



From shyness to phobia: a neurobiological approach to social anxiety as a dimension

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Phobias

fears which is:

- exaggerate for the situation
- not explainable or reducible with rational arguments
- independent from the voluntary control
- cause avoidance of the feared situation

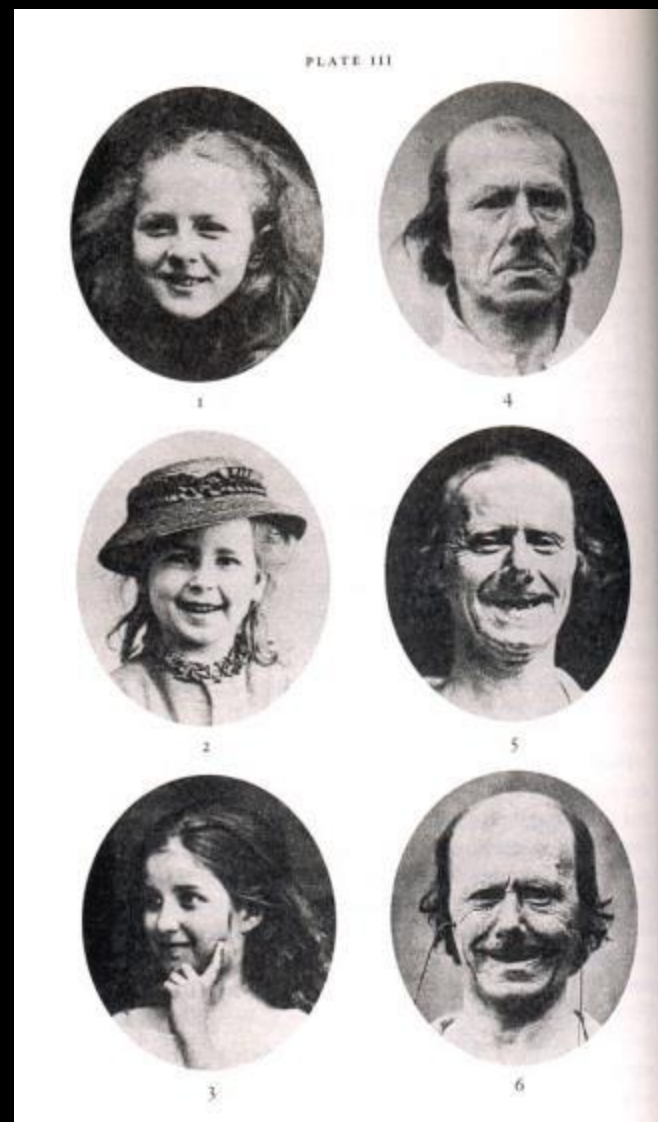
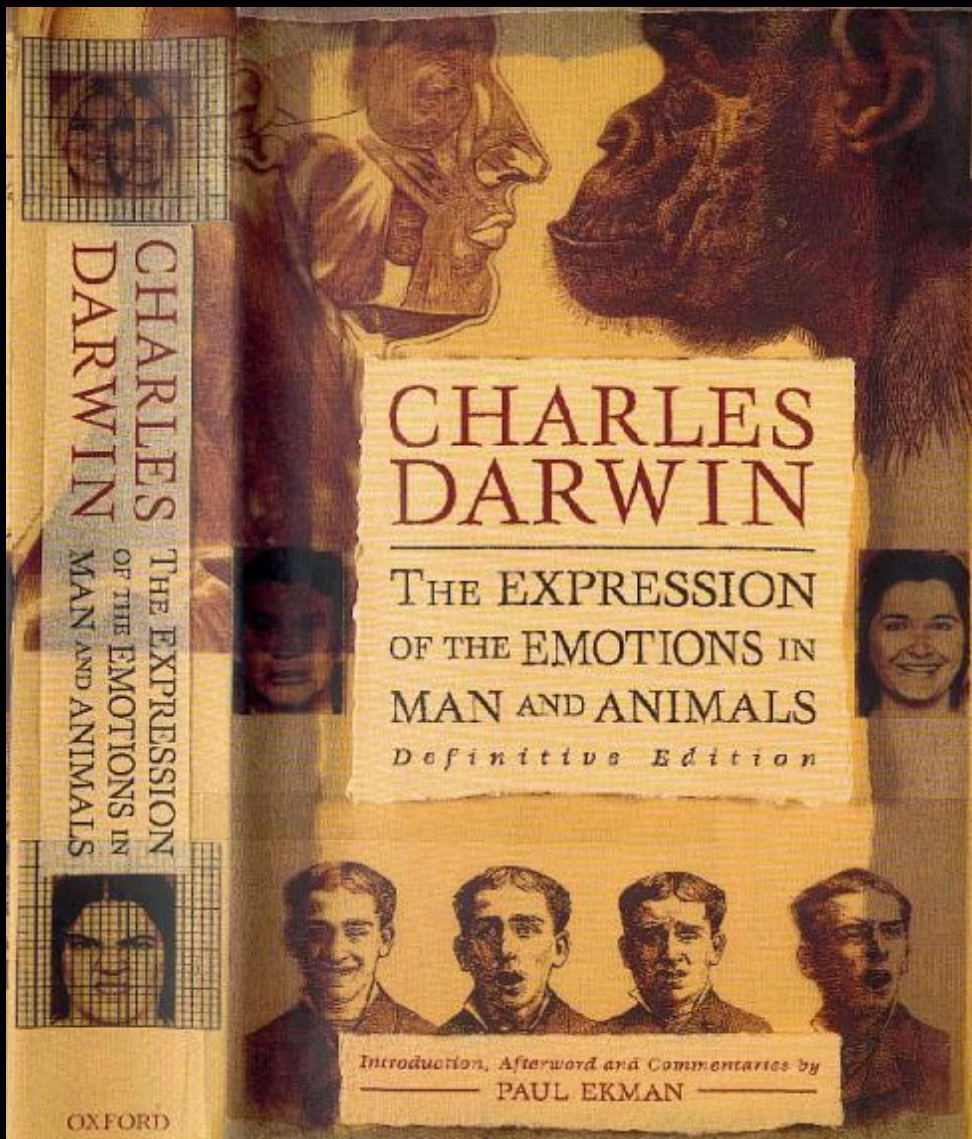
Sims, 2009



Social phobia

“...a marked and persistent fear of social or performance situations in which the person is exposed to unfamiliar people or possible scrutiny by others...”

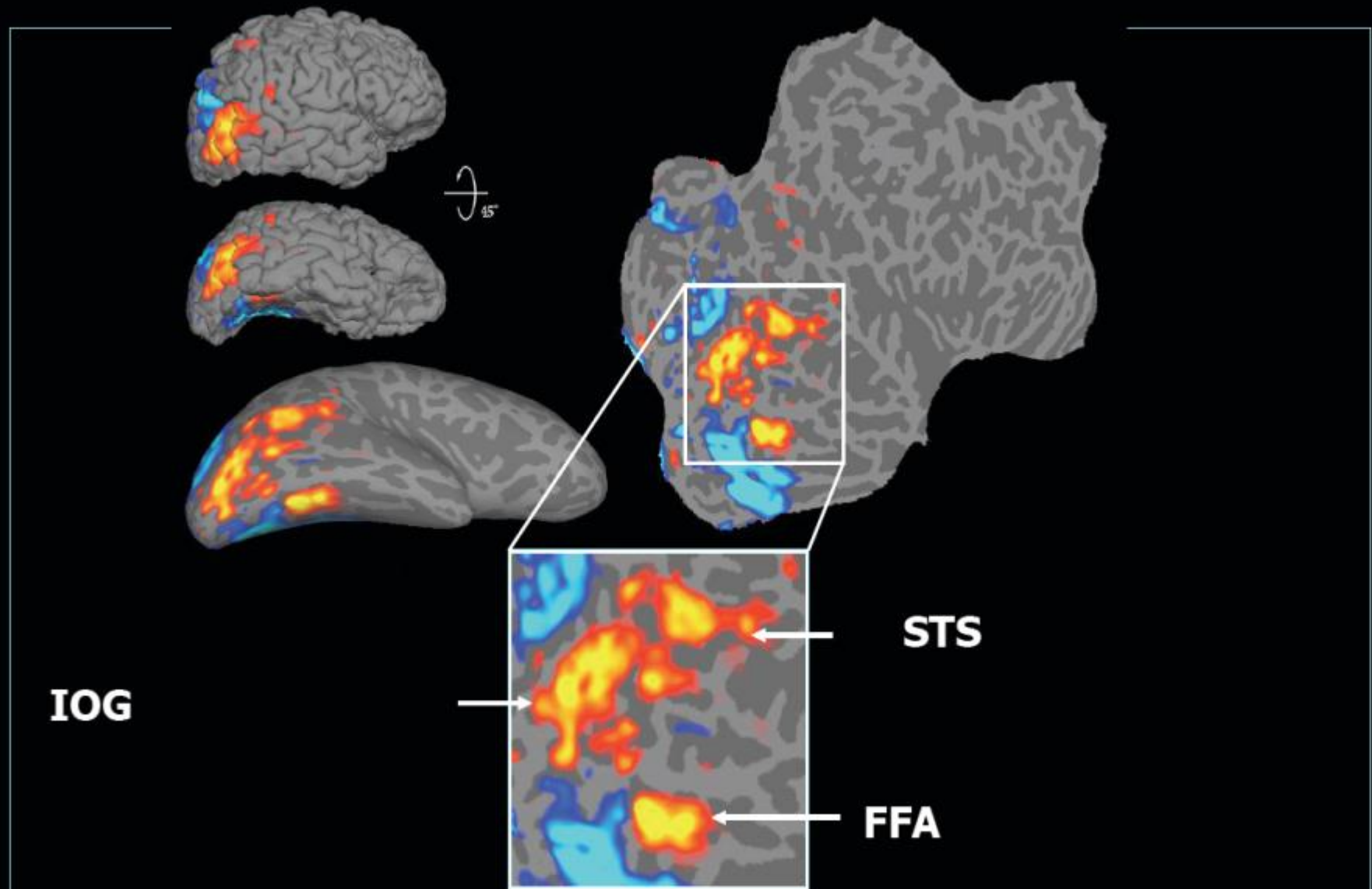
DSM-IV-TR





Hari et al., 2009

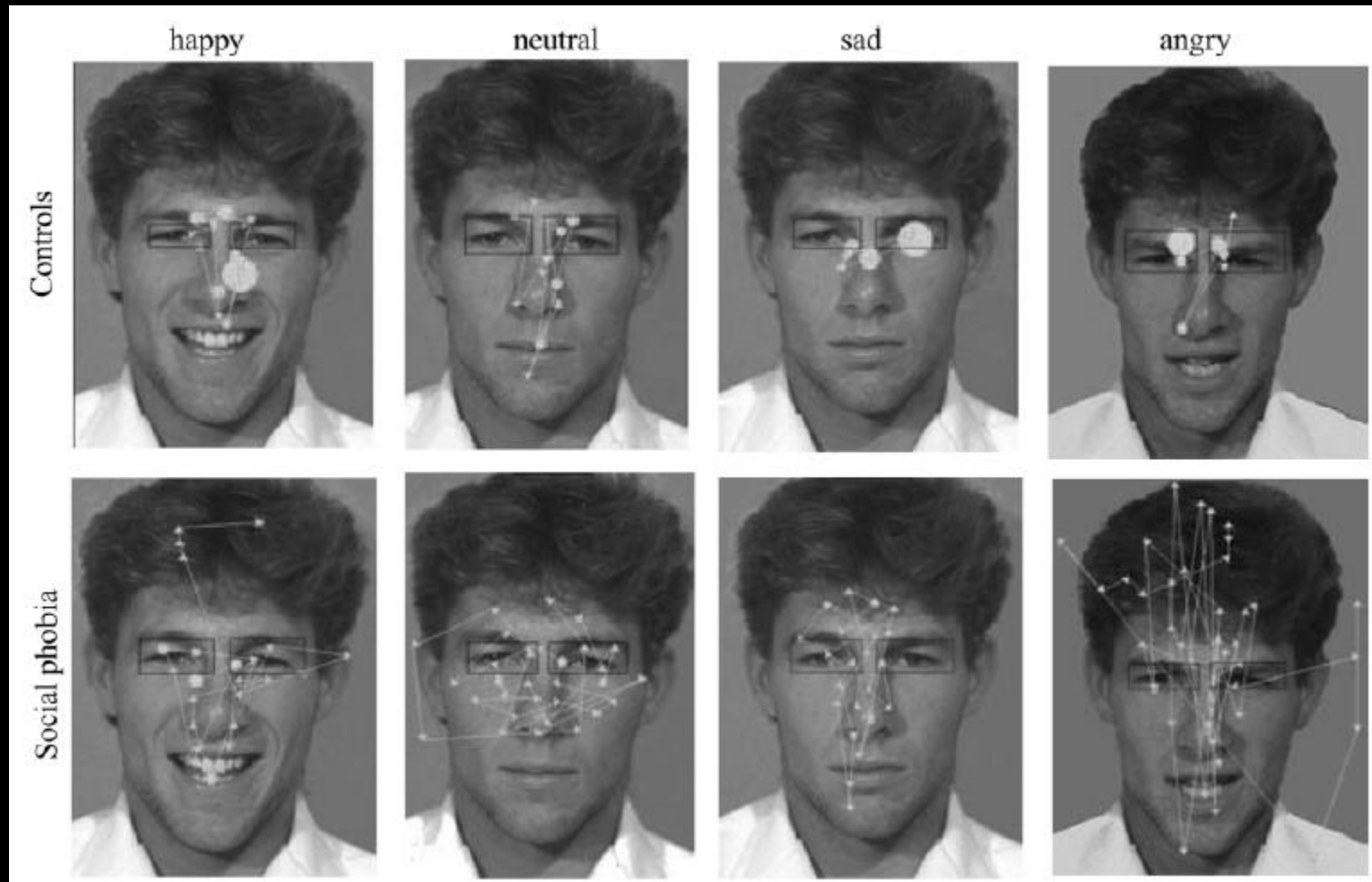
face perception...selectivity?



Face to face: visual scanpath evidence for abnormal processing of facial expressions in social phobia

Psychiatry Research 127 (2004) 43–53

Kaye Horley^{a,b,*}, Leanne M. Williams^{b,c}, Craig Gonsalvez^a, Evian Gordon^{b,d}

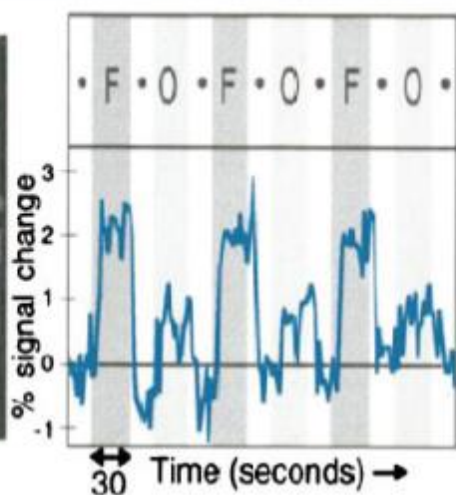
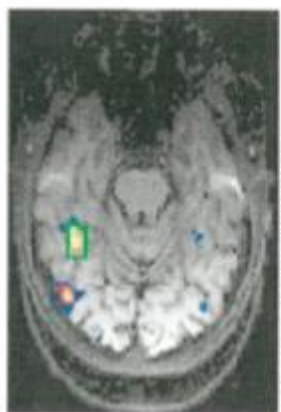


face perception...selectivity?

