

# Social cognition in schizophrenia

Contemporary topics in cognitive neuroscience

FSS

Martin Jáni

[martinjani@mail.muni.cz](mailto:martinjani@mail.muni.cz)

About me



# Outline

- Schizophrenia
- Social cognition
- Networks
- Self

**"OK CLASS, FIND A PARTNER"**



**OH GOD NO**

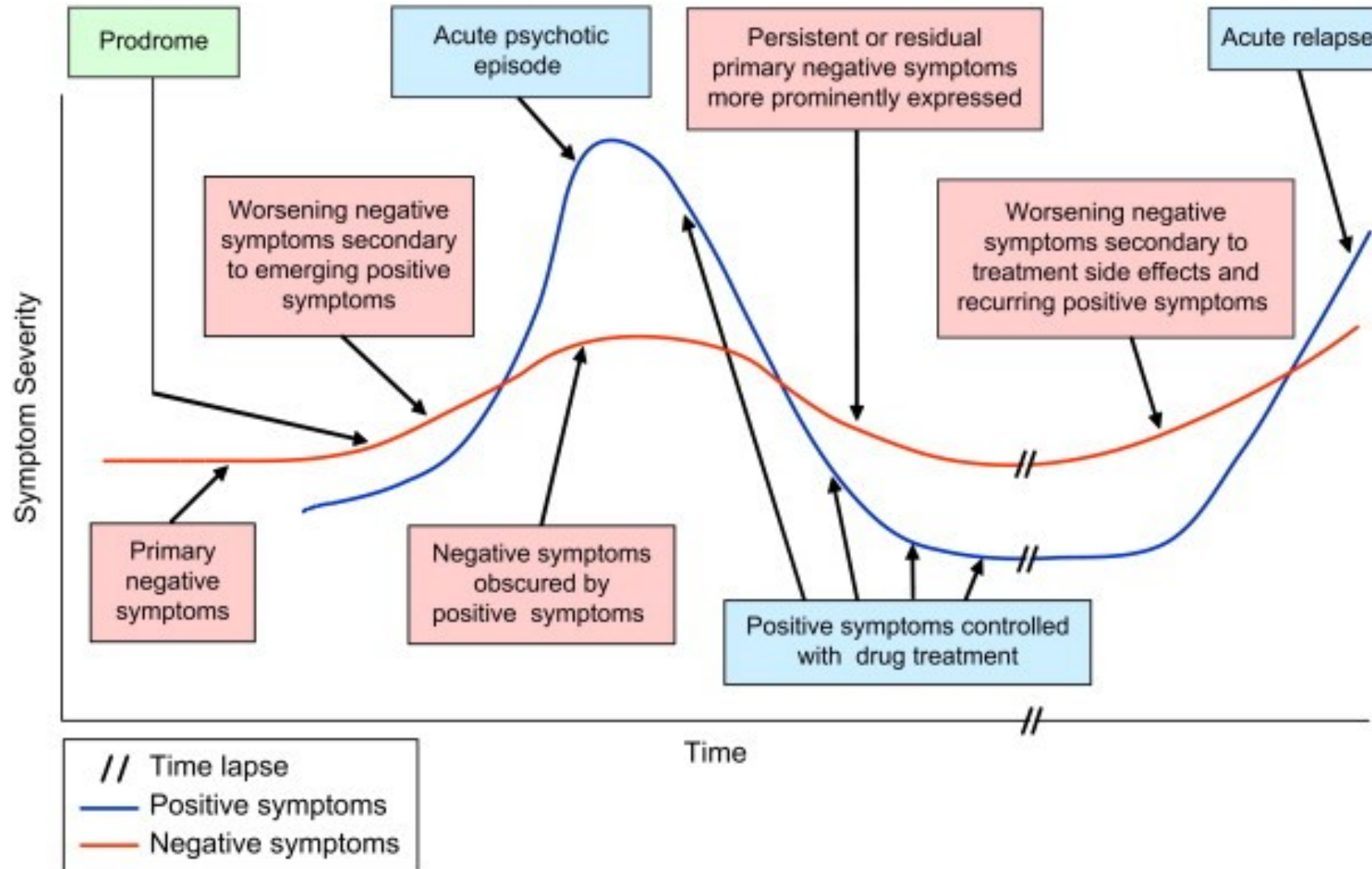


