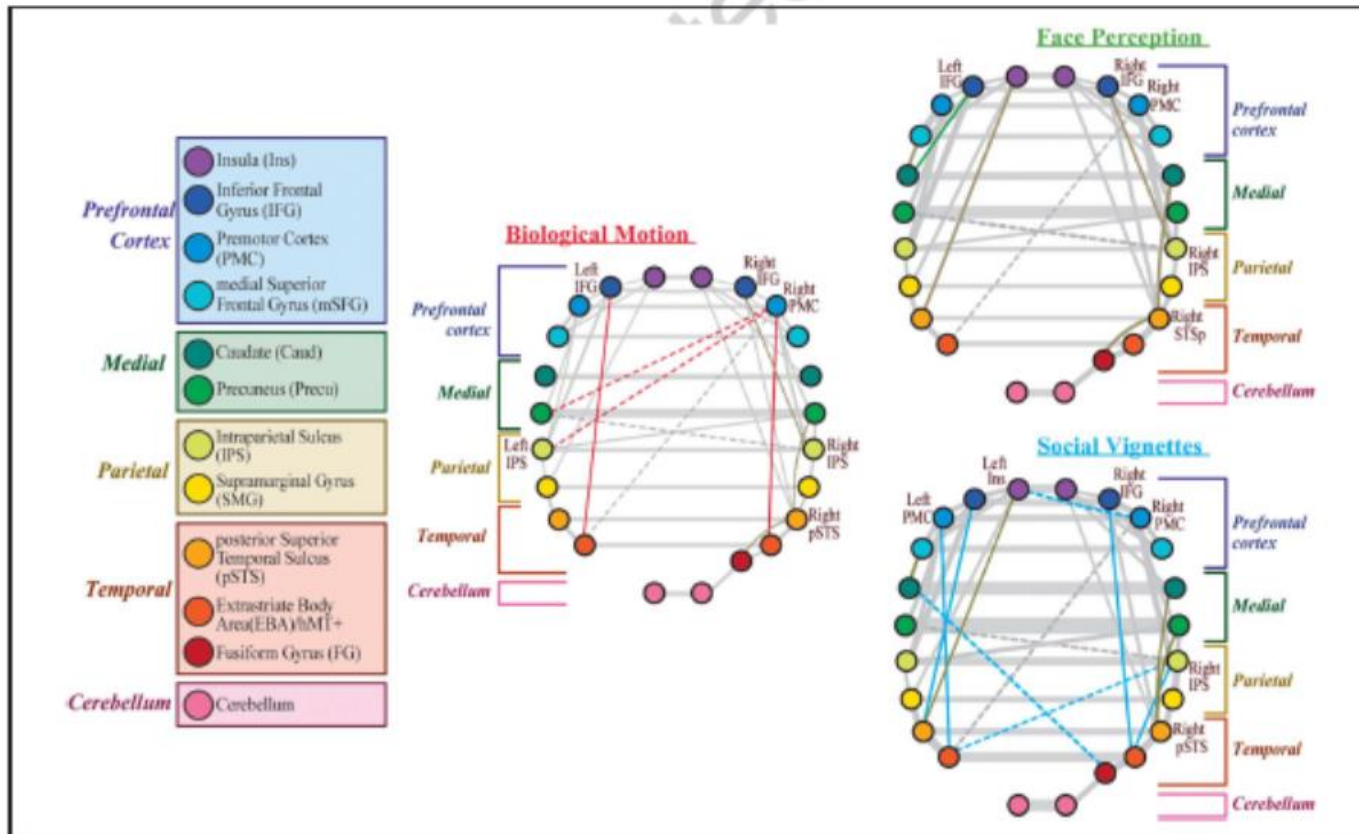


The Superior Temporal Sulcus Is Causally Connected to the Amygdala: A Combined TBS-fMRI Study



Network Connectivity of the Right STS in Three Social Perception Localizers

Samhita Dasgupta¹, Sarah C. Tyler², Jonathan Wicks¹,
Ramesh Srinivasan¹, and Emily D. Grossman¹



We find a core pattern of cortical connectivity that supports the hypothesis that the STSp serves as a hub of the social brain network. The right STSp was **the most highly connected** of the brain regions measured, with many long range connections to pFC.