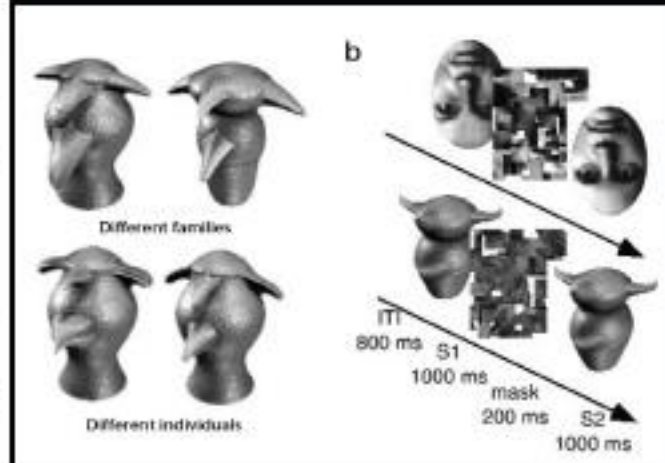
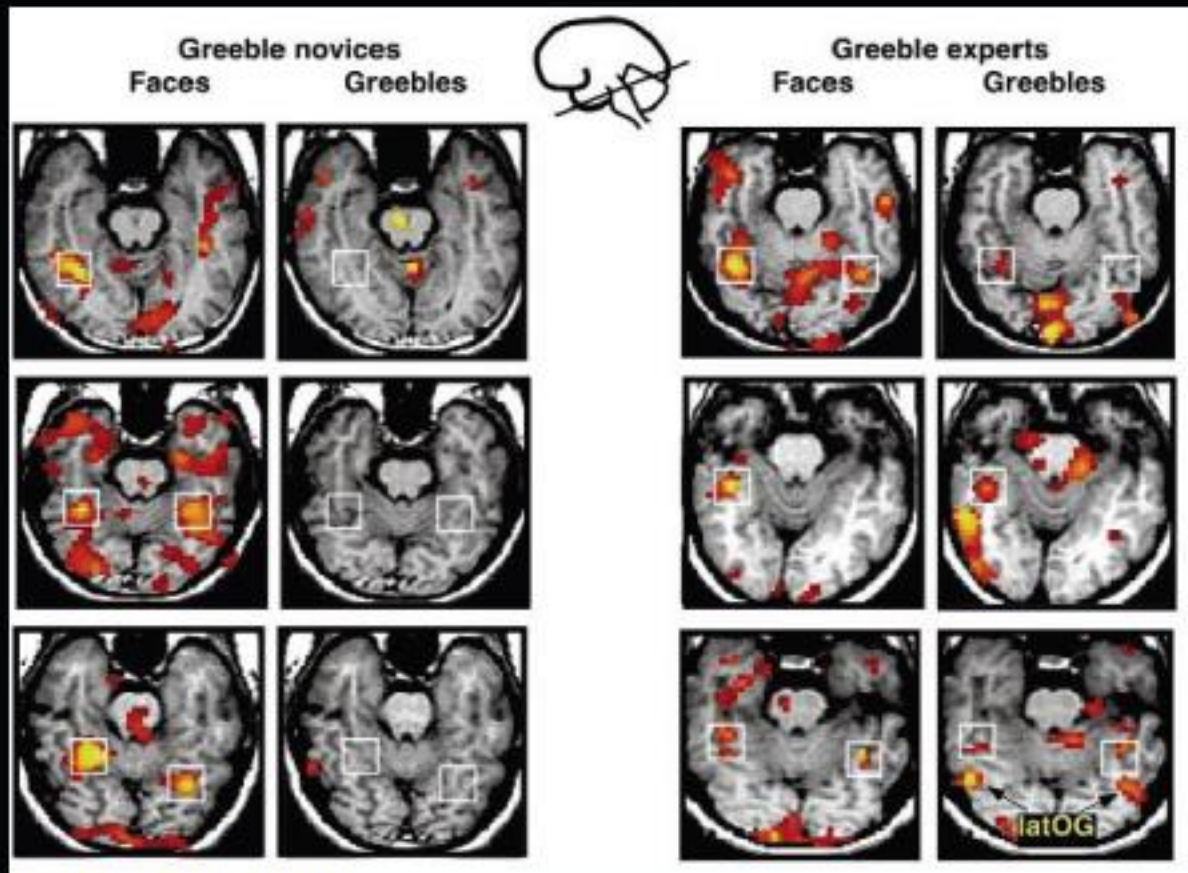
McCarthy et al.
J Cog Neurosci, 1997

Kanwisher et al. J Neurosci, 1997

3a. Faces > Objects

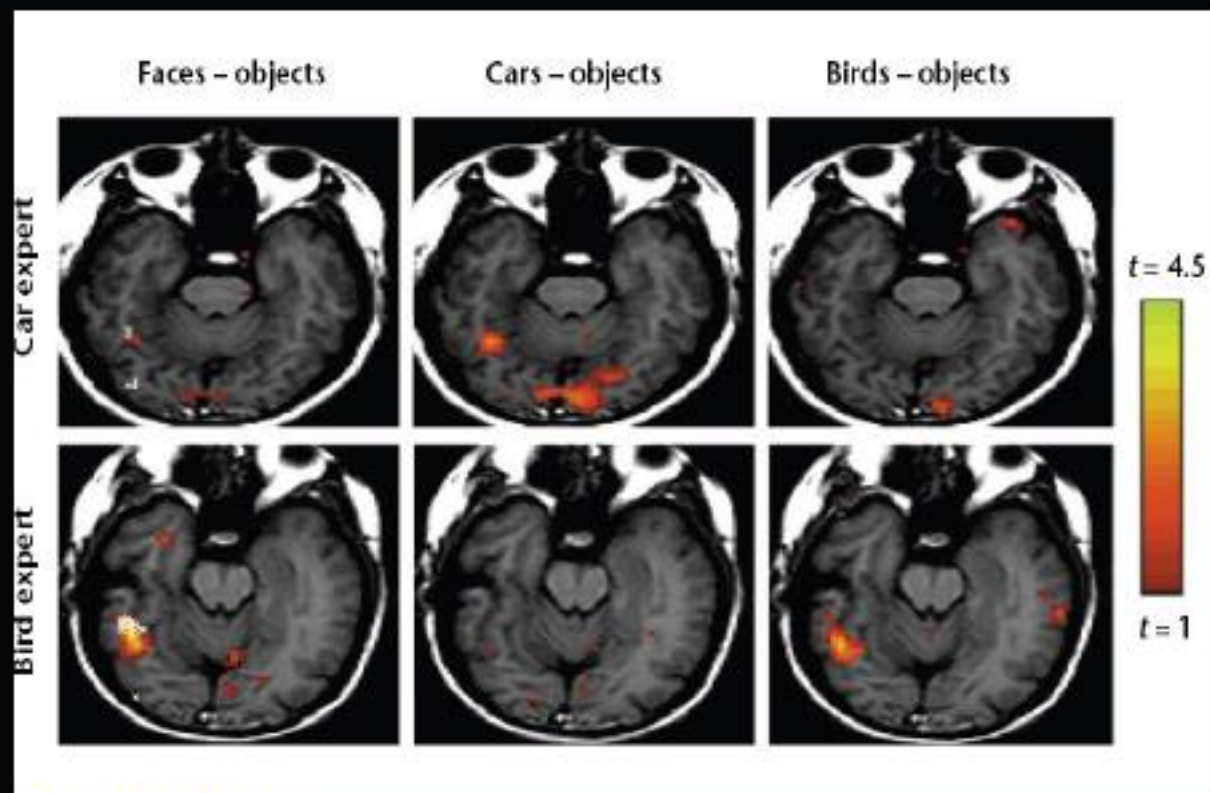


face perception...selectivity?



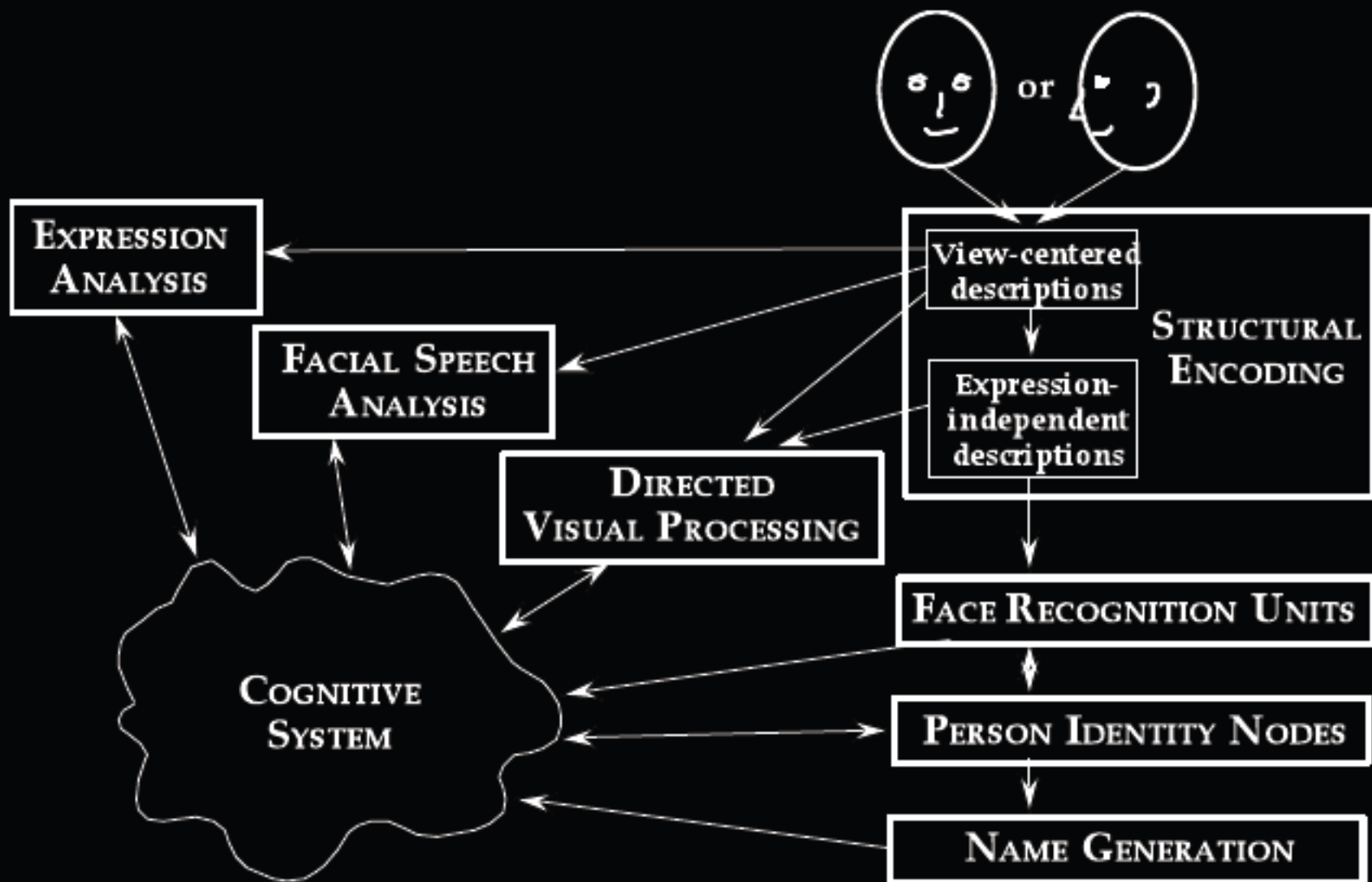
Gauthier, et al., 1999

face perception...selectivity?

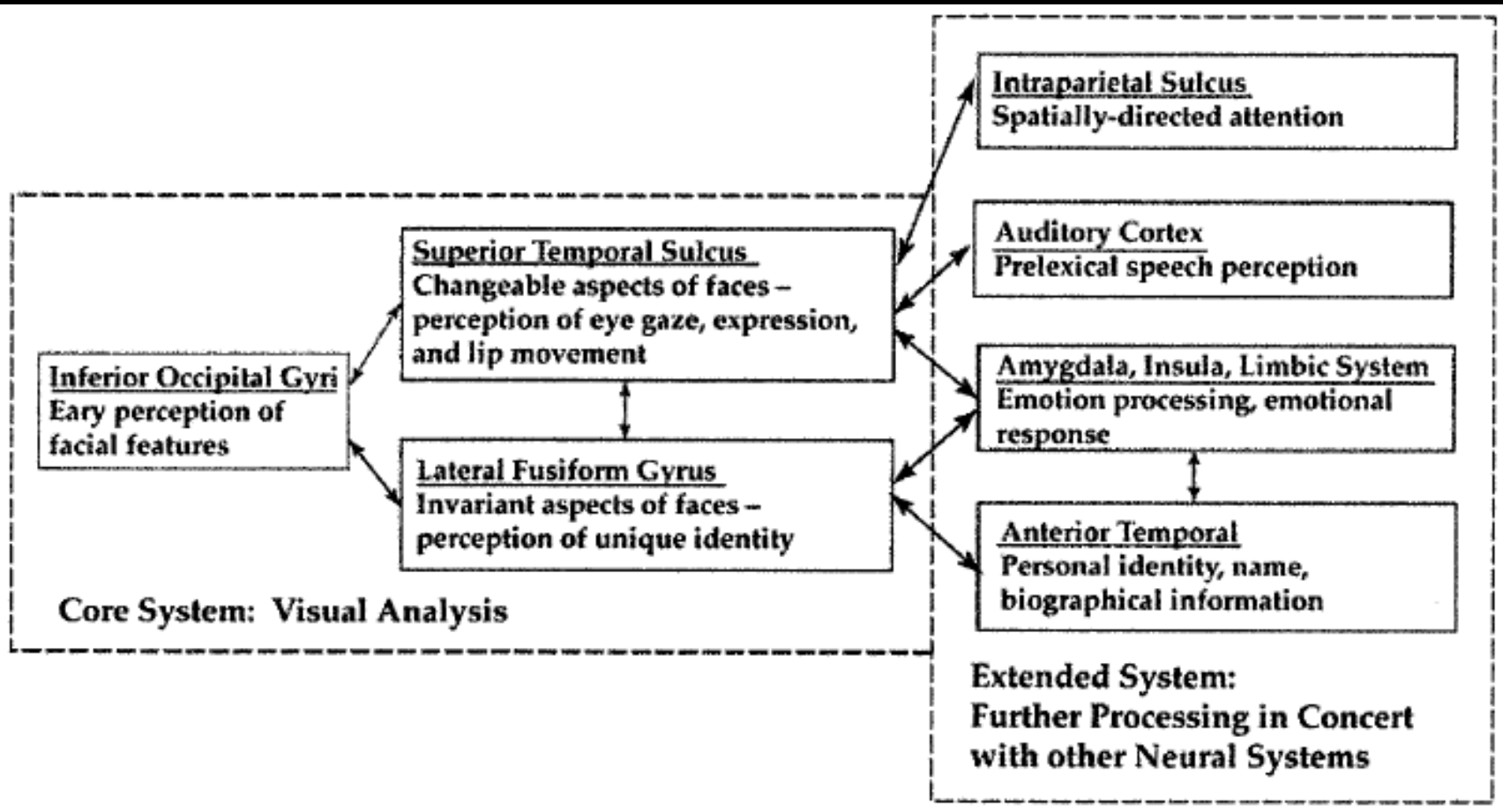
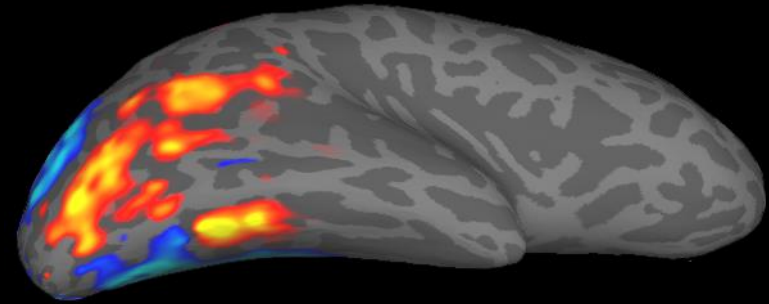