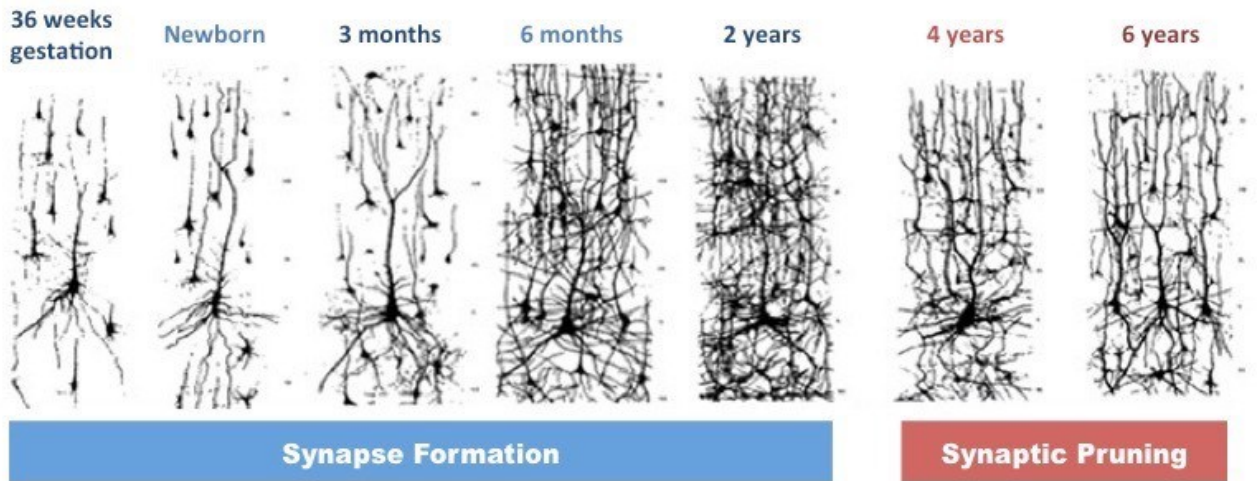
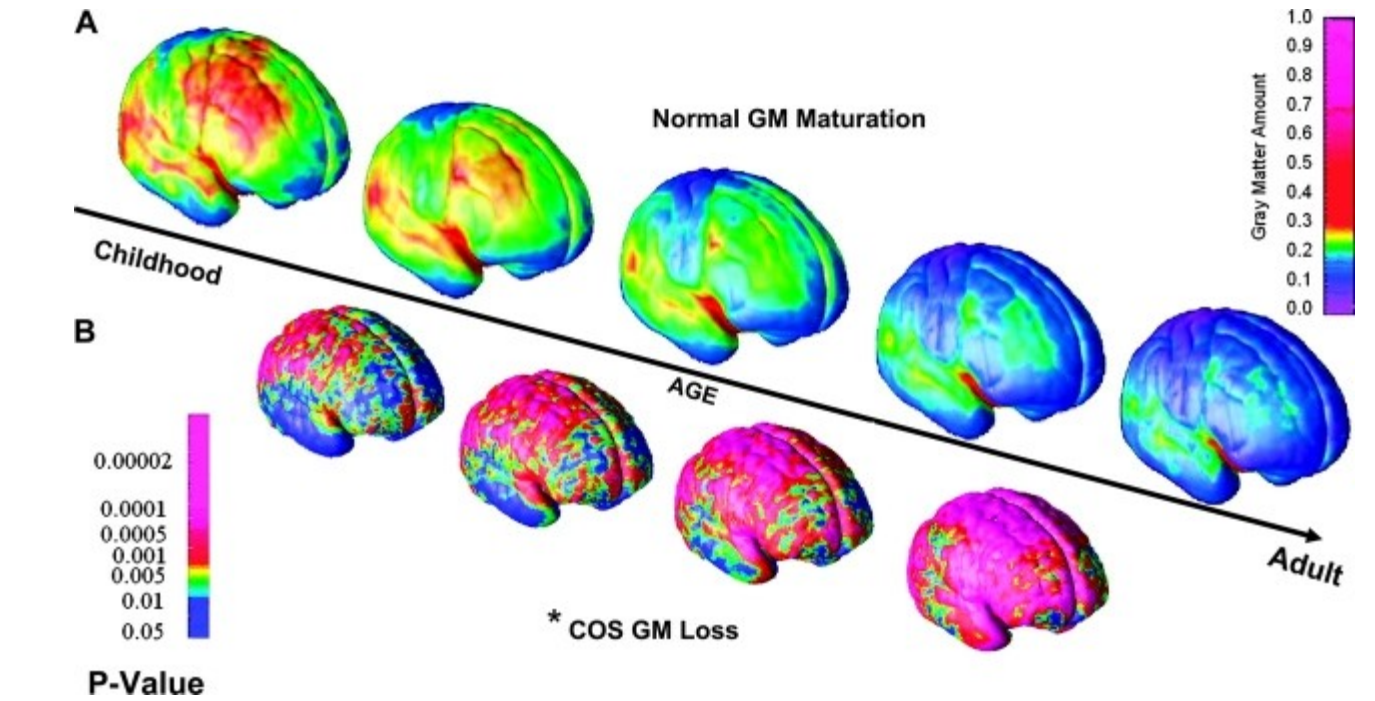
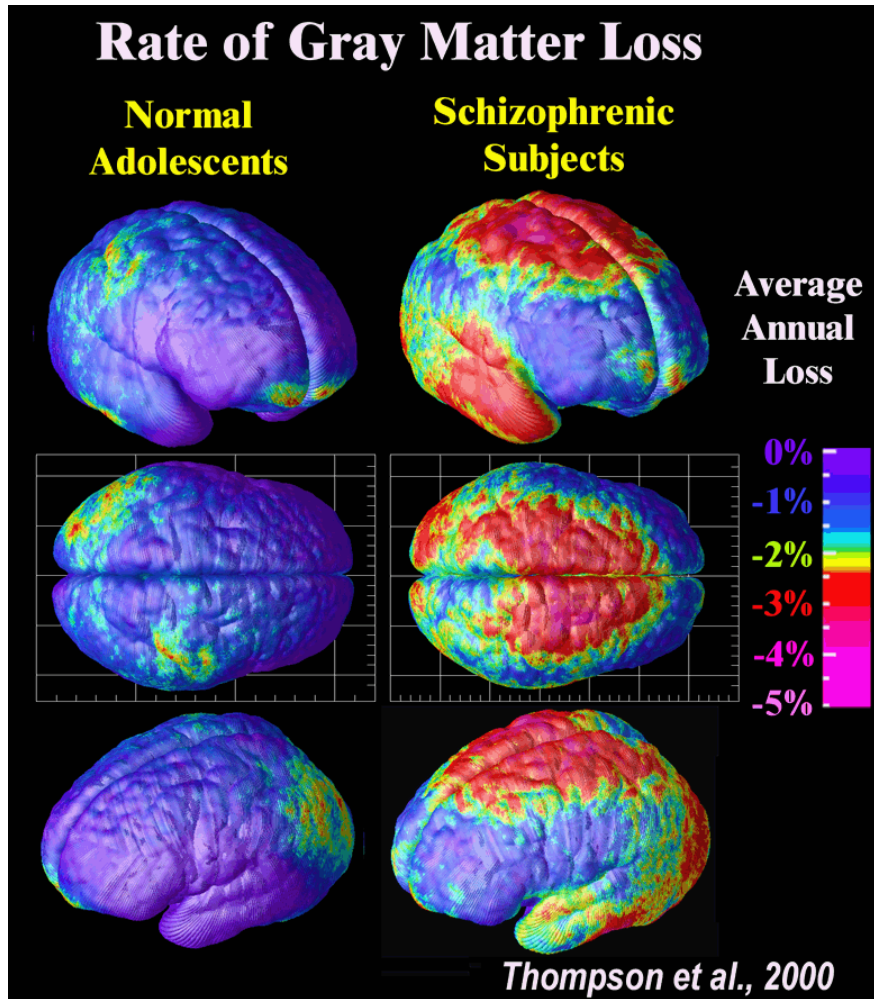
**FOREVER ALONE**

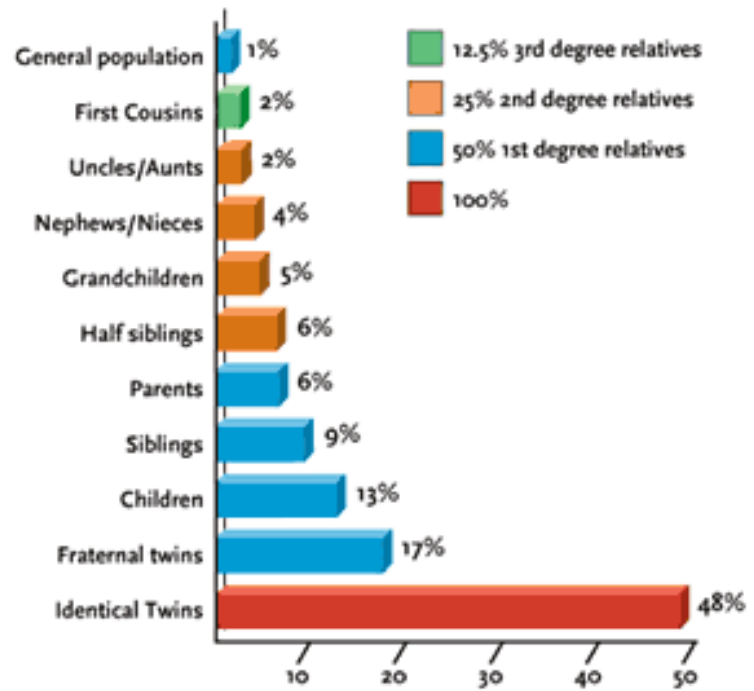
Level: Emo

# Schizophrenia $\neq$ psychosis

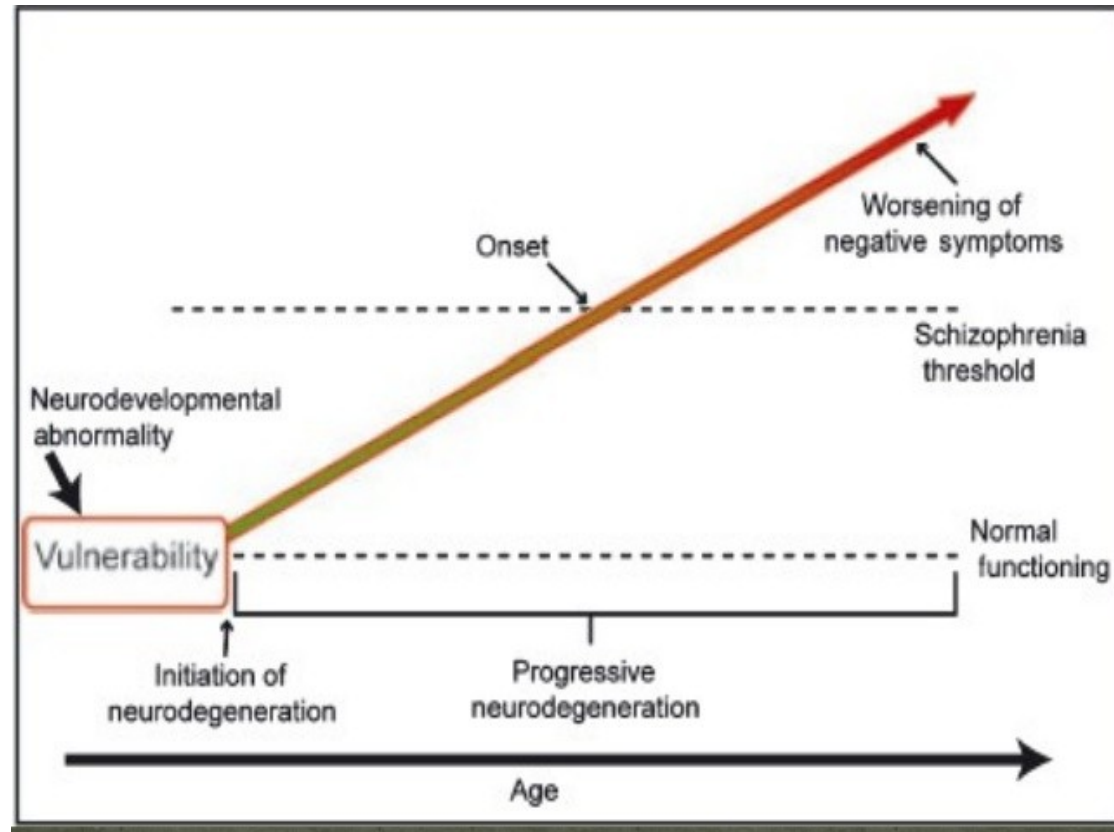
EXPRESSION OF POSITIVE AND NEGATIVE SYMPTOMS OVER TIME