An integrative neural model of social perception, action observation, and theory of mind

Daniel Y.-J. Yang*, Gabriela Rosenblau, Cara Keifer, Kevin A. Pelphrey

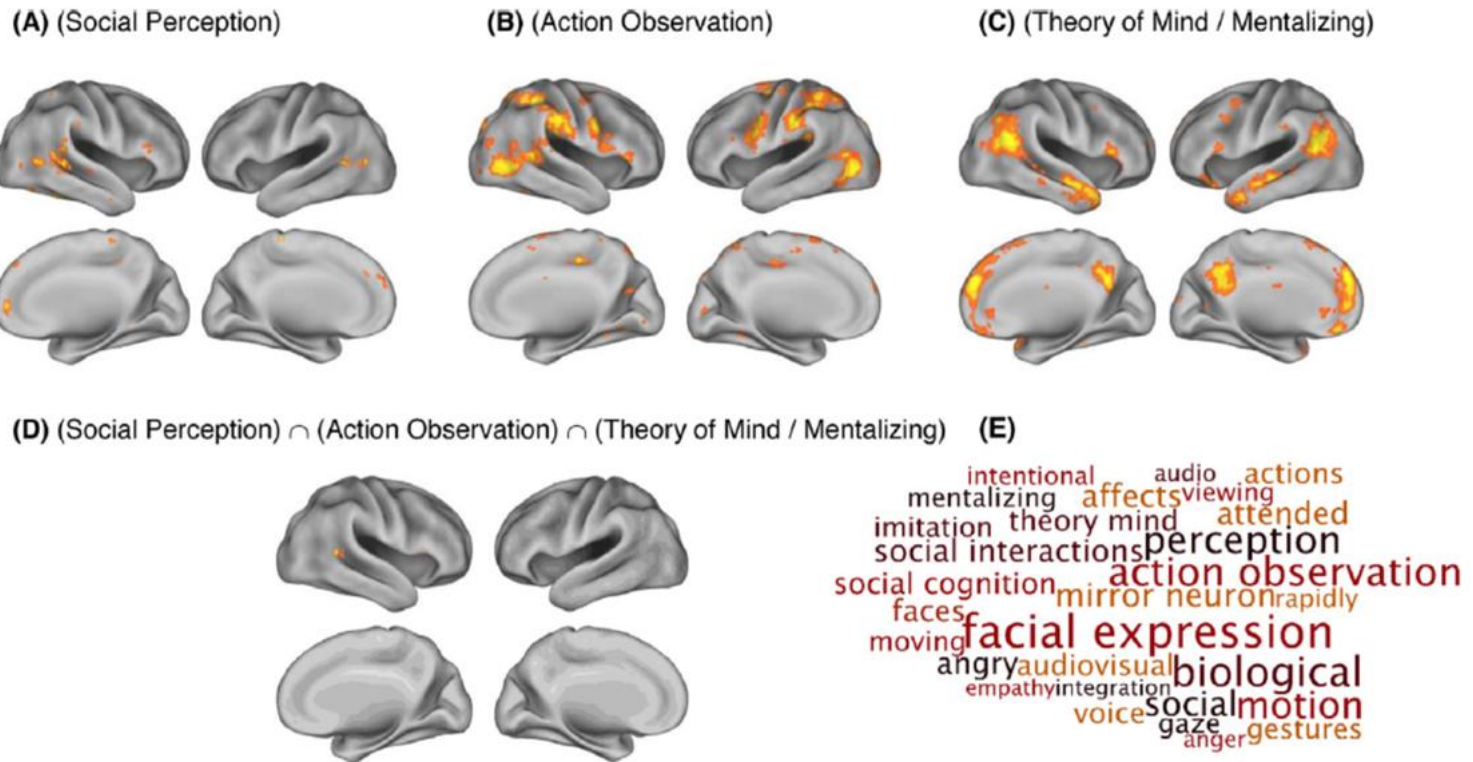


Fig. 2. Brain regions engaged during: (A) social perception, (B) action observation, and (C) theory of mind/mentalizing, as reported by the large-scale, meta-analytical tool Neurosynth (reverse inference, FDR $q < .01$). Figure (D) is the conjunction of (A)–(C). The only common region was localized to the right pSTS, center of gravity = (52, –46, 9), MNI152 mm coordinate. Figure (E) is the word cloud of the top 30 psychological terms most strongly associated with the right pSTS region as shown in Figure (D); the terms were generated via the decode function of Neurosynth.