Gautier, et al., 2000

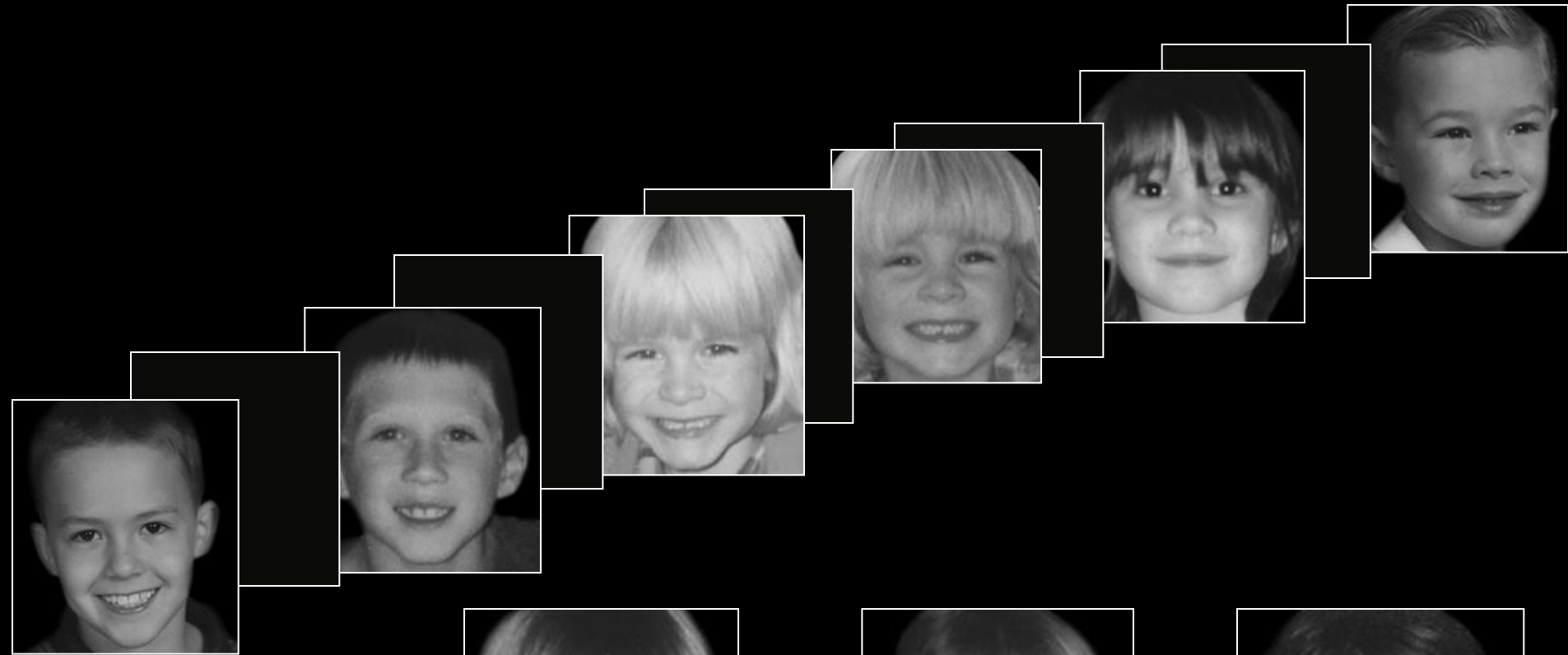
Bruce & Young model for face recognition



A Distributed Neural System for Face Perception



Lo studio delle mamme



Proprio figlio



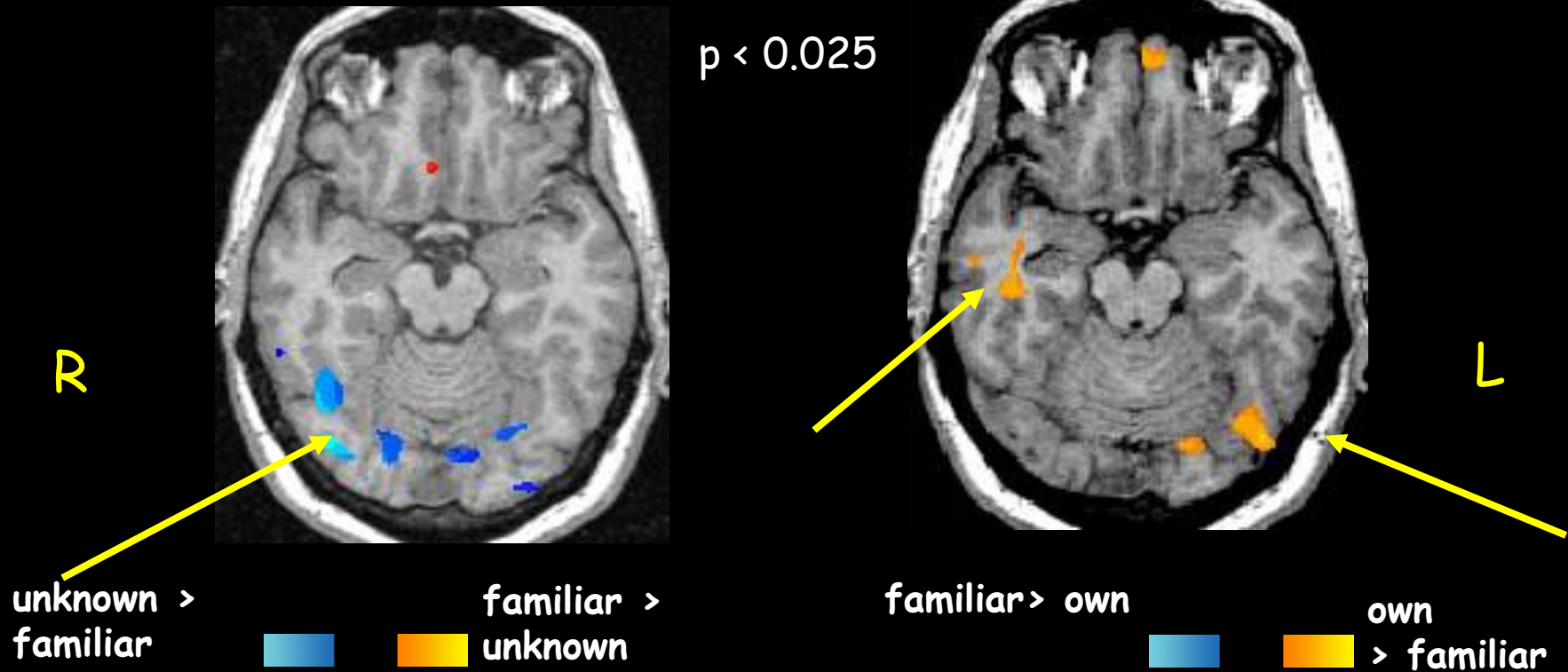
Amici del figlio



sconosciuto

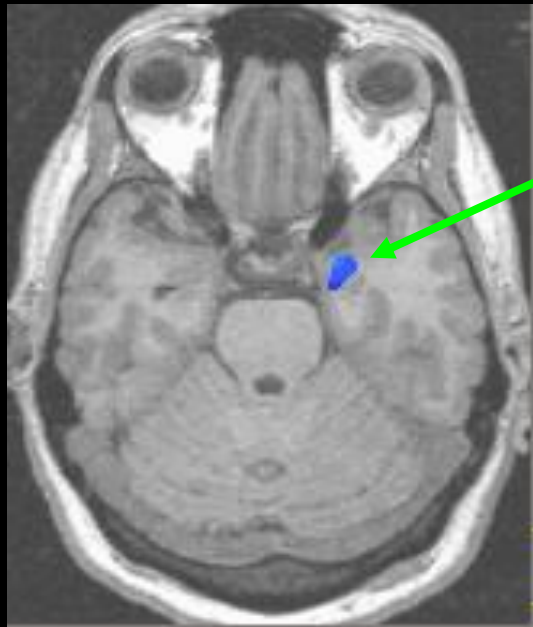
Giro fusiformi

- sconosciuti > propri > familiari

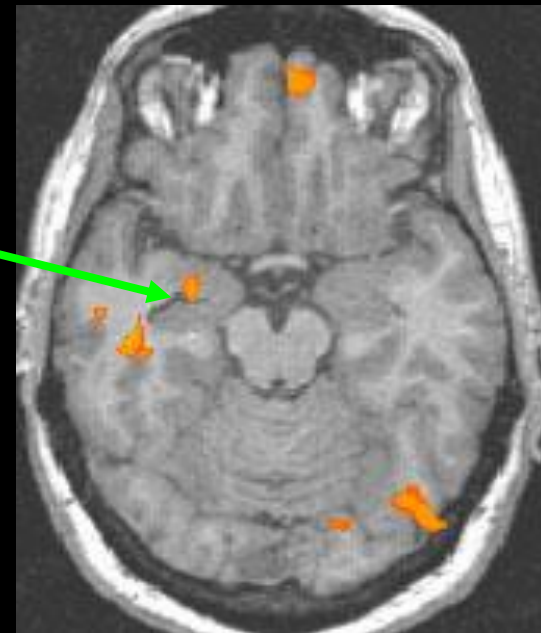


amigdala

- sconosciuto > proprio > familiare



$p < 0.025$



unknown >
familiar



familiar >
unknown



familiar > own

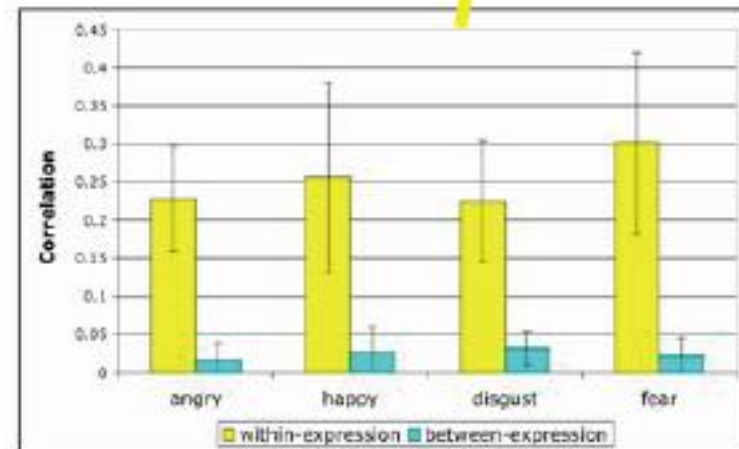
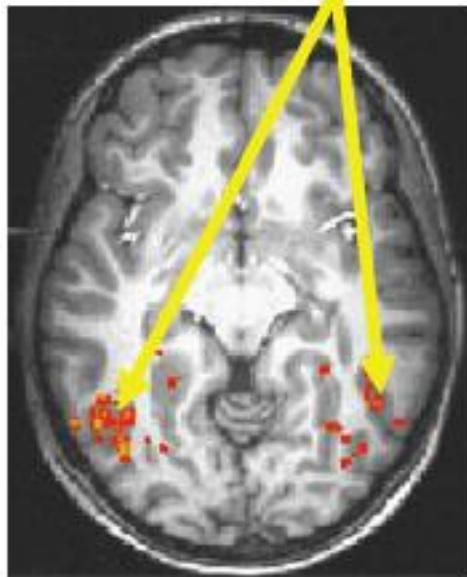
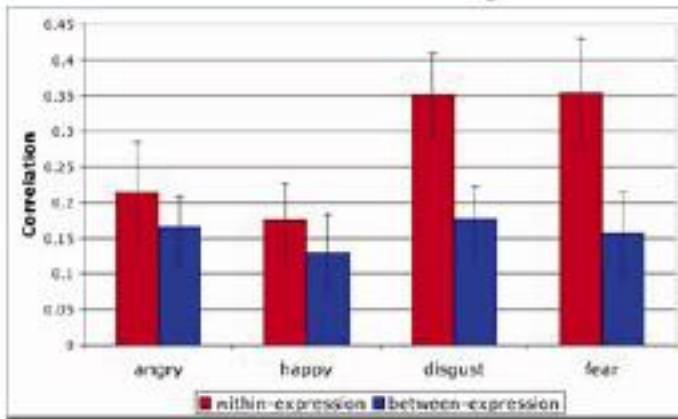


own

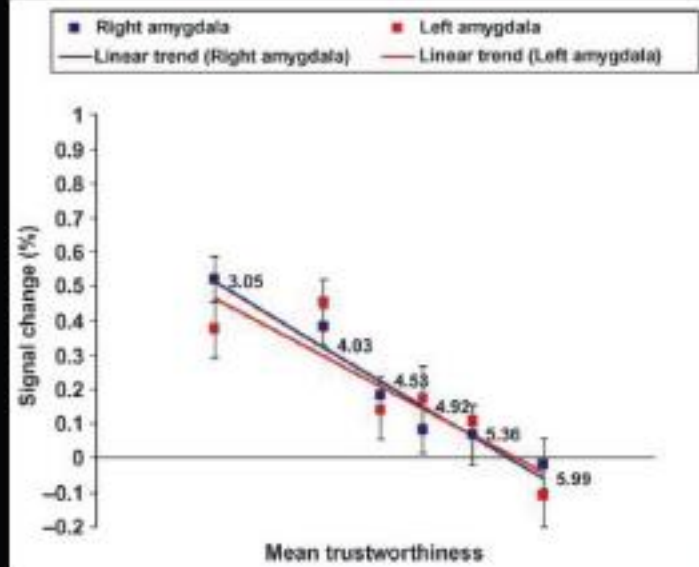
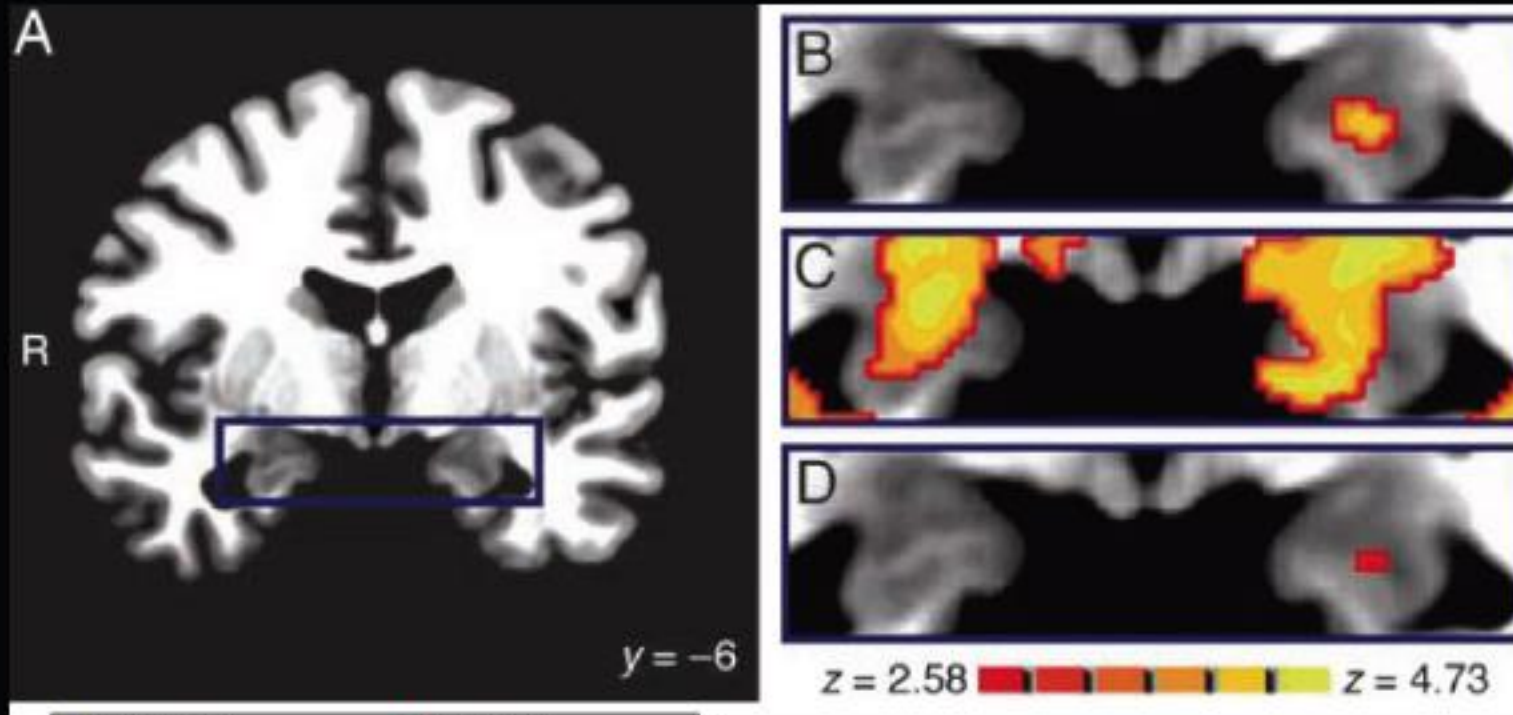