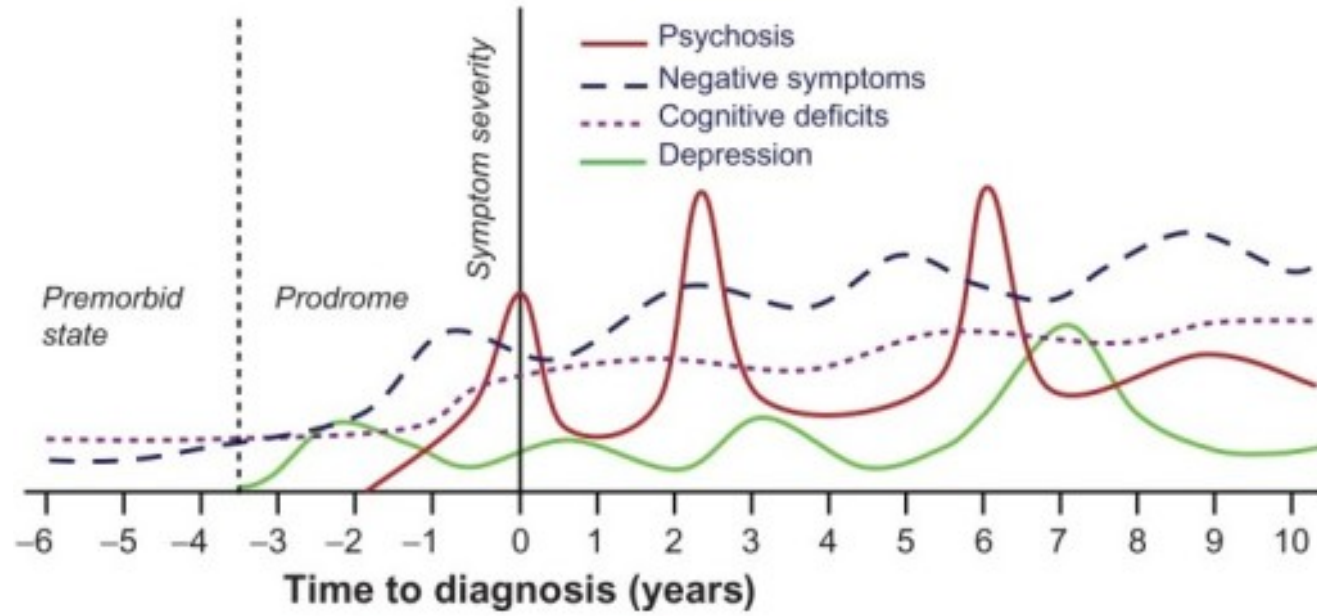


Gottesman 2001





# Cognition as endophenotype





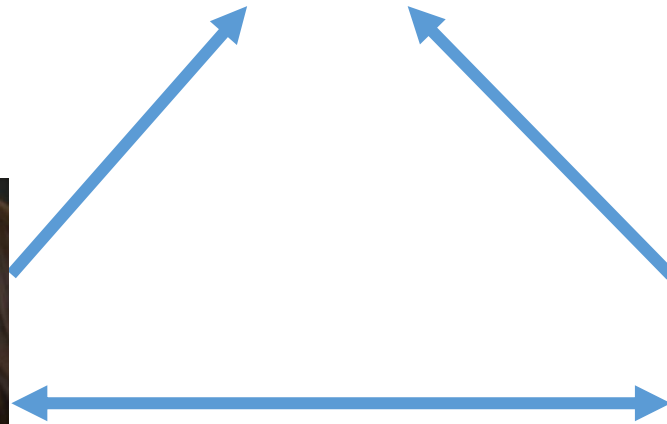
**Functional outcome**



**General cognition**



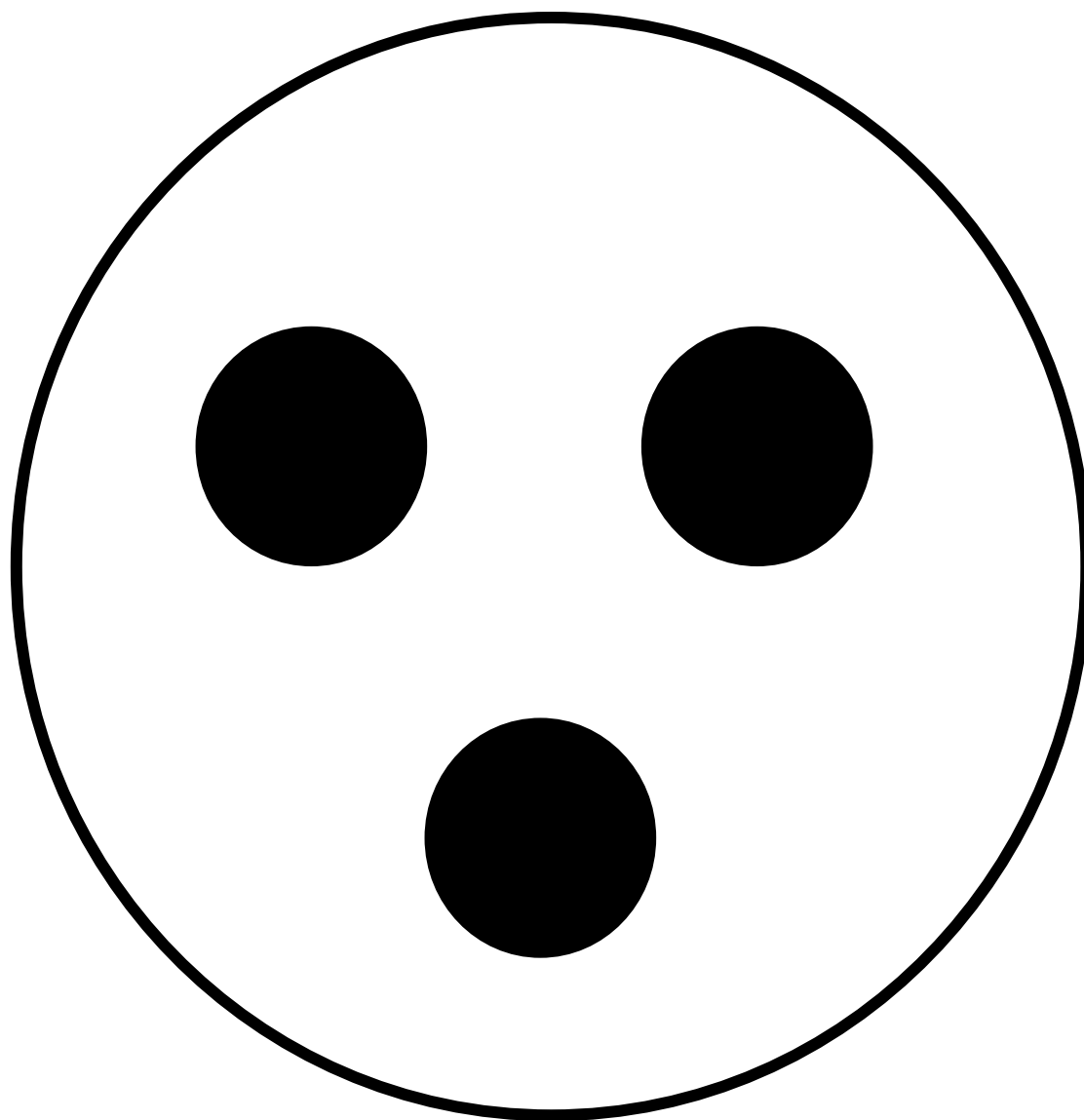
**Social cognition**

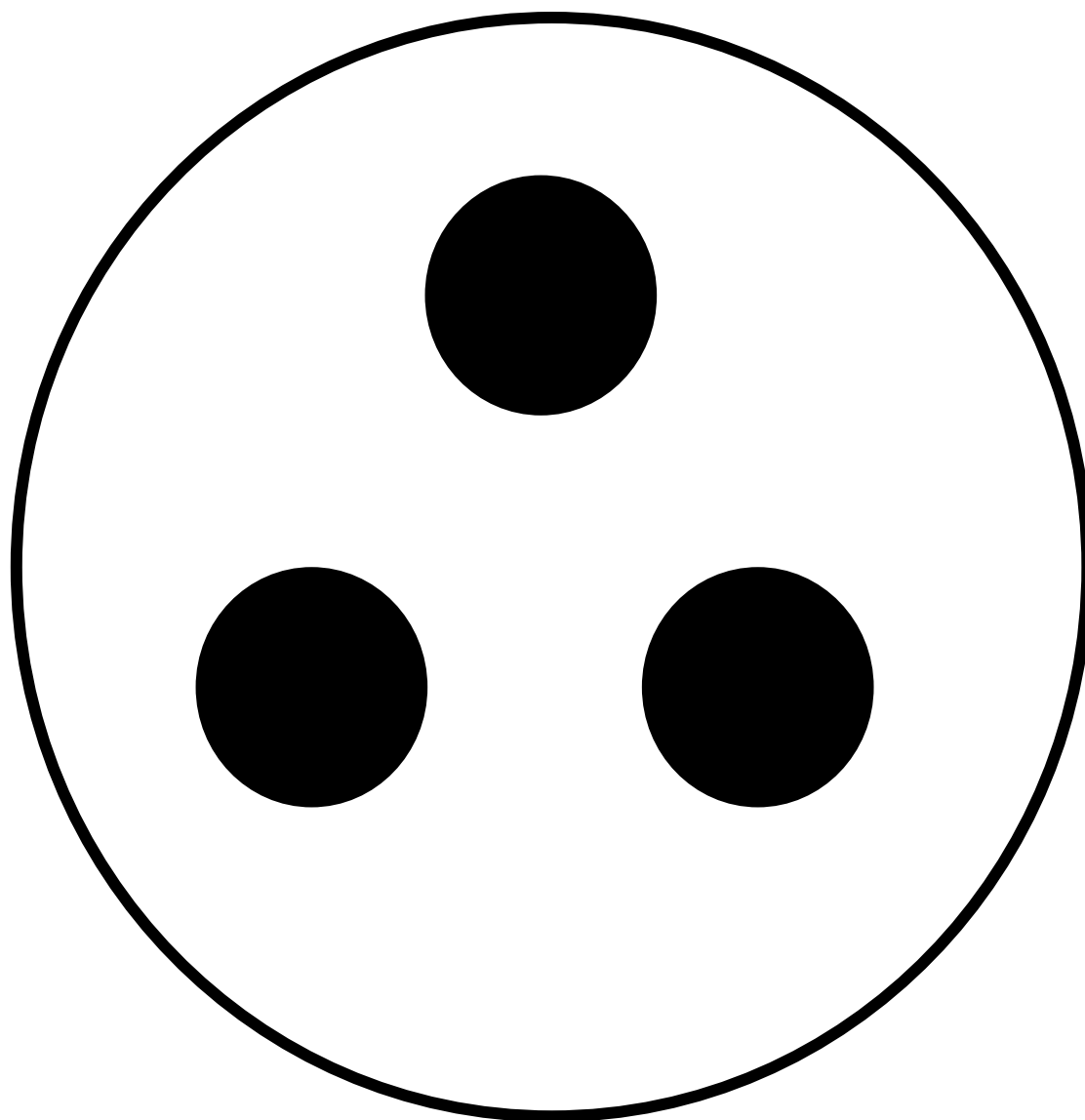


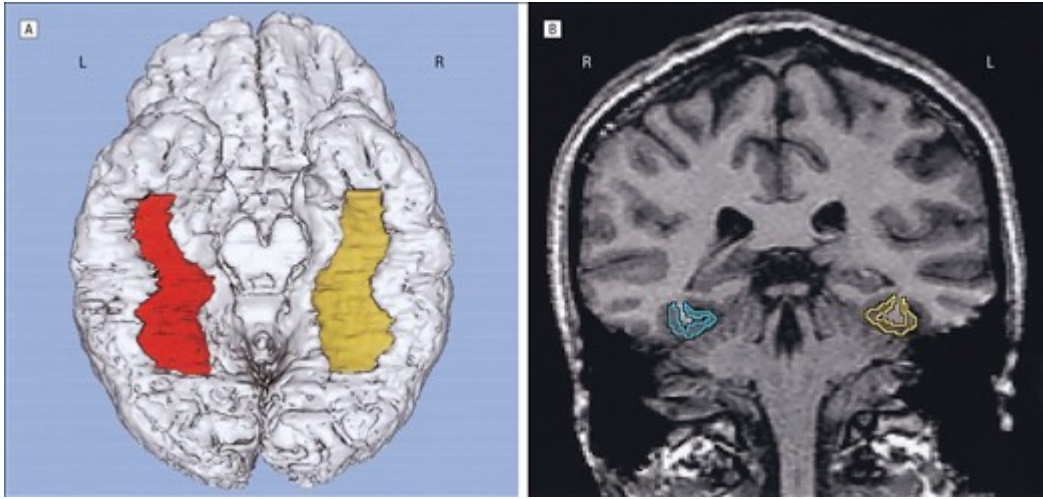