Zmniejszona aktywność rpSTS u pacjentów:

- rozpoznawanie emocji / atrybucja stanów mentalnych (Mier et al., 2016)
- historyjki ToM (Ciaramidaro et al., 2015)
- obserwacja animacji przedstawiających różne poziomy interakcji pomiędzy bohaterami (Das et al., 2012)
- radzenie sobie z odrzuceniem społecznym w sytuacji uczestnictwa w interakcji społecznej (Lee et al., 2014).

Zmniejszona łączność funkcjonalna rpSTS u pacjentów:

- rozpoznawanie emocji / atrybucja stanów mentalnych (Mier et al., 2016)
- historyjki ToM (Ciaramidaro et al., 2015)
- przetwarzanie metaforycznych gestów (Straube et al., 2013)

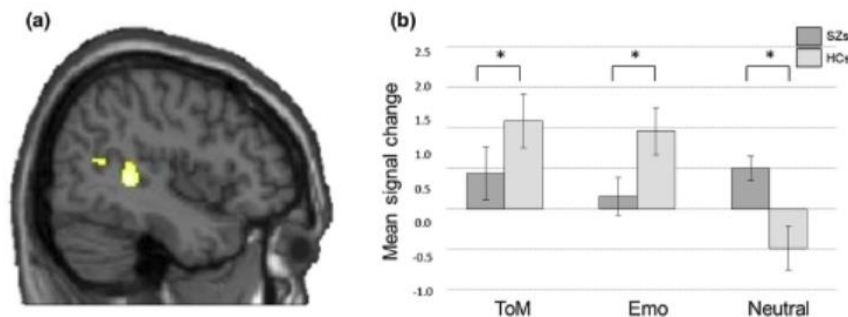
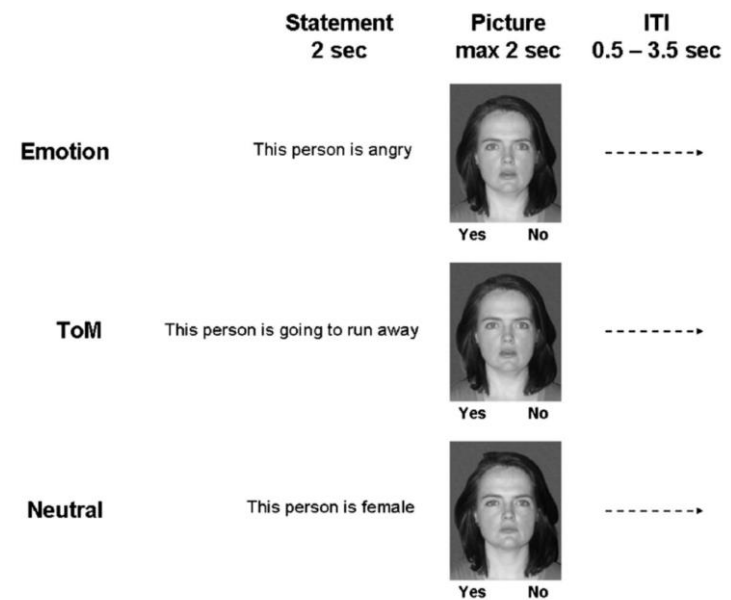
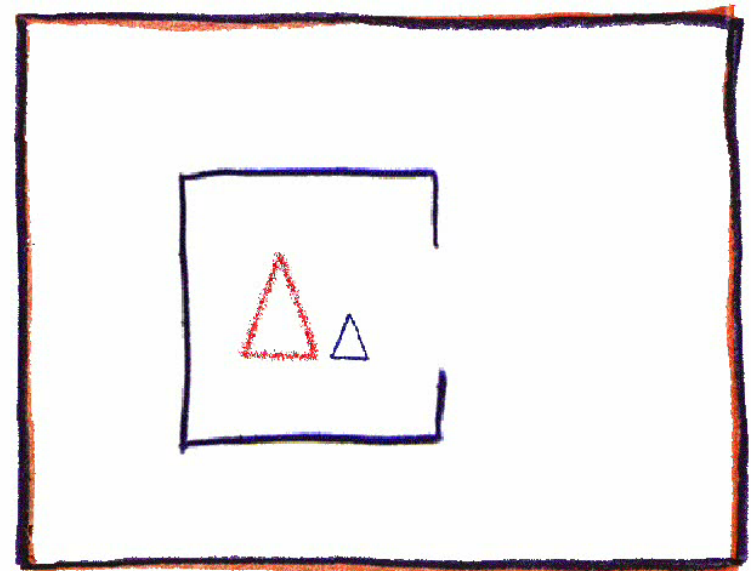