> familiar

expression detection



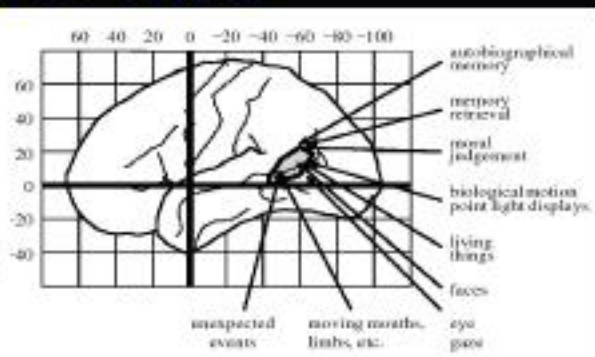
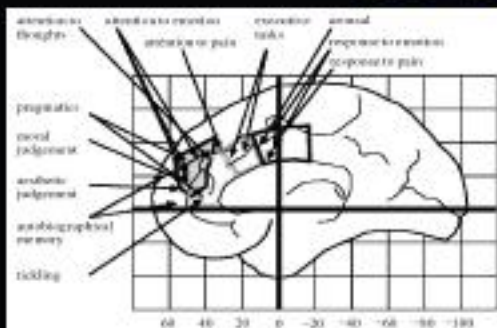
Fiducia



Engell et al., 2007

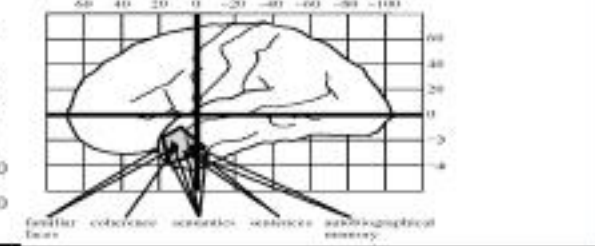
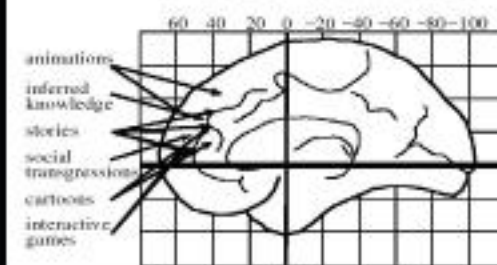
theory of mind

acc



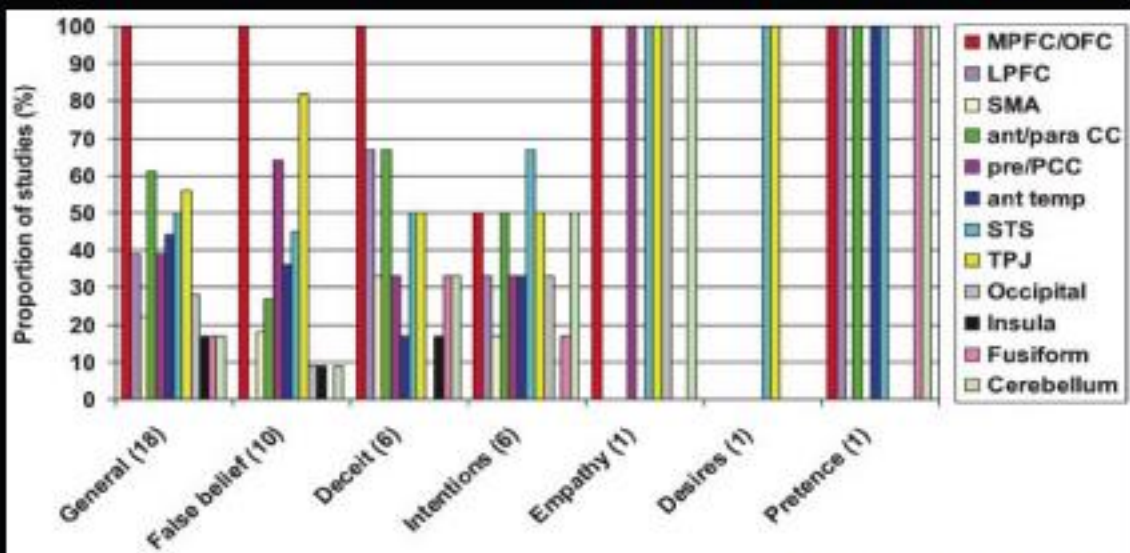
STS

MPFC



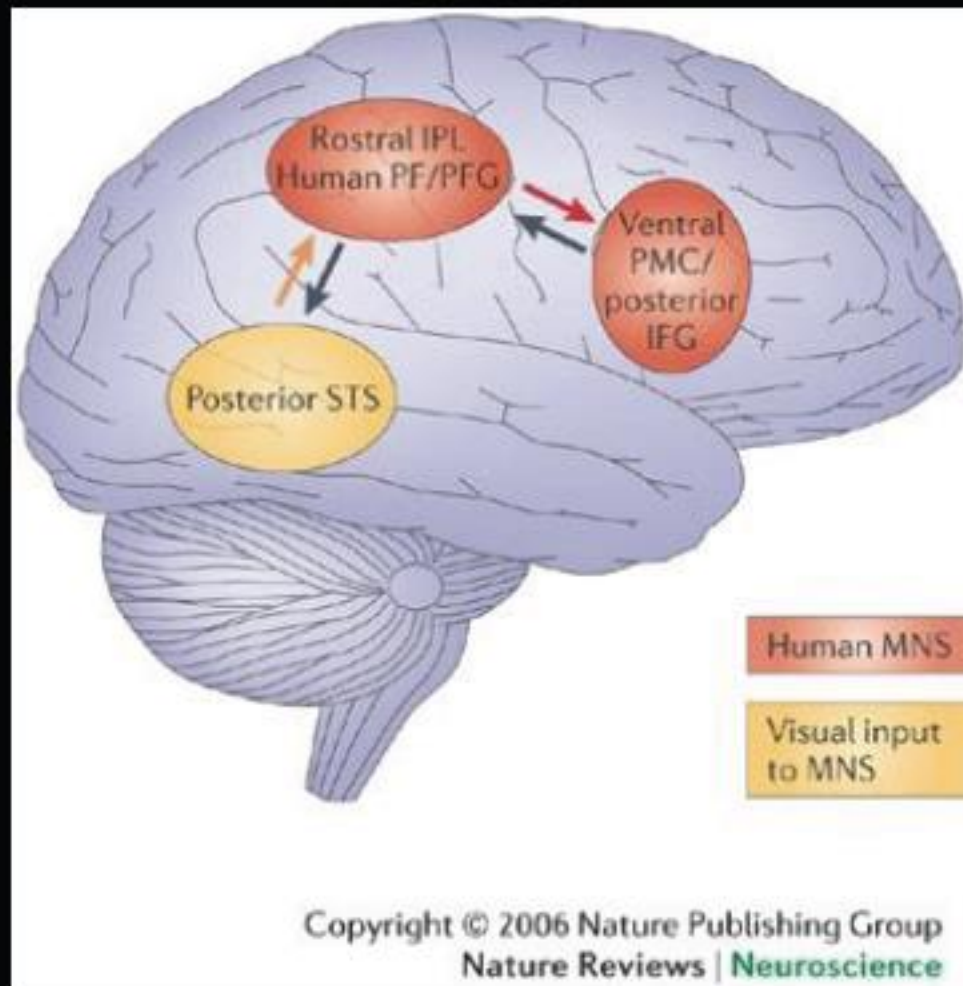
temporal pole

Frith et al., 2003



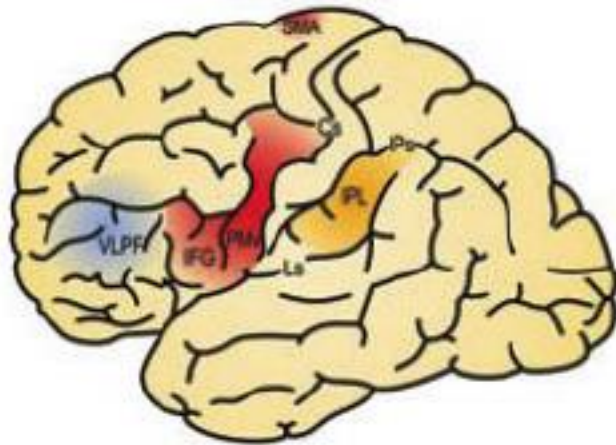
Carrington et al., 2009

mirror neuron system

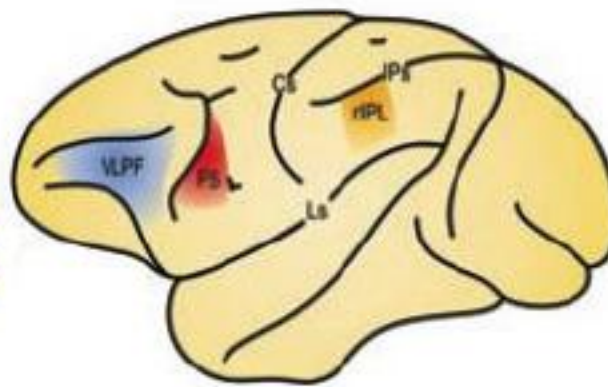


Iacoboni et al., 2006

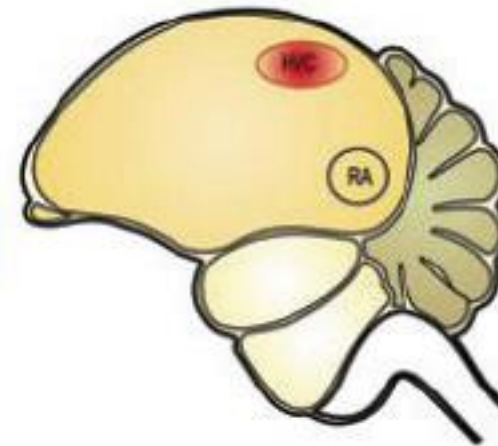
HUMAN



MONKEY



BIRD



Perceived motor events



Levels of recognition of motor events

Motor act
Neonatal imitation/mimicry, social learning

Action
Predictive coding of other's goals, social interaction

Single movements
Automatic imitation and learning by imitation

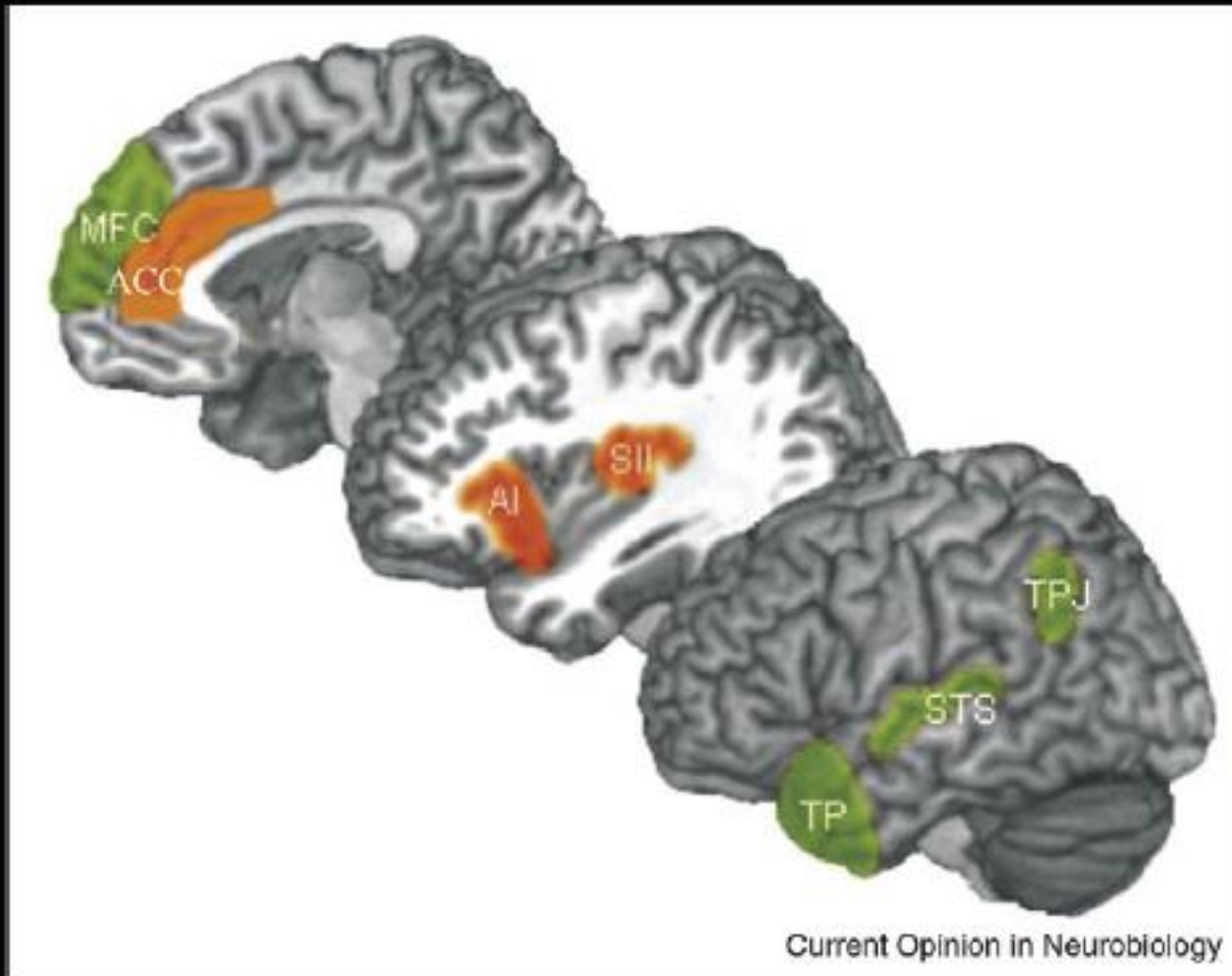
Motor act
Neonatal imitation/mimicry, social learning