## Social cognition / isolation







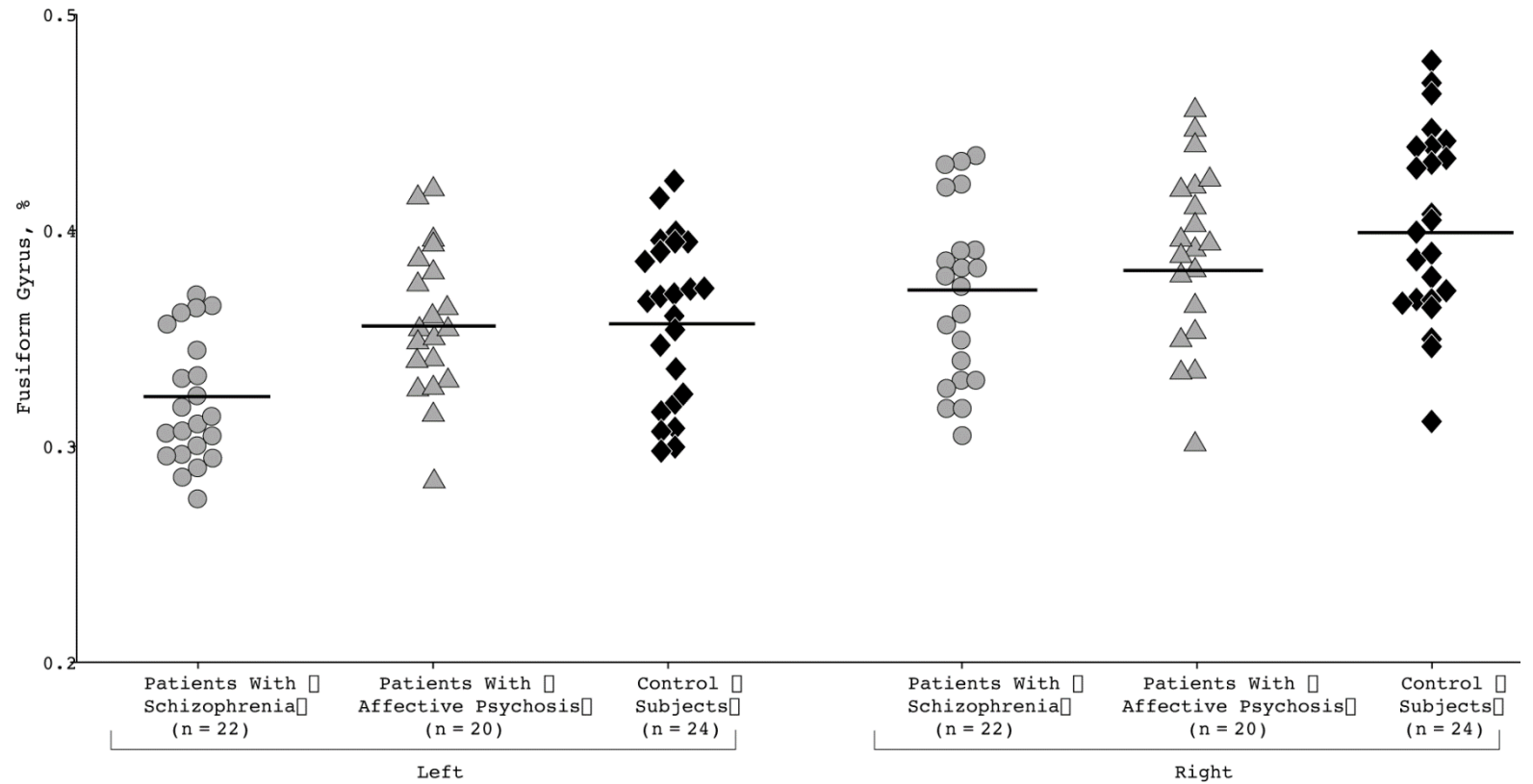




Fusiform gyrus  
GM volume reduction

Face identification

Lee et al. 2002





Face detection

Age/sex identification

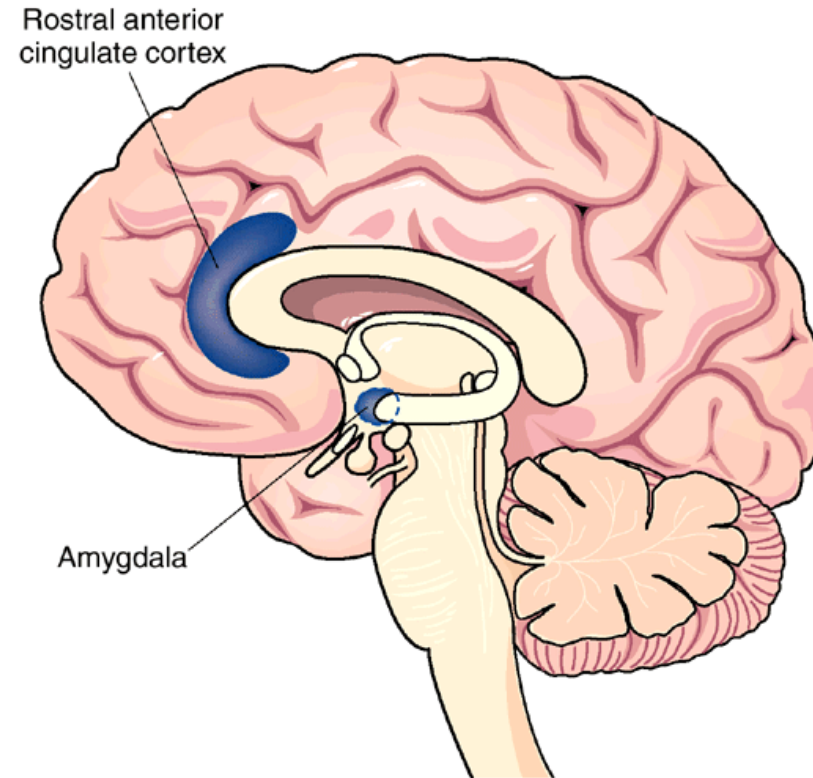
Identity discrimination



# Facial emotion recognition



**positive / negative emotion**  
**specific emotions**  
**neutral faces**  
**misattribution**  
**role