Fig. 2 Significant social-cognitive function by group interaction in activity. **a** Display of activity differences in right posterior superior temporal sulcus ($p < 0.005$, uncorrected) and **b** mean signal change (with respect to the fixation cross baseline) within the right posterior superior temporal sulcus



Rekrutacja:

Kryteria włączenia + wywiad MINI: SCZ (n=50) + HC (n=50)

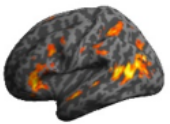
Ocena behawioralna:

Ocena kliniczna: (tylko SCZ): PANSS

Ocena neuropsychologiczna (wszyscy): MCCB + ocena poznania społecznego

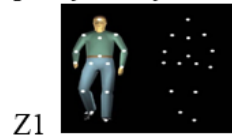
fMRI

(skan strukturalny
T1w + sekwencje
funkcjonalne)

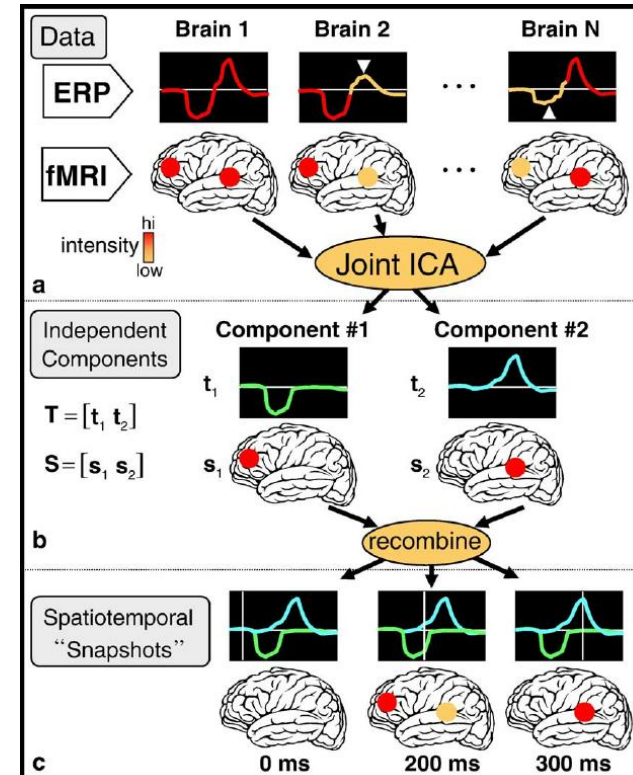
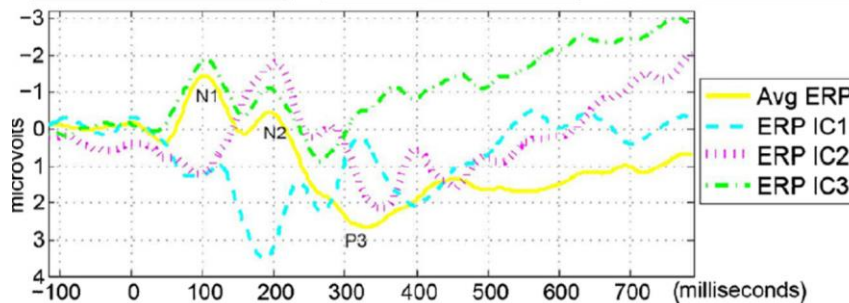
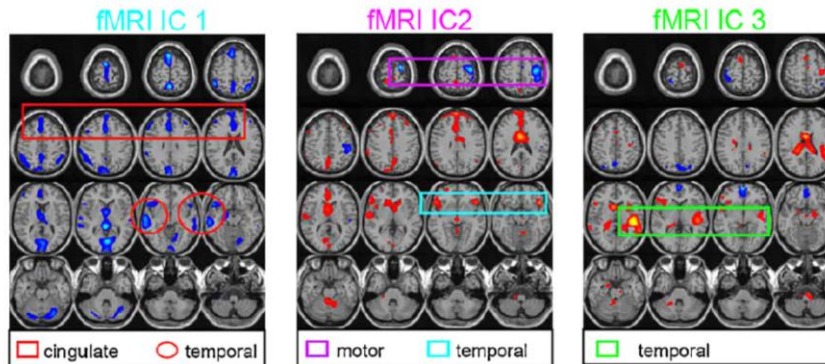
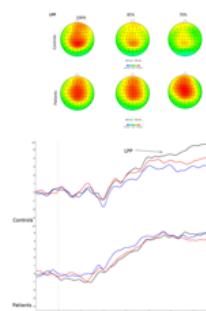