Action
Predictive coding of other's goals, social interaction

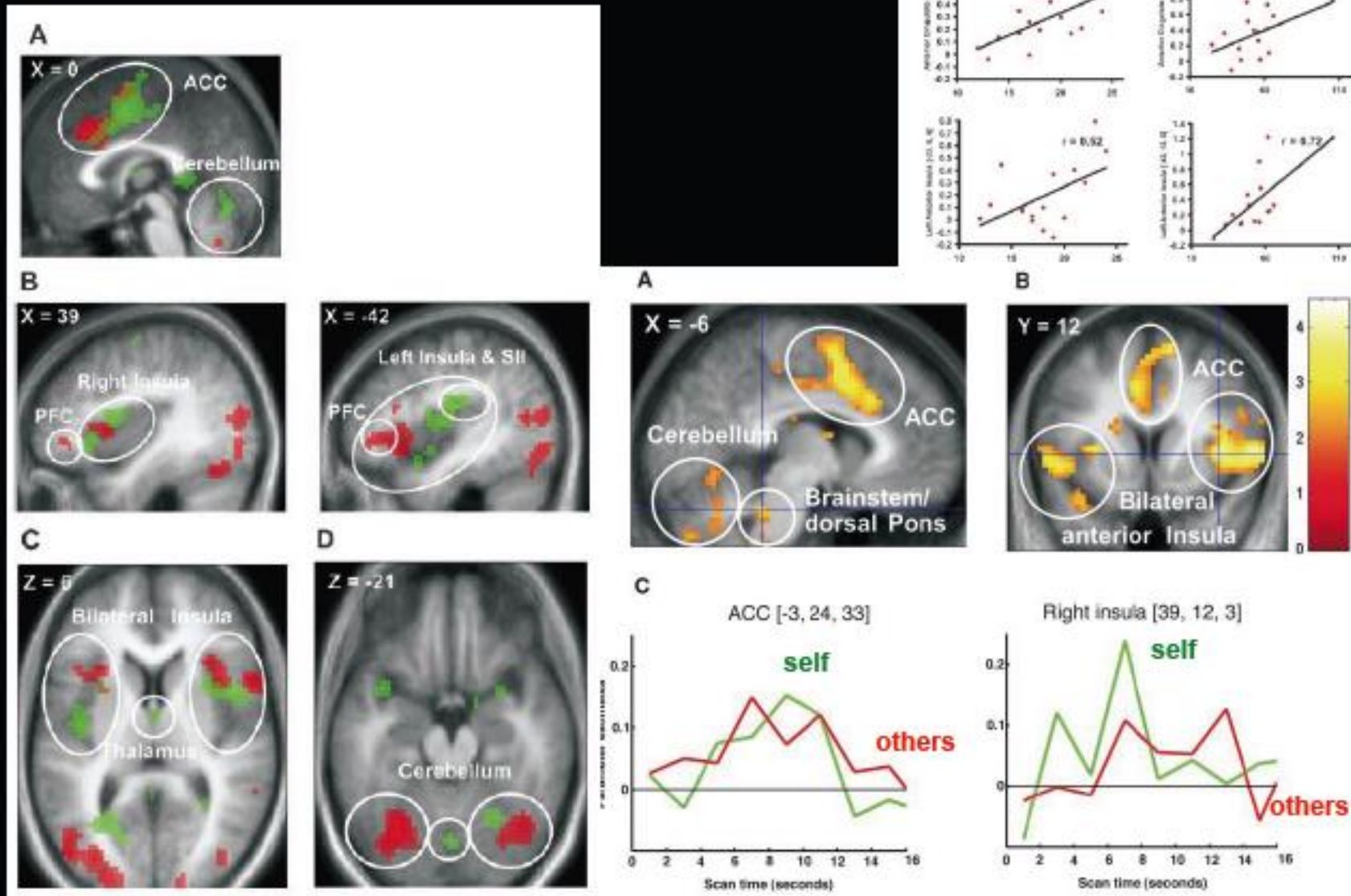
— — —
Bonini & Ferrari 2011

— — —
— — —
Syllables
Counter-singing, song learning by imitation

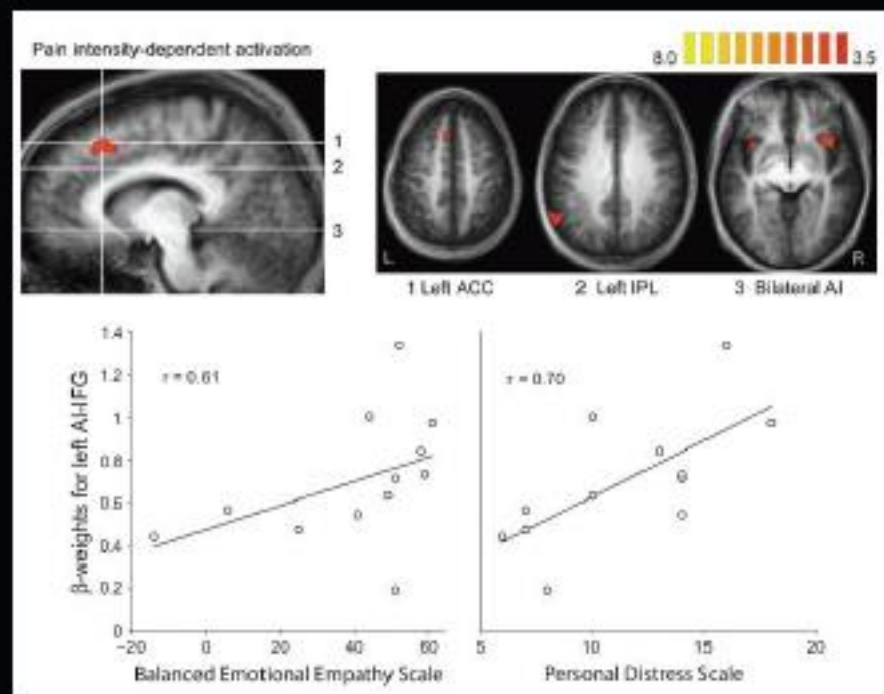
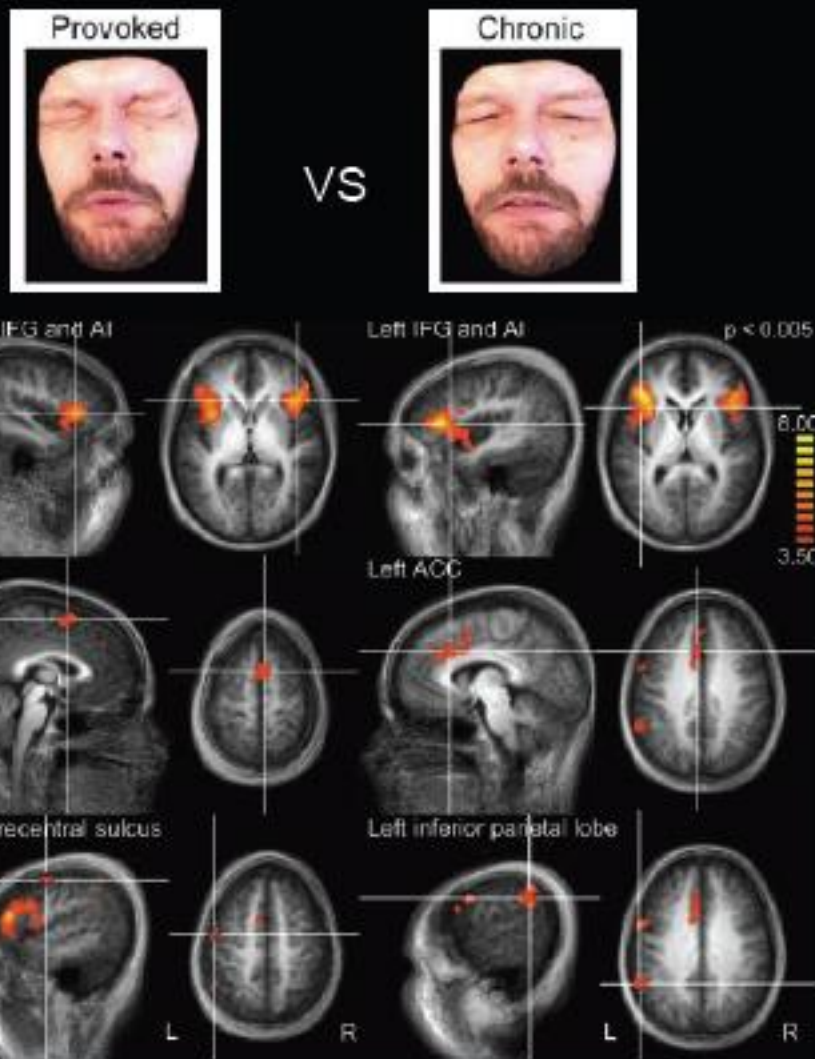
Empatia cognitiva e affettiva nel cervello