of context**



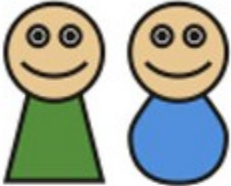


**How does the person feel?**



# Theory of mind

first-order



second-order



third-order

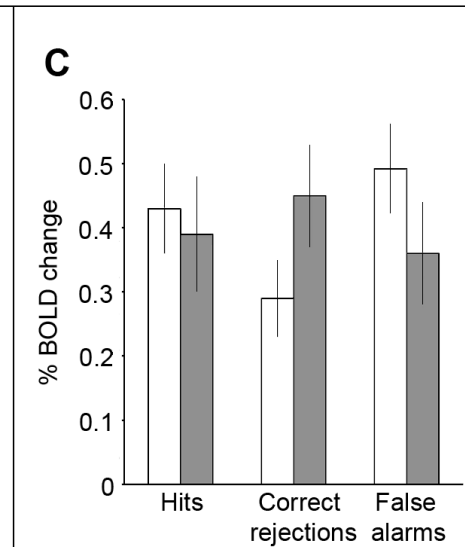
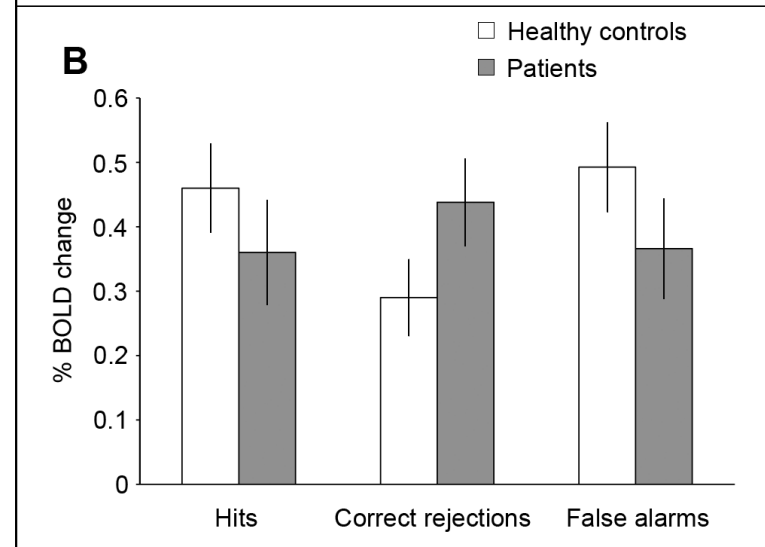
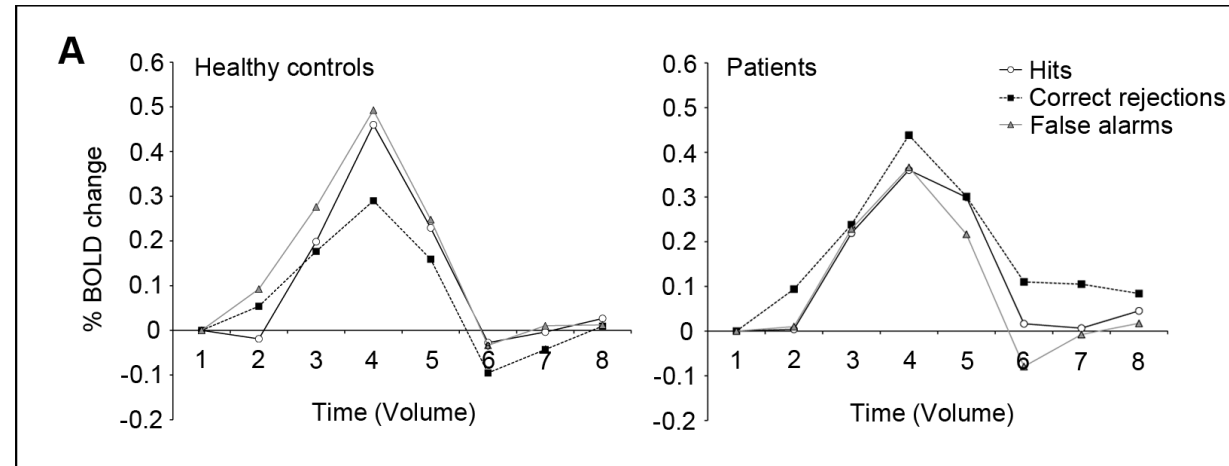
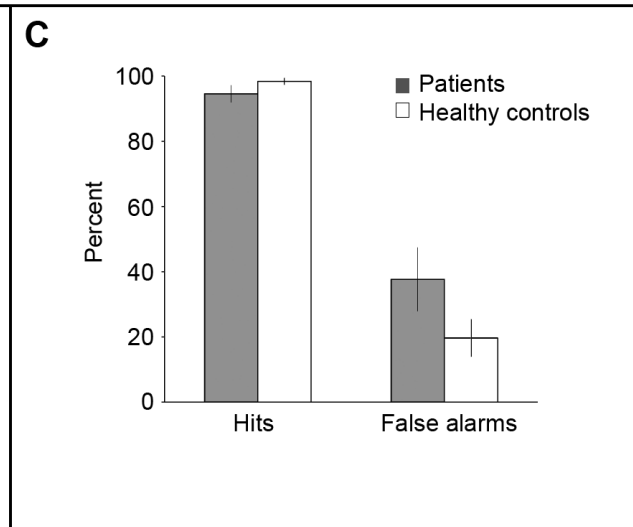
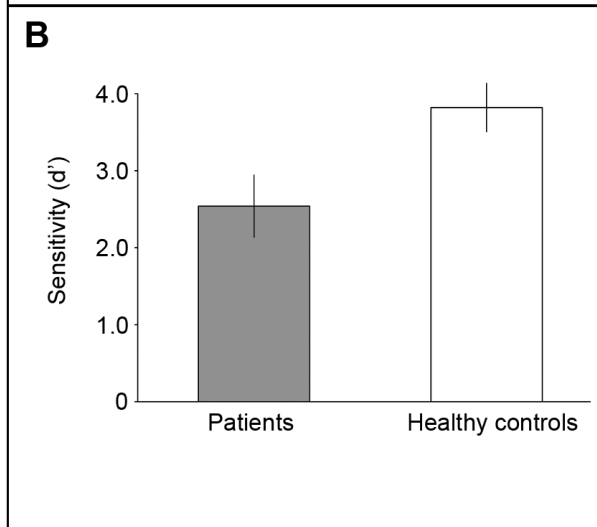