Procedura eksperymentalna

Zapis spoczynkowy (*resting state*)



EEG



Enhancing Neuroplasticity to Augment Cognitive Remediation in Schizophrenia

Carol Jahshan^{1,2*}, Yuri Rassovsky^{2,3} and Michael F. Green^{1,2}

Review of social cognitive treatments for psychosis

Joanna M. Fiszdon^{a,b,*}, L. Felice Reddy^{a,c}

(A)



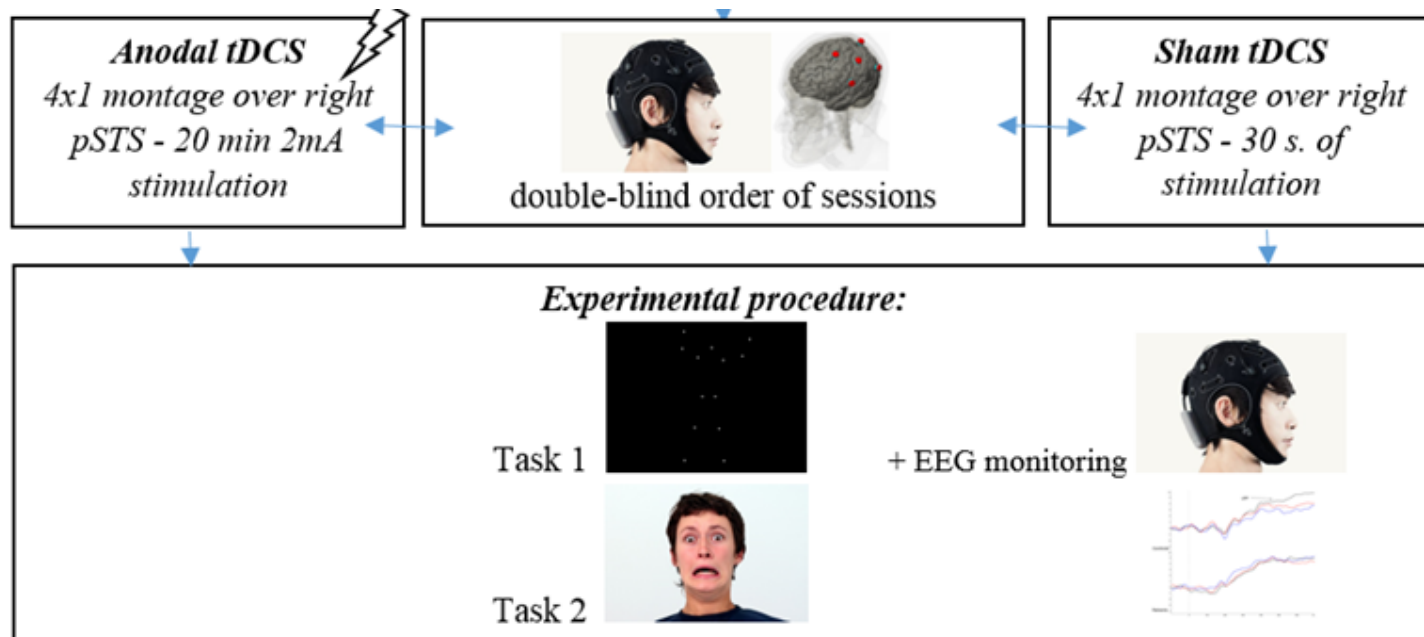
Transcranial Direct Current Stimulation (tDCS)



High-Definition tDCS (HD-tDCS)