Empatia cognitiva e affettiva nel cervello

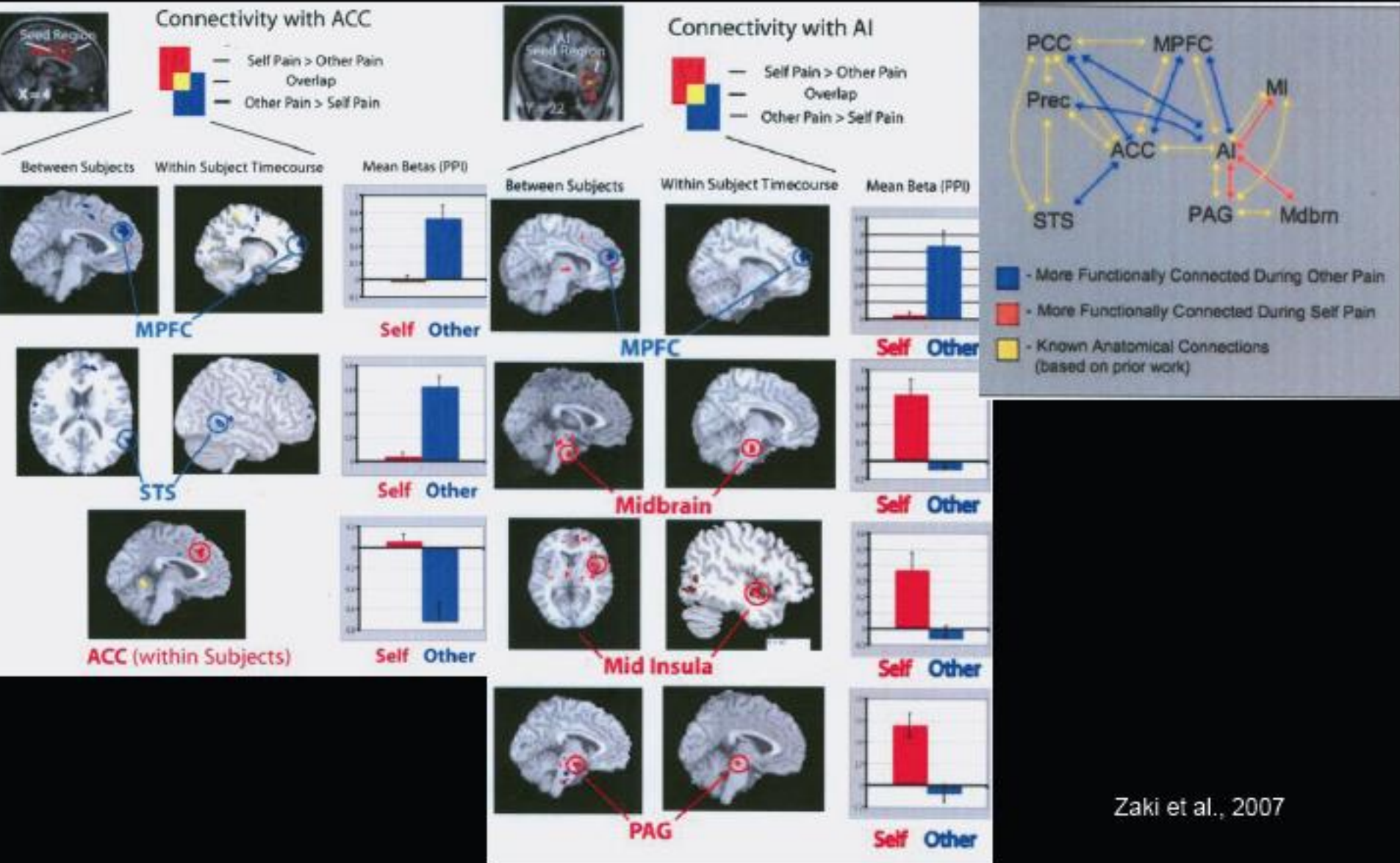


Empatia cognitiva e affettiva nel cervello

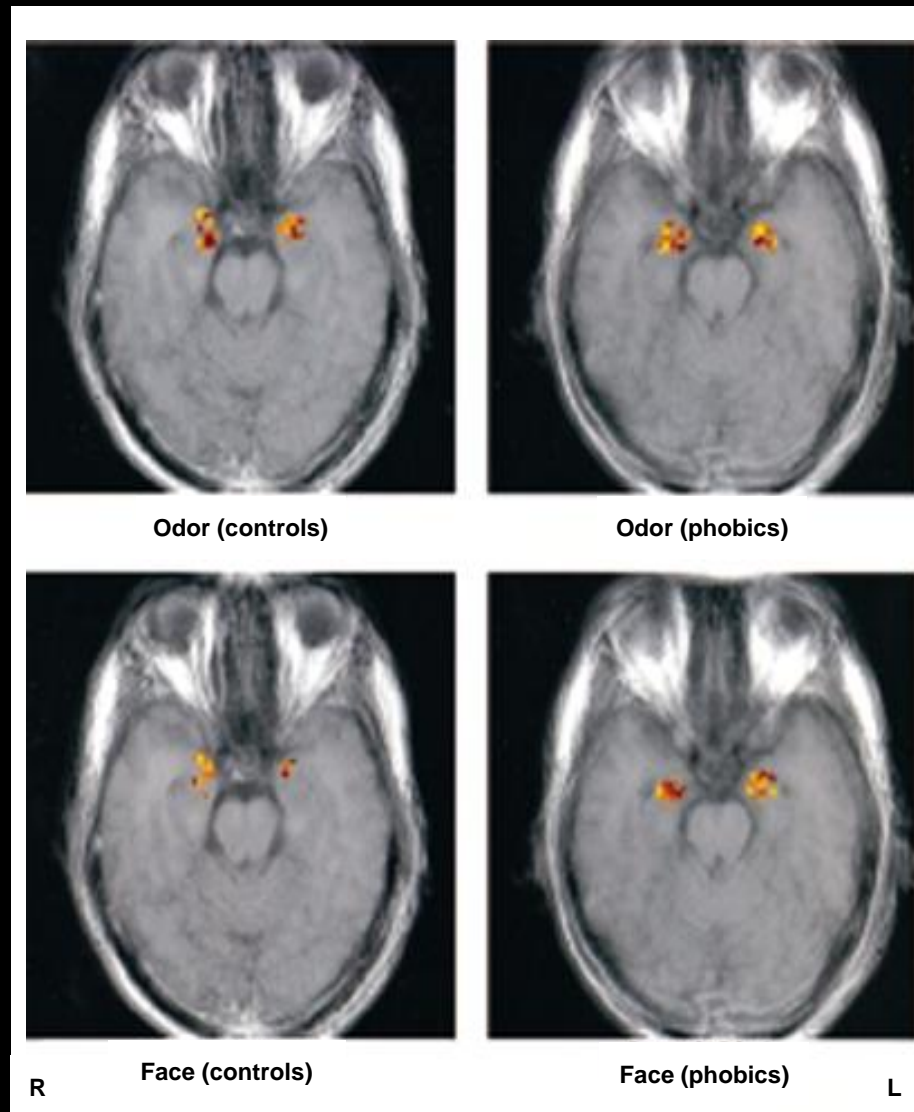


Saarela et al., 2007

Empatia cognitiva e affettiva nel cervello

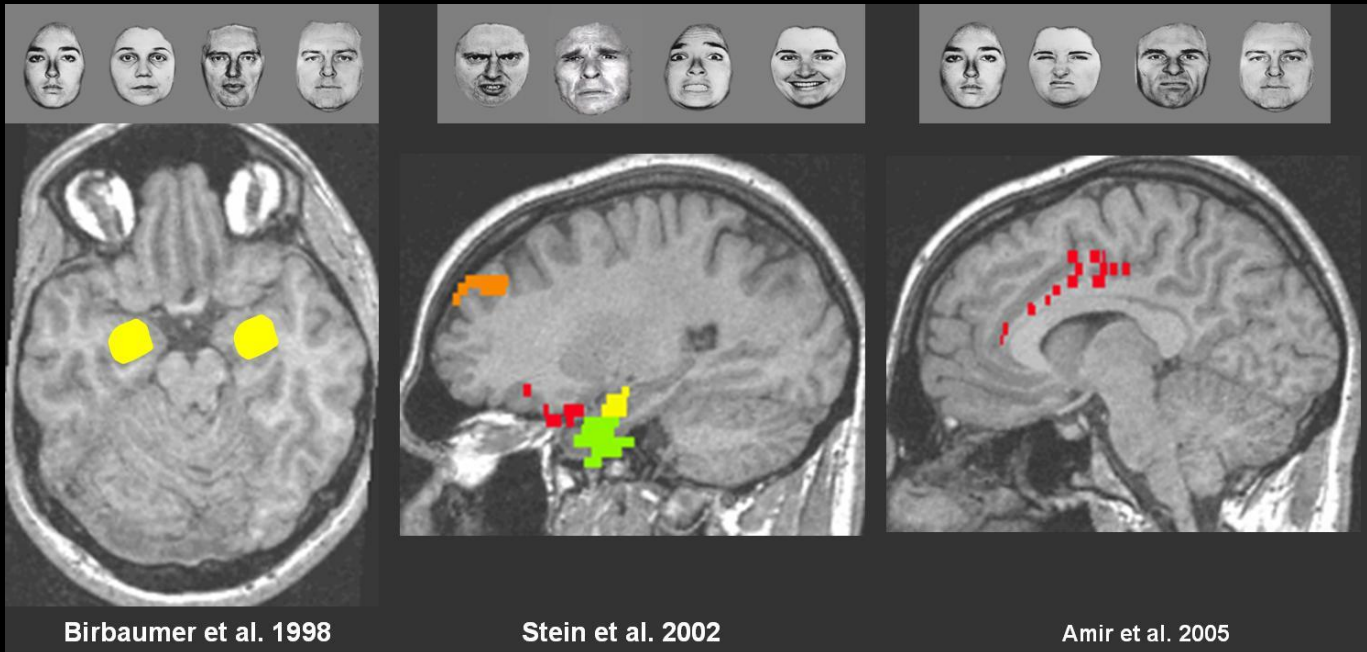


Fobia sociale

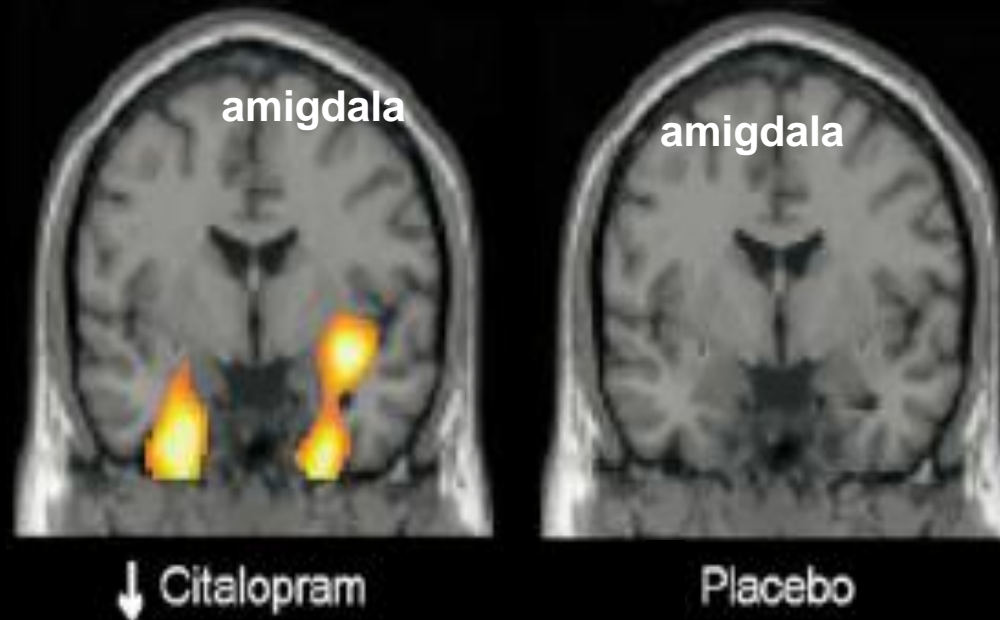


Birbaumer et al, 1998

Fobia sociale



Fobia sociale



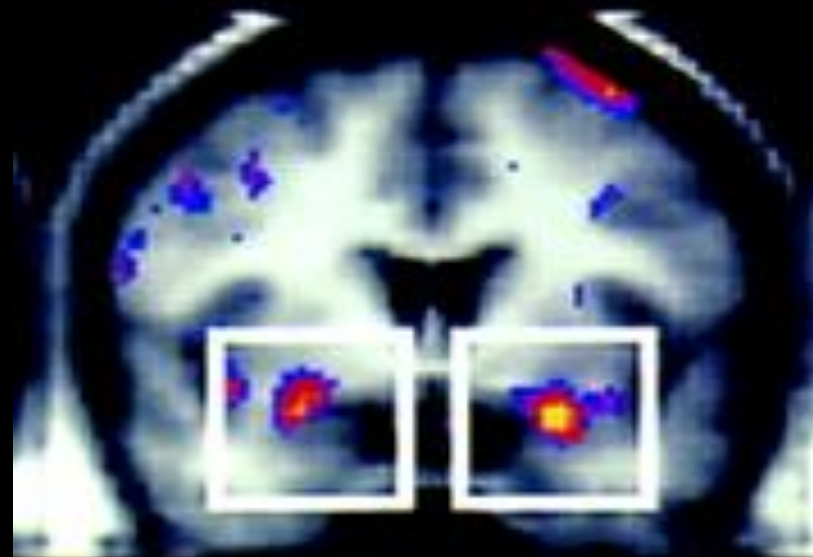
Furmark et al. 2005

nei pz lo stimolo fobico (discorso pubblico) dopo terapia induce minore consumo di ossigeno rispetto alla condizione di base

Percezione di paura



vs



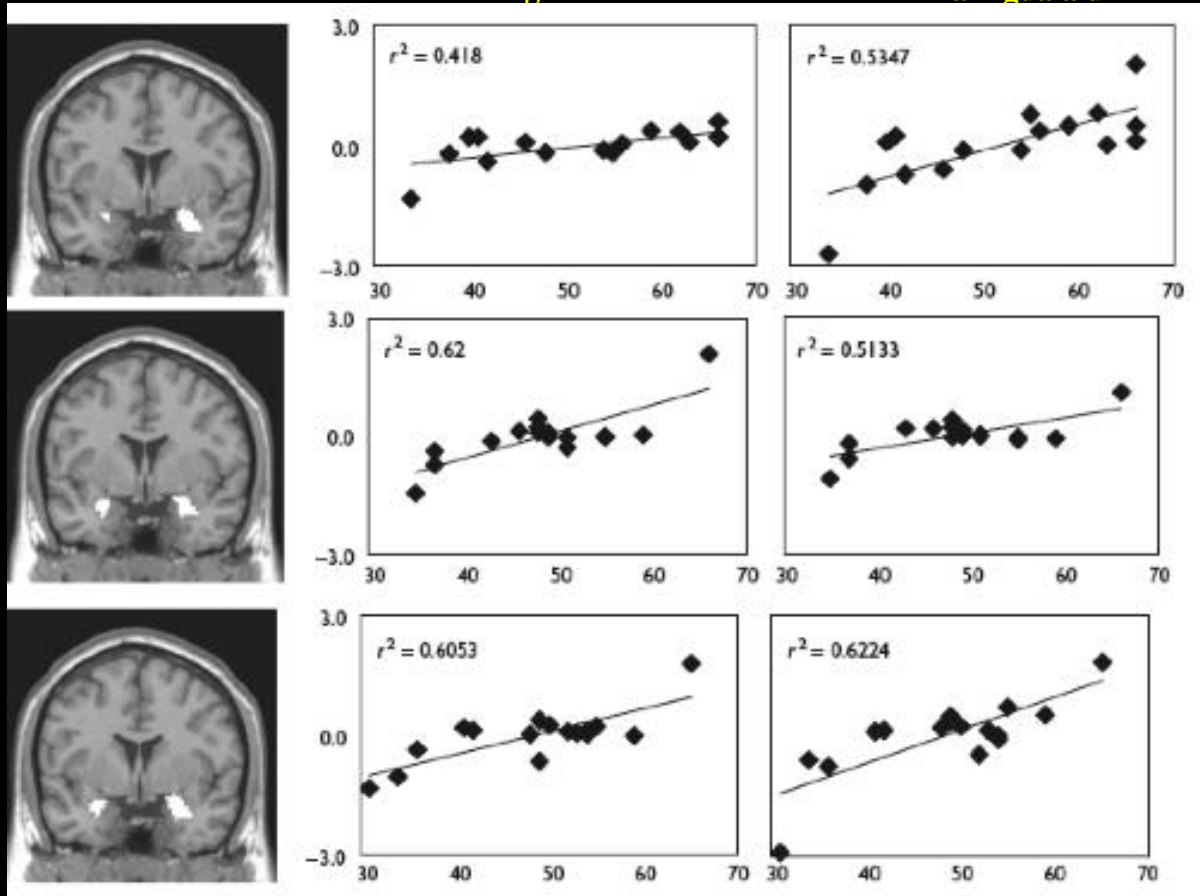
Breiter et al, 1999

Ansia sociale

prestational anxiety

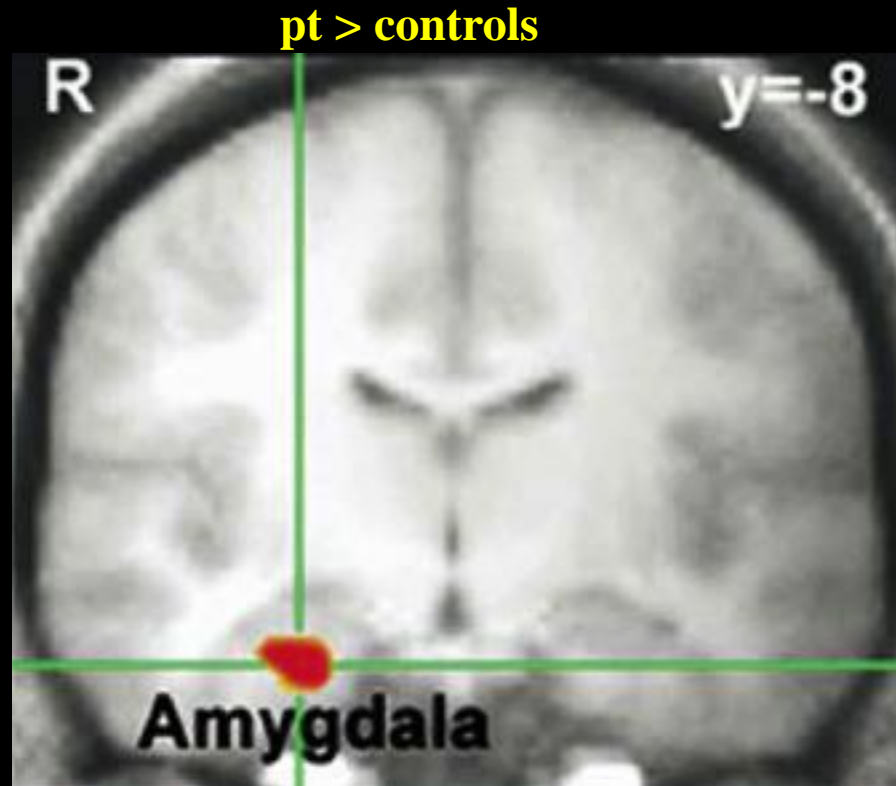
fear of negative evaluation

MASC
(Multidimensional Anxiety Scale for Children)



Killgore et al., 2005

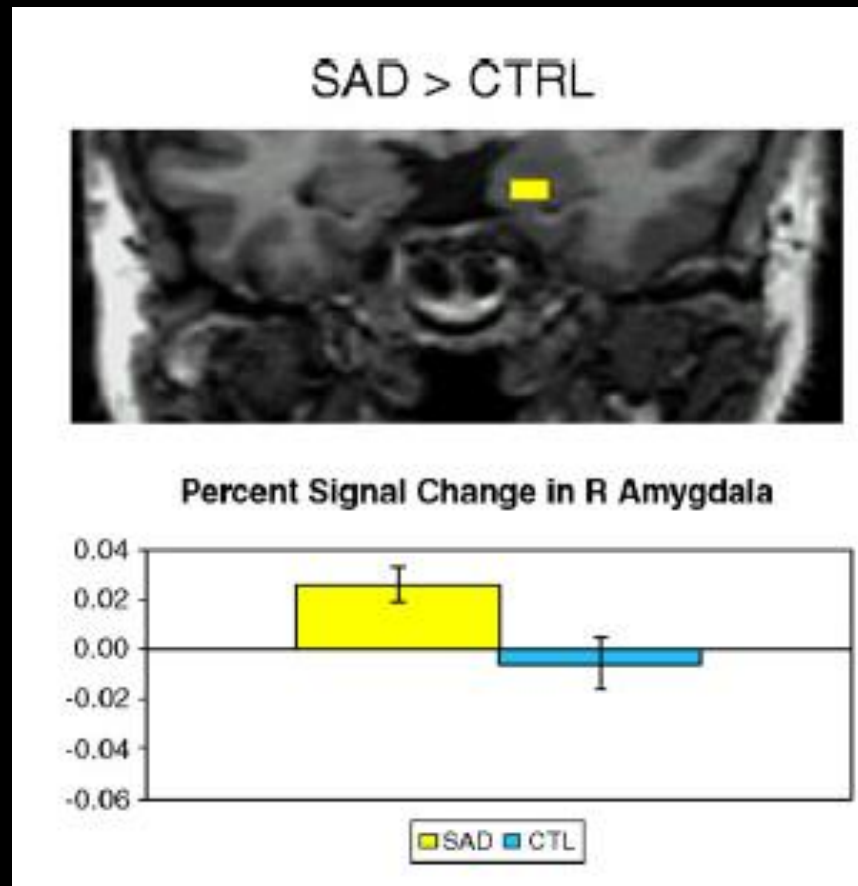
Fobia Sociale



Luan Phan et al., 2006

Fobia Sociale

Veramente neutro?