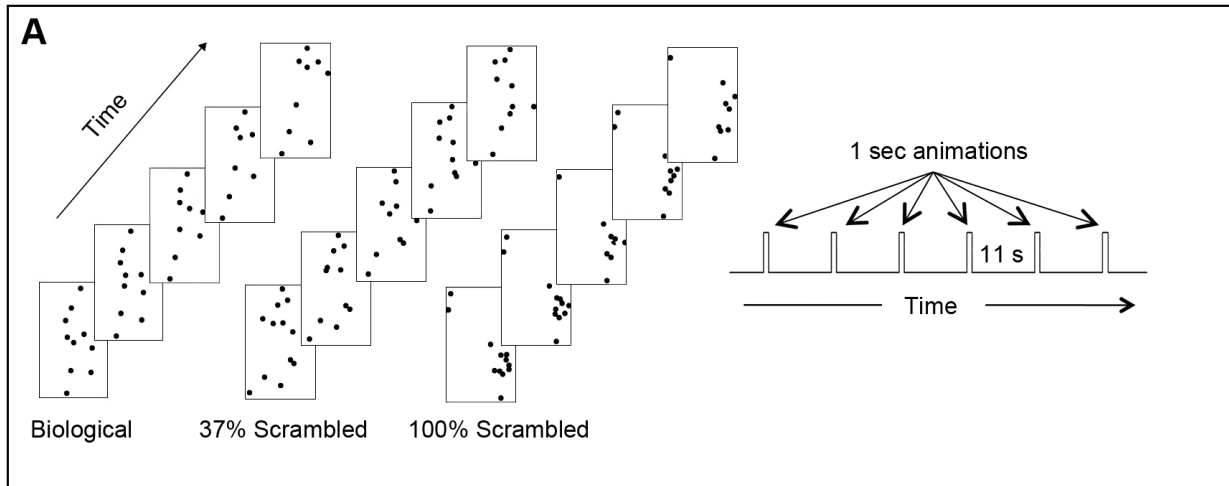


<https://www.youtube.com/watch?v=LUN2YN0bOi8>

Animated shapes

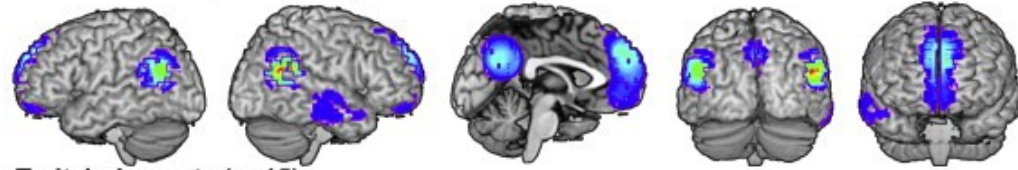
<https://vimeo.com/51243376>

<https://www.youtube.com/watch?v=f8TFi6qvPbc>

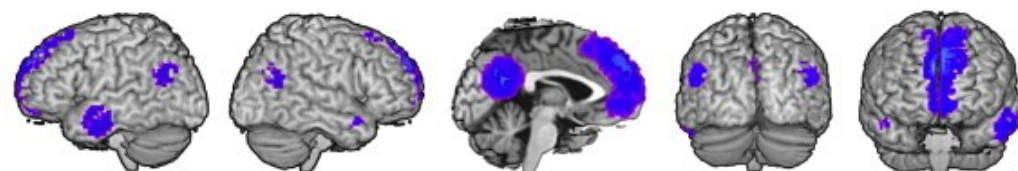


# Meta-analyses for individual task groups

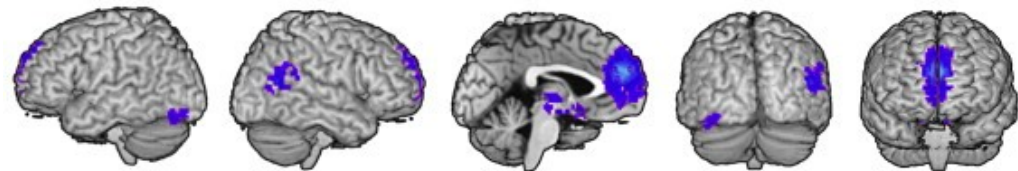
False Belief vs. photo (n=15)