4x1 HD-tDCS





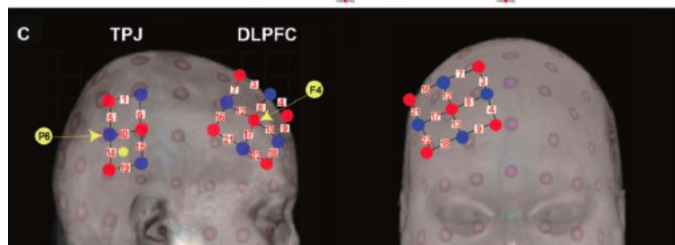
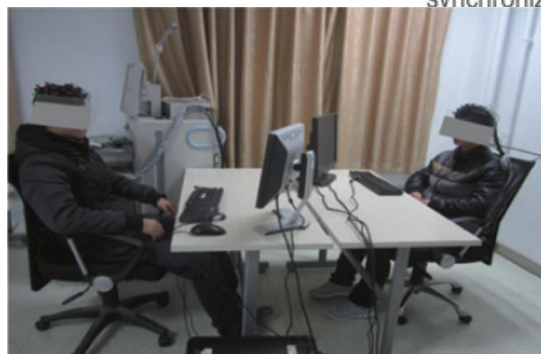
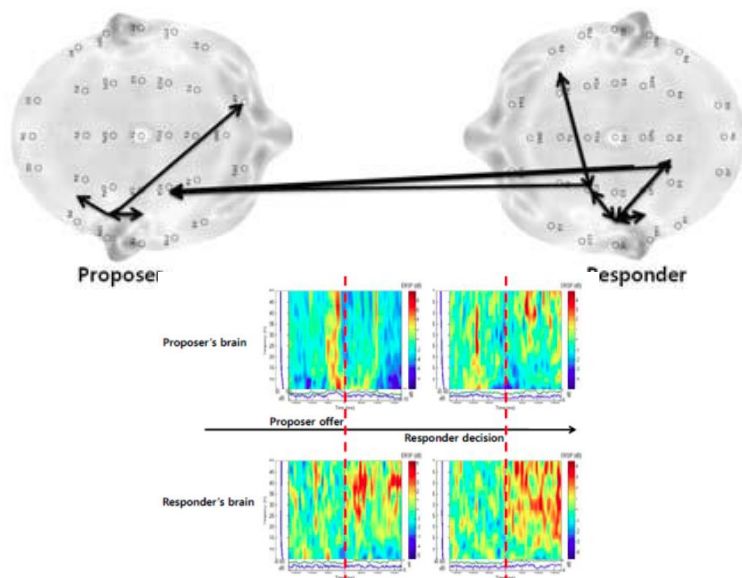
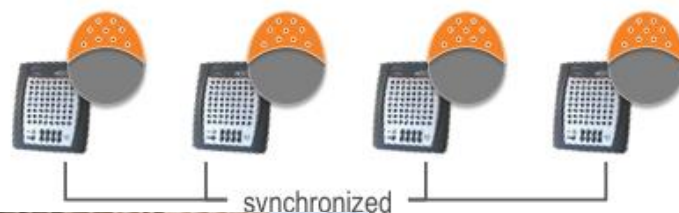
SynAmps_{RT}

Used together for high-density
256-ch recordings, or...