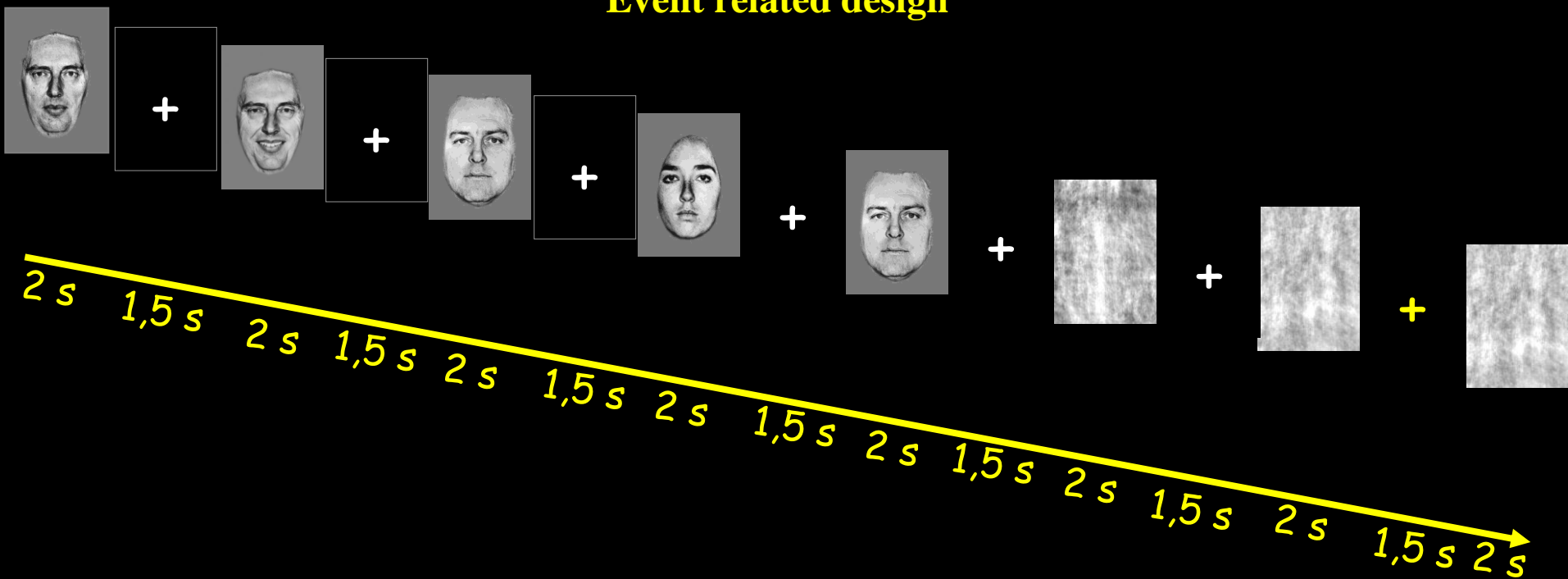
Cooney et al., 2006

Fobia Sociale

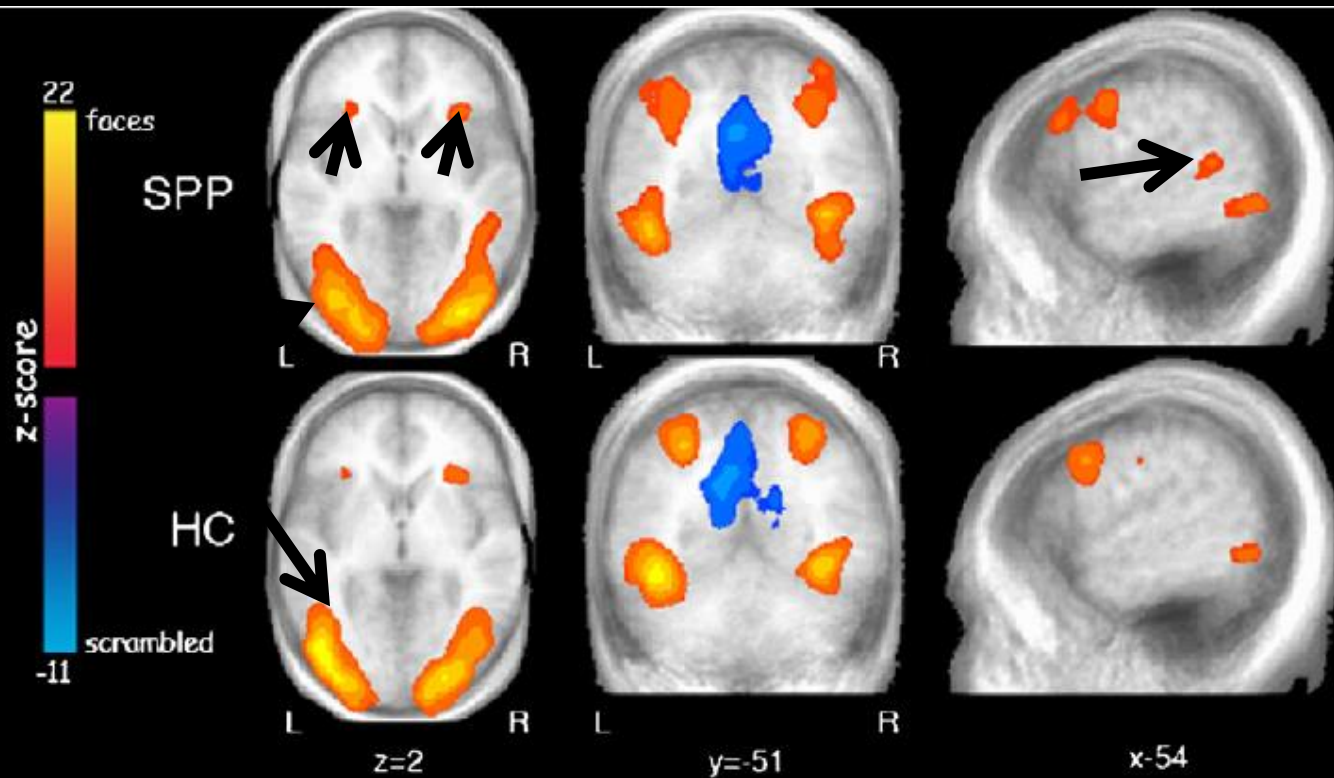
Differential modulation of neural activity throughout the distributed neural system for face perception in patients with Social Phobia and healthy subjects

Gentili C, Gobbini MI, Ricciardi E, Vanello N, Pietrini P, Haxby JV, Guazzelli M.

Event related design

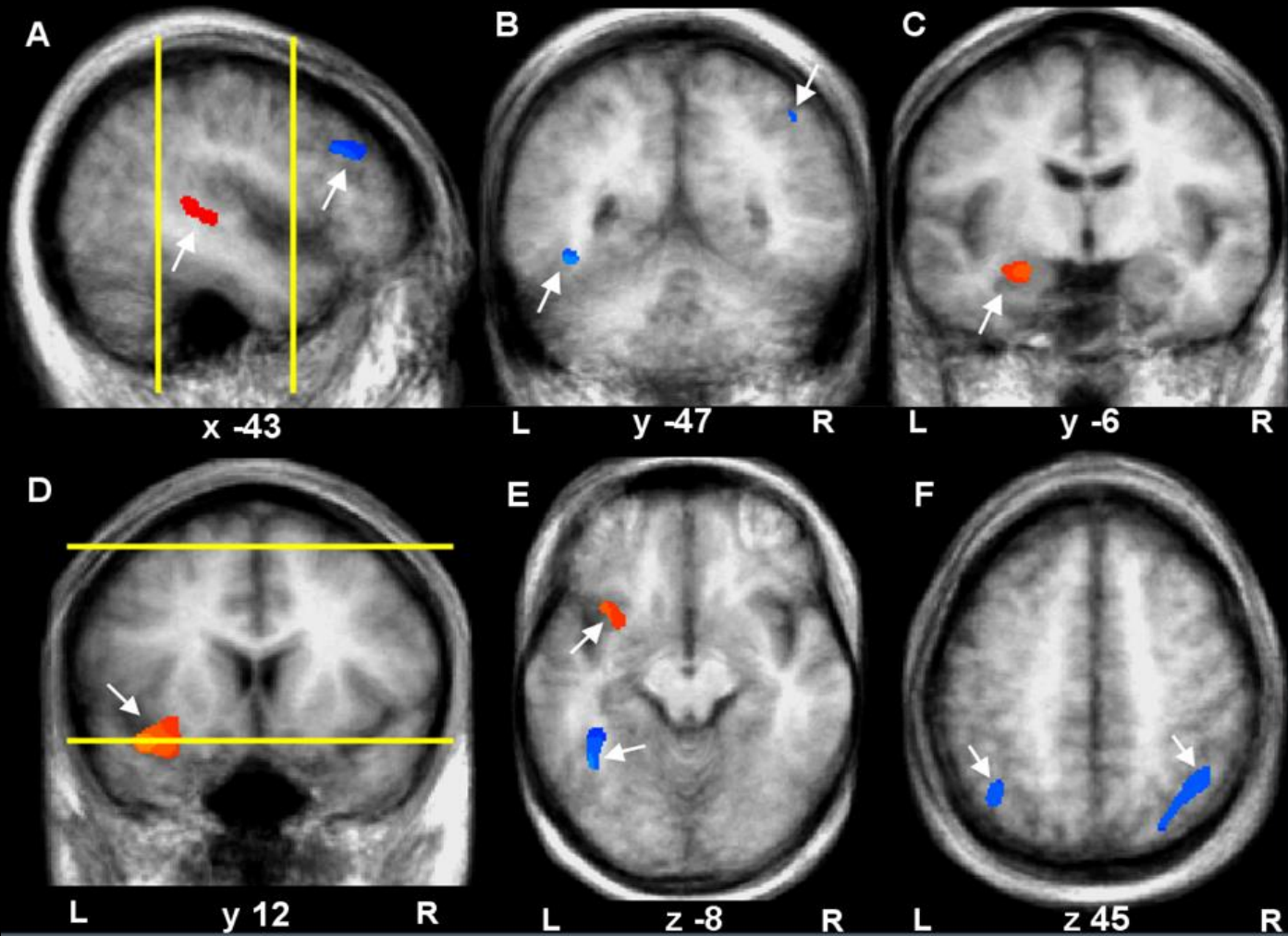


Fobia Sociale

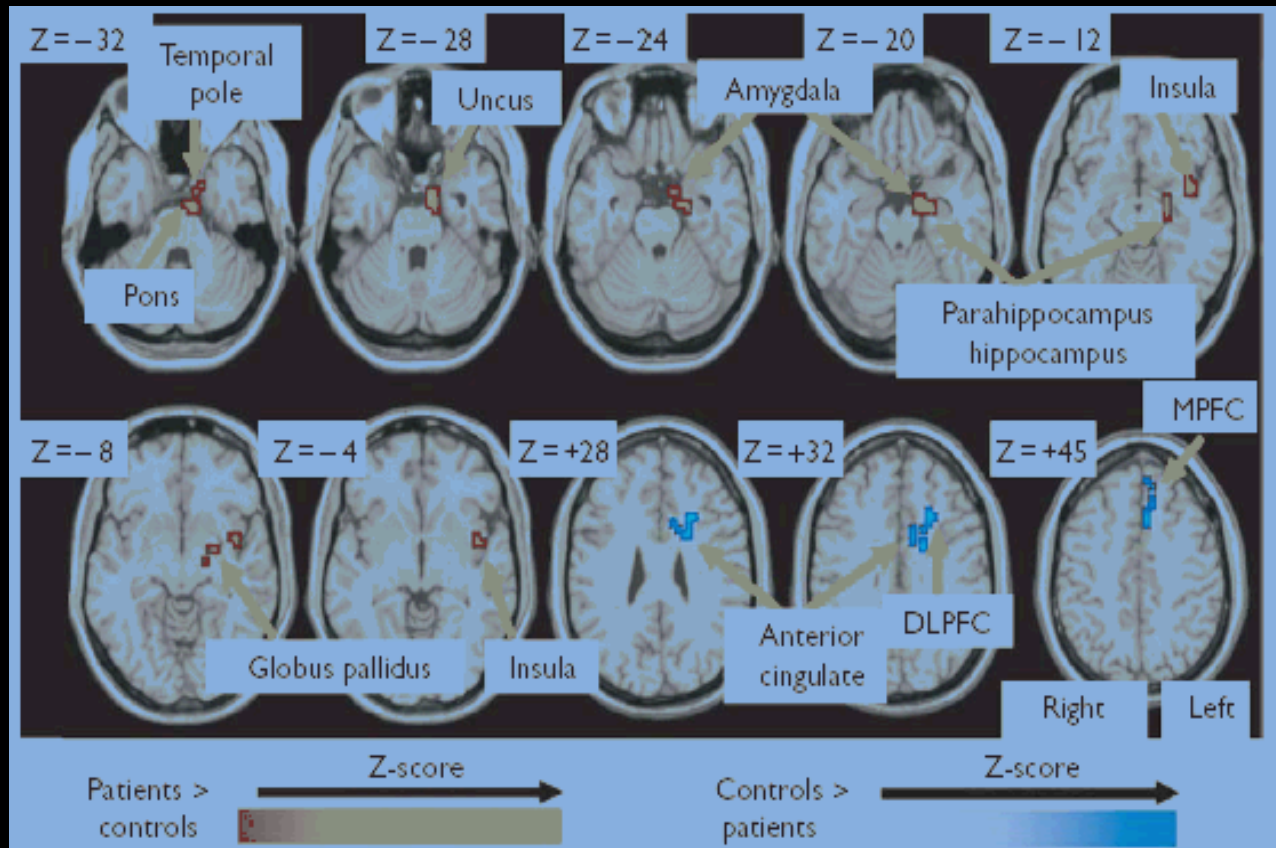


Fobia Sociale

pts vs control

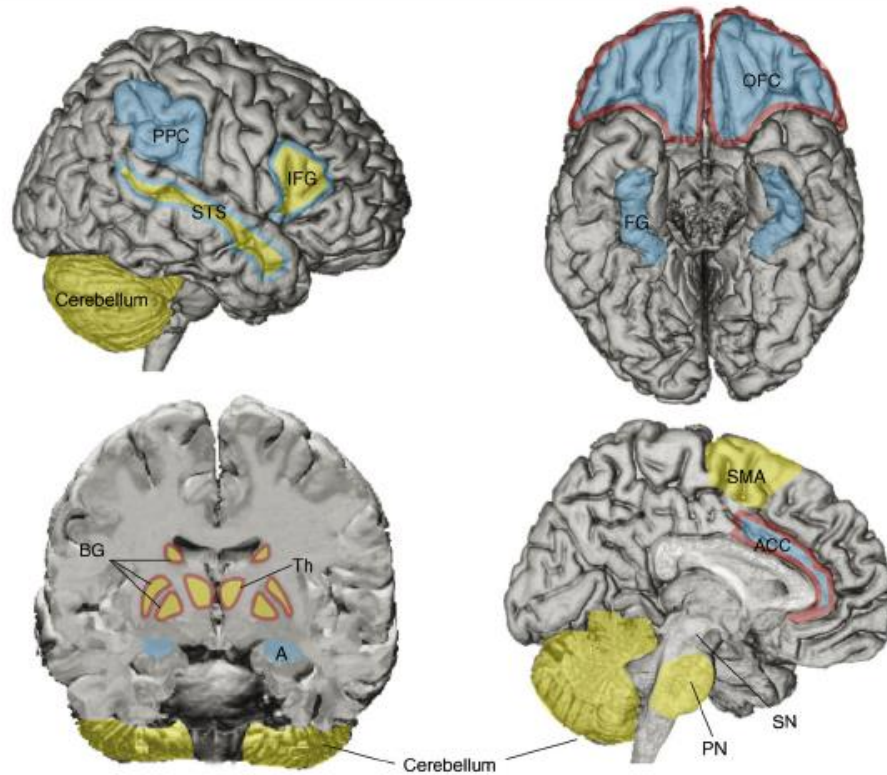


Fobia Sociale



Loberbaum et al., 2004

Neuroanatomia dell'autismo



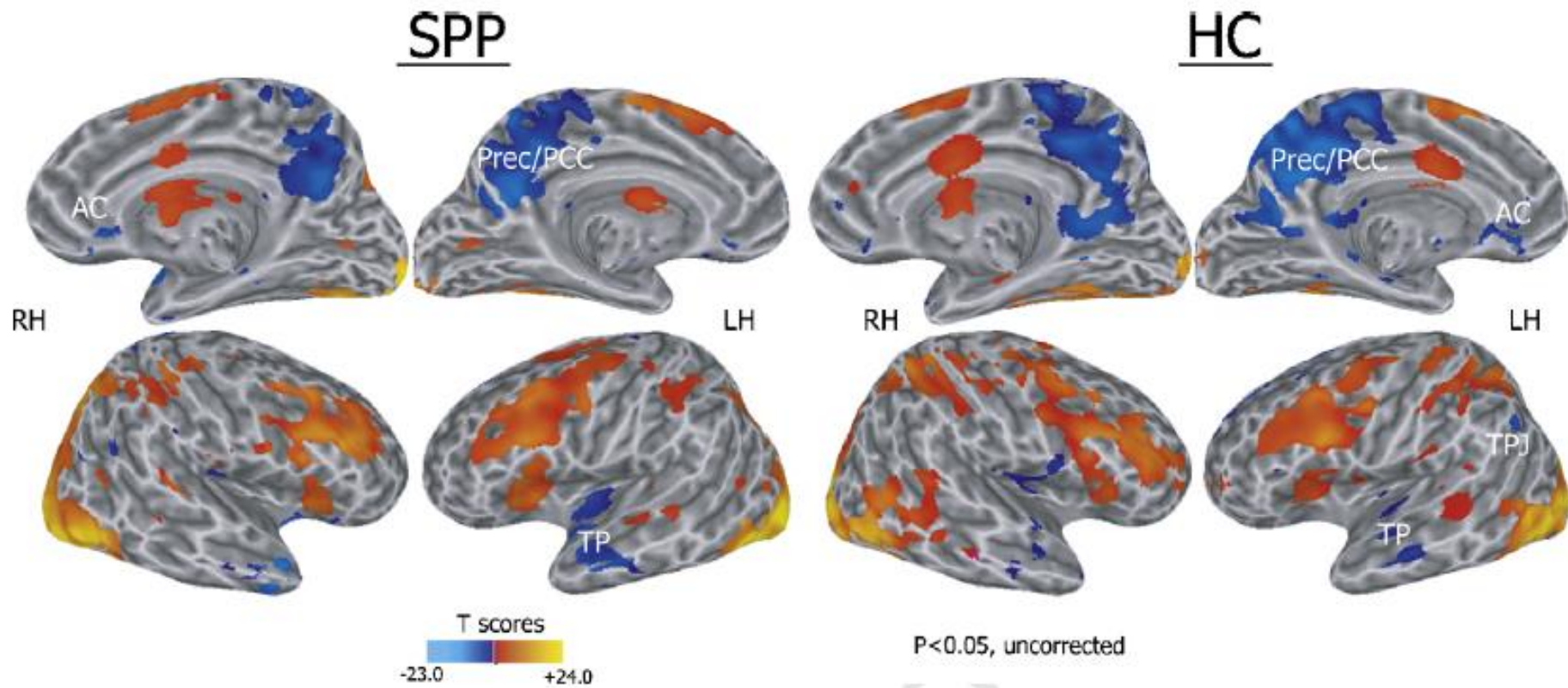
Social impairment	Communication deficits	Repetitive behaviors
OFC – Orbitofrontal cortex ACC – Anterior cingulate cortex FG – Fusiform gyrus STS – Superior temporal sulcus A – Amygdala mirror neuron regions IFG – Inferior frontal gyrus PPC – Posterior parietal cortex	IFG- Inferior frontal gyrus (Broca's area) STS – Superior temporal sulcus SMA – Supplementary motor area BG – Basal ganglia SN – Substantia nigra Th – Thalamus PN – Pontine nuclei cerebellum	OFC – Orbitofrontal cortex ACC – Anterior cingulate cortex BG – Basal ganglia Th – Thalamus