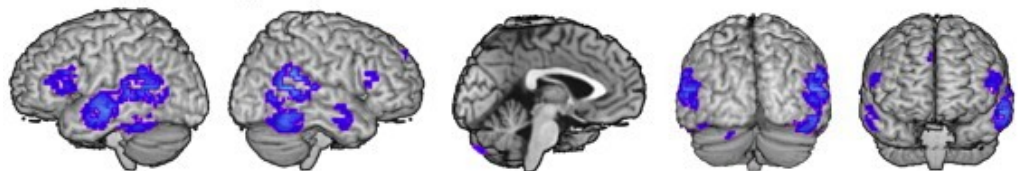
Trait Judgments (n=15)



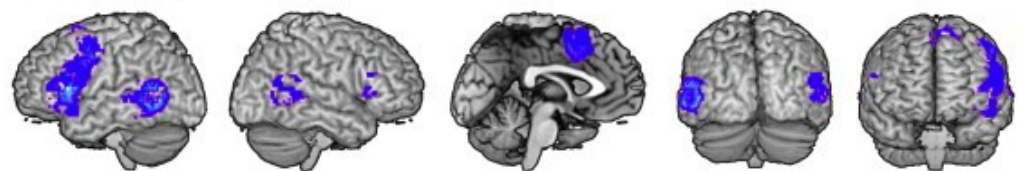
Strategic Games (n=9)



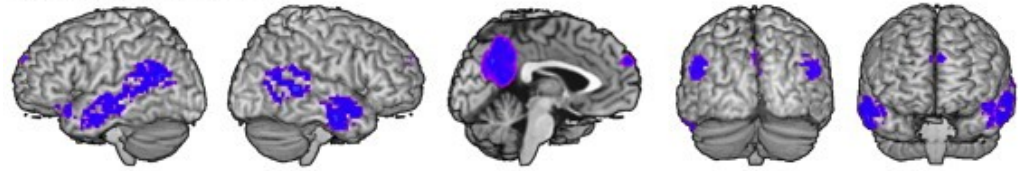
Social Animations (n=14)



Mind in the Eyes (n=10)



Rational Actions (n=10)



z-values (permutation-based)  
3 6 9 12

# Schizophrenia vs healthy group

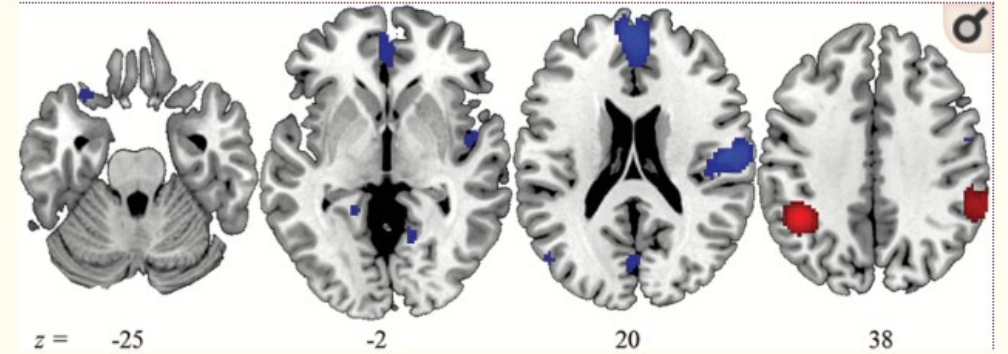


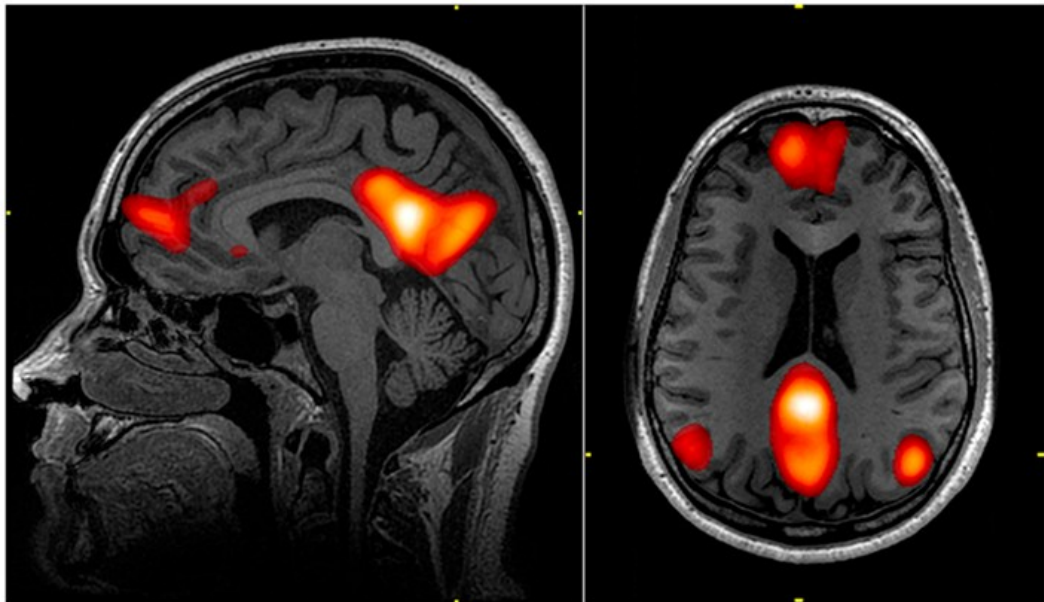
Fig. 1.

Slices illustrate convergent under-activation (slices -25, -2, 20) and over-activation (slice 38) in patients compared to healthy controls at a voxel-level (height) threshold of  $P < .005$  (uncorrected) and a cluster-level (extent) threshold of 10 voxels.