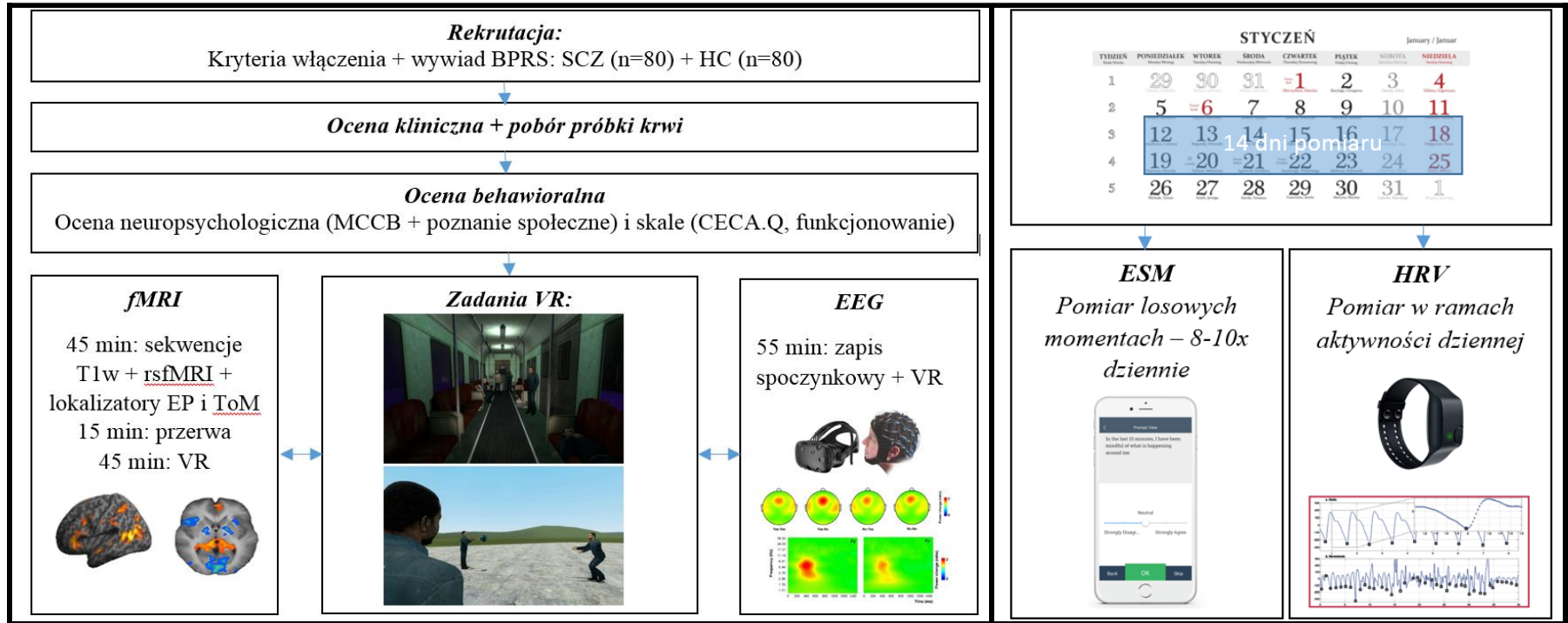


EEG Hyperscanning

Collect 64-ch EEG data from 4 subjects
simultaneously

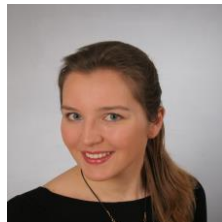
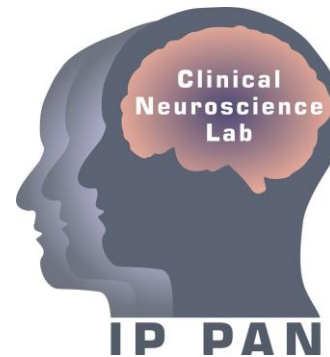


Plany

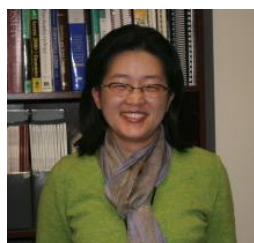
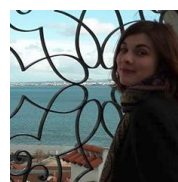
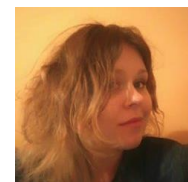
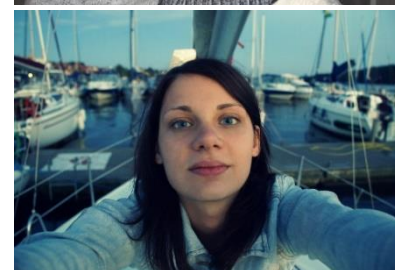




UNIwersytet
MEDYCZNY
W ŁÓDZI



LOBI
laboratory of Brain Imaging





NARODOWE CENTRUM NAUKI



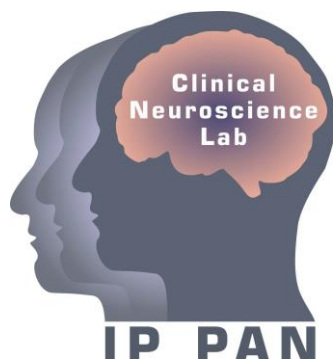
Ministerstwo Nauki
i Szkolnictwa Wyższego



*Fundacja na rzecz
Nauki Polskiej*



UNIwersytet
Warszawski



fb: @ClinLabIPPAN
mail: lokruszek@psych.pan.pl