TRENDS in Neurosciences

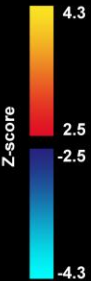
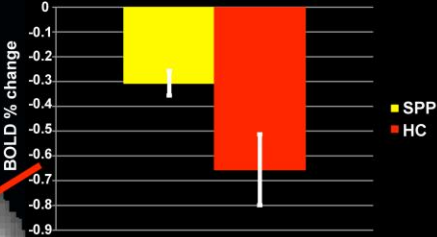
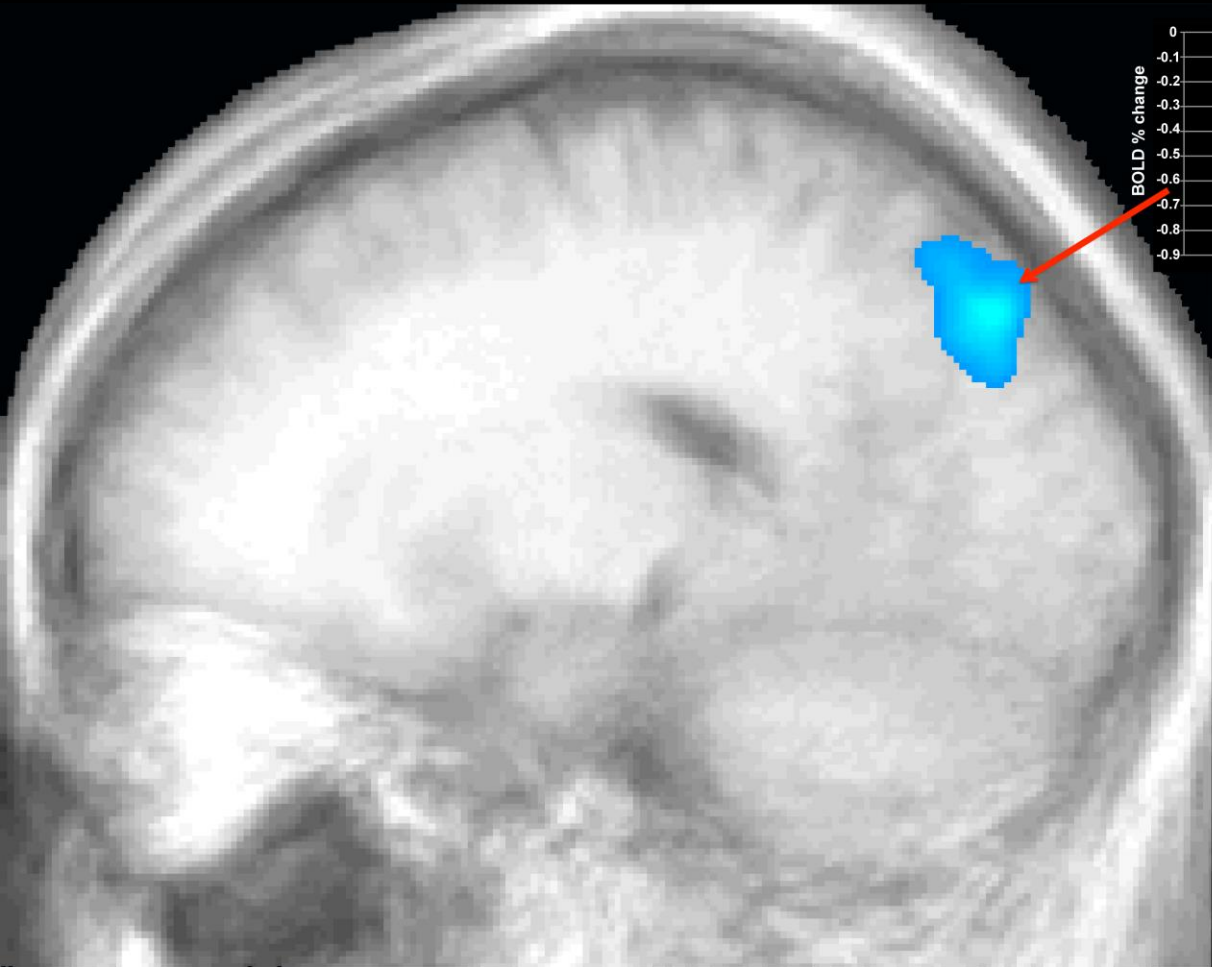
“Enough has now been said to prove the general law of perception, which is this, that whilst part of what we perceive comes through our senses from the object before us, another part (and it may be the larger part) always comes (in Lazarus's phrase) out of our own head.” William James (James, 1890)

“This concept, that the significance of incoming sensory information depends on the pre-existing functional disposition of the brain, is a far deeper issue than one gathers at first glance...” Rodolfo Llinas (Llinas, 2001)

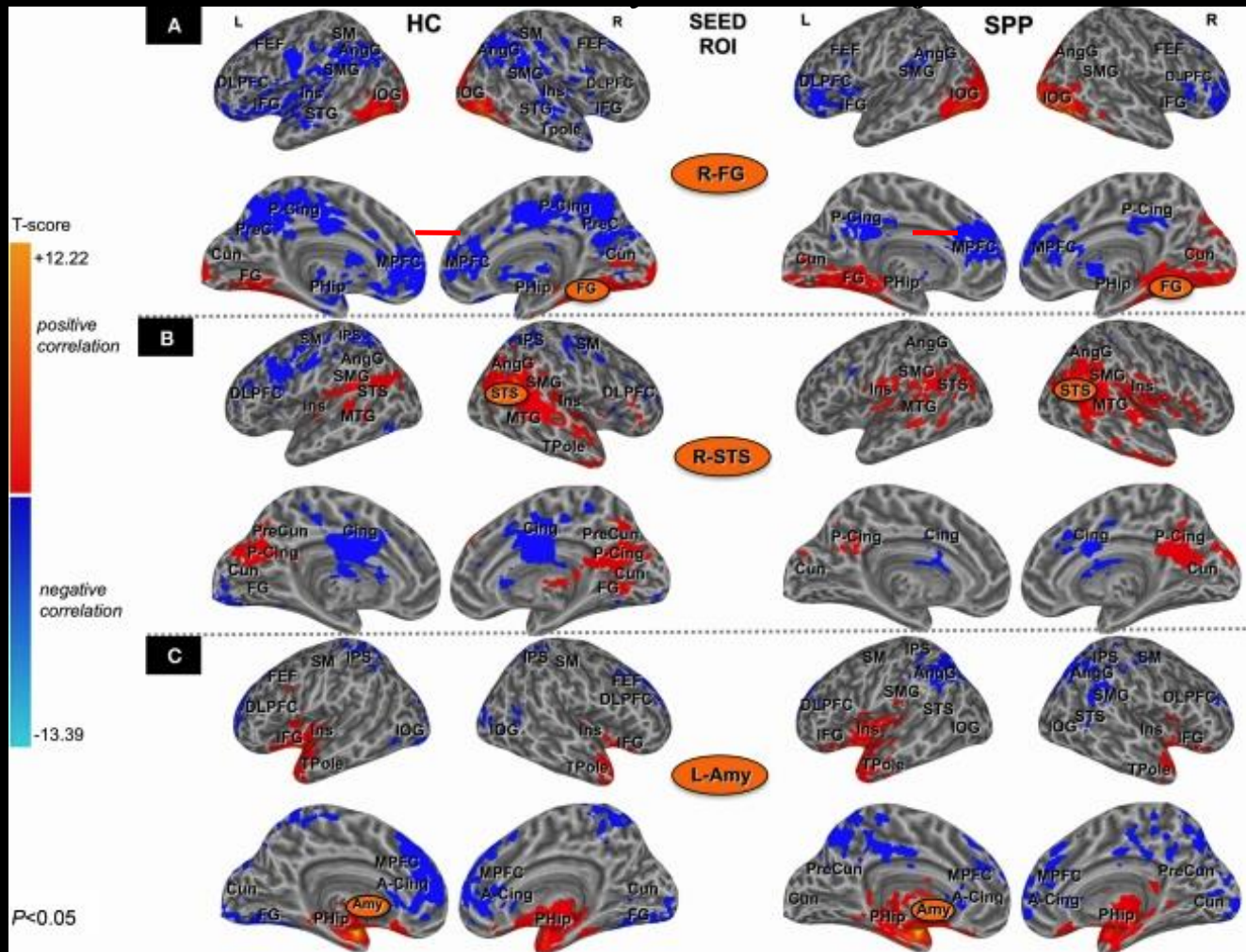
Fobia Sociale



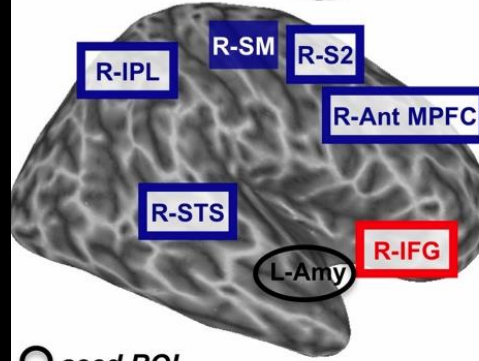
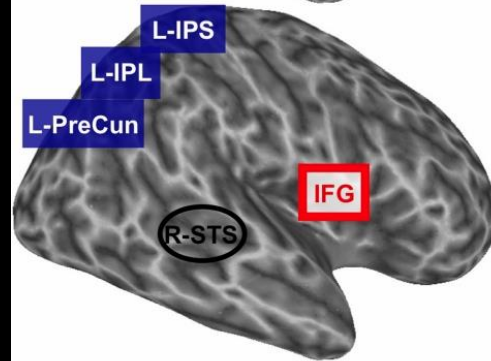
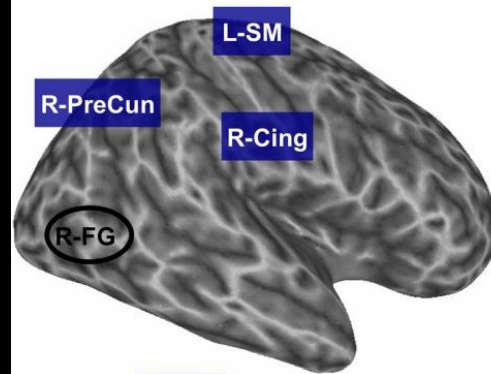
Fobia Sociale



Fobia Sociale

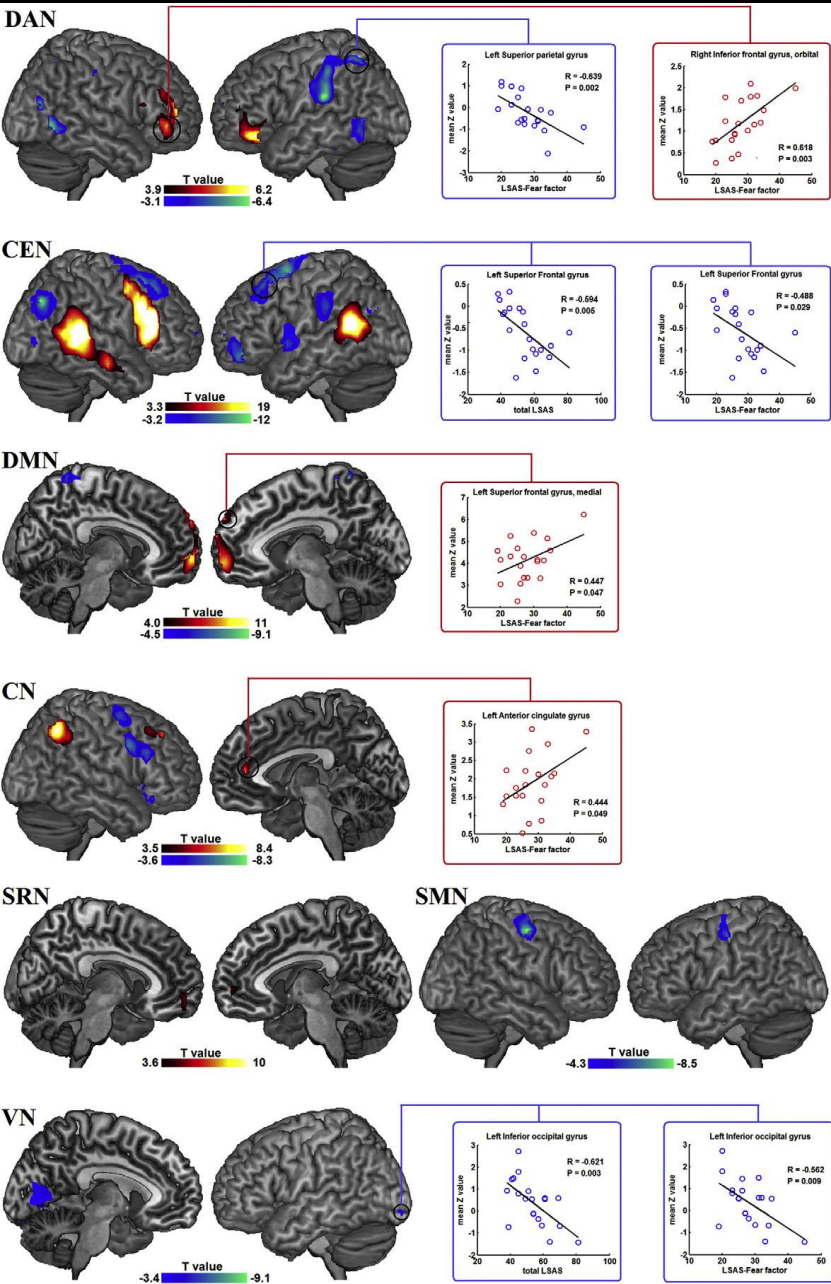


Fobia Sociale



- seed ROI
- stronger negative correlation in HC
- stronger negative correlation in SPP
- stronger positive correlation in HC
- stronger positive correlation in SPP