Kronbichler et al. 2017

Schurz et al. 2013

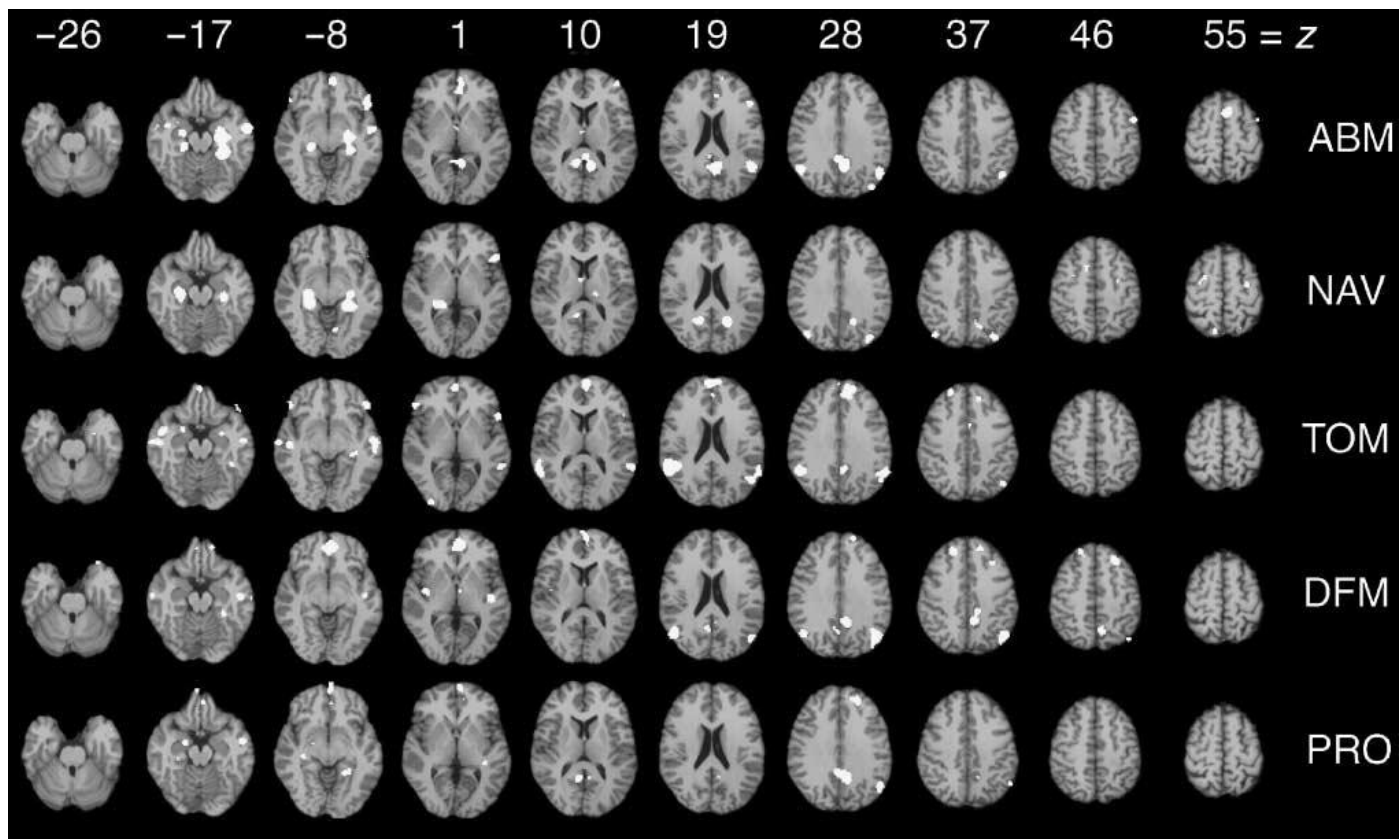


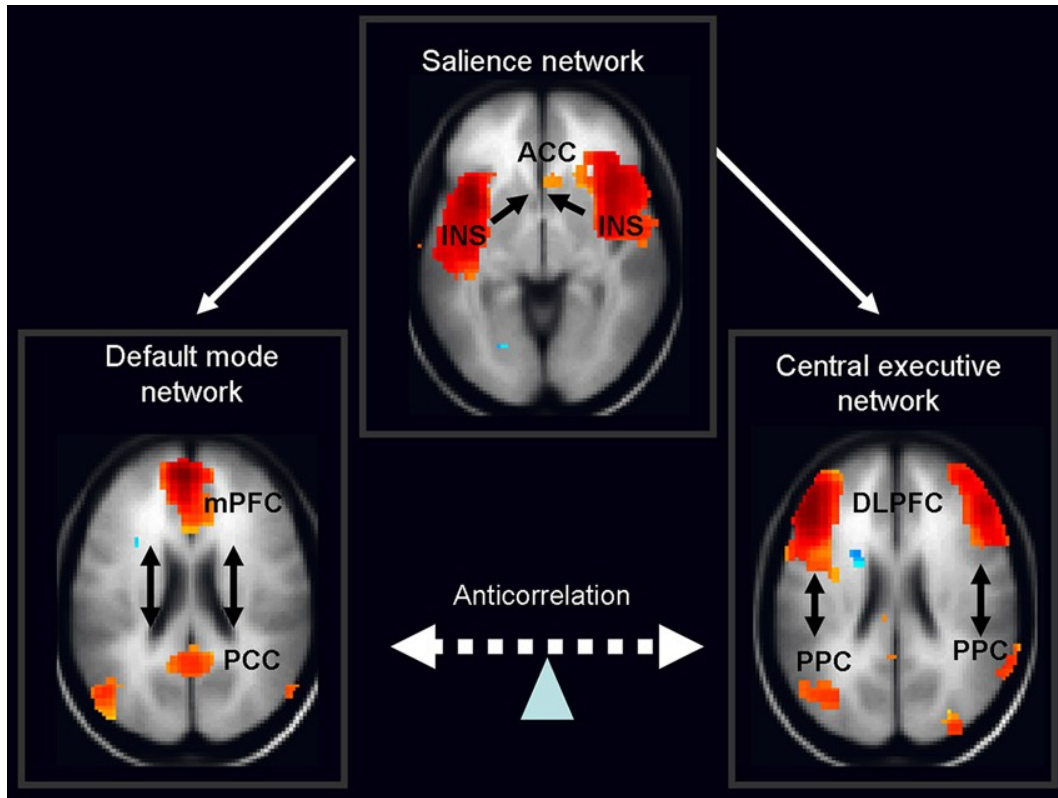


**Default mode / task negative network**  
(Raichle et al. 2001)

**Autobiographical memory**  
**Navigation**  
**Theory of Mind**  
**Default mode**  
**Prospective thinking**

Spreng et al. 2008





Internal vs external stimuli

Self  
 Minimal self / ipseity  
 Autobiographical self



**Self monitoring**  
**Sense of agency**  
**Anomalous self experience**

**thank you for your attention**

## Literature

- Gottesman II, Erlenmeyer-Kimling L. Family and twin strategies as a head start in defining prodromes and endophenotypes for hypothetical early-interventions in schizophrenia. *Schizophr Res* [Internet]. 2001 Aug 1;51(1):93–102. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11479071>
- Jáni M, Kašpárek T. Emotion recognition and theory of mind in schizophrenia: A meta-analysis of neuroimaging studies. *World J Biol Psychiatry* [Internet]. 2017 May 30;1–11. Available from: <https://www.tandfonline.com/doi/full/10.1080/15622975.2017.1324176>
- Kim J, Park S, Blake R. Perception of Biological Motion in Schizophrenia and Healthy Individuals: A Behavioral and fMRI Study. Op de Beeck HP, editor. *PLoS One* [Internet]. 2011 May 20;6(5):e19971. Available from: <http://dx.plos.org/10.1371/journal.pone.0019971>
- Lee CU, Shenton ME, Salisbury DF, Kasai K, Onitsuka T, Dickey CC, et al. Fusiform gyrus volume reduction in first-episode schizophrenia: a magnetic resonance imaging study. *Arch Gen Psychiatry* [Internet]. 2002 Sep;59(9):775–81. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12215076>
- Nekovarova T, Fajnerova I, Horacek J, Spaniel F. Bridging disparate symptoms of schizophrenia: a triple network dysfunction theory. *Front Behav Neurosci* [Internet]. 2014 May 30;8:171. Available from: <http://journal.frontiersin.org/article/10.3389/fnbeh.2014.00171/abstract>
- Raichle ME, MacLeod AM, Snyder AZ, Powers WJ, Gusnard DA, Shulman GL. A default mode of brain function. *Proc Natl Acad Sci U S A* [Internet]. 2001 Jan 16;98(2):676–82. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11209064>
- Shamay-Tsoory SG, Aharon-Peretz J, Levkovitz Y. The neuroanatomical basis of affective mentalizing in schizophrenia: comparison of patients with schizophrenia and patients with localized prefrontal lesions. *Schizophr Res* [Internet]. 2007 Feb;90(1–3):274–83. Available from: <http://www.scopus.com/inward/record.url?eid=2-s2.0-33846614078&partnerID=tZOtx3y1>
- Schurz M, Radua J, Aichhorn M, Richlan F, Perner J. Fractionating theory of mind: A meta-analysis of functional brain imaging studies. *Neurosci Biobehav Rev* [Internet]. 2014;42(0):9–34. Available from: <http://www.sciencedirect.com/science/article/pii/S0149763414000128>
- Spreng RN, Mar R a, Kim ASN. The Common Neural Basis of Autobiographical Memory, Prospection, Navigation, Theory of Mind, and the Default Mode: A Quantitative Meta-analysis. *J Cogn Neurosci* [Internet]. 2009 Mar;21(3):489–510. Available from: <http://www.mitpressjournals.org/doi/10.1162/jocn.2008.21029>
- Thompson PM, Vidal C, Giedd JN, Gochman P, Blumenthal J, Nicolson R, et al. Mapping adolescent brain change reveals dynamic wave of accelerated gray matter loss in very early-onset schizophrenia. *Proc Natl Acad Sci U S A* [Internet]. 2001 Sep 25;98(20):11650–5. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11573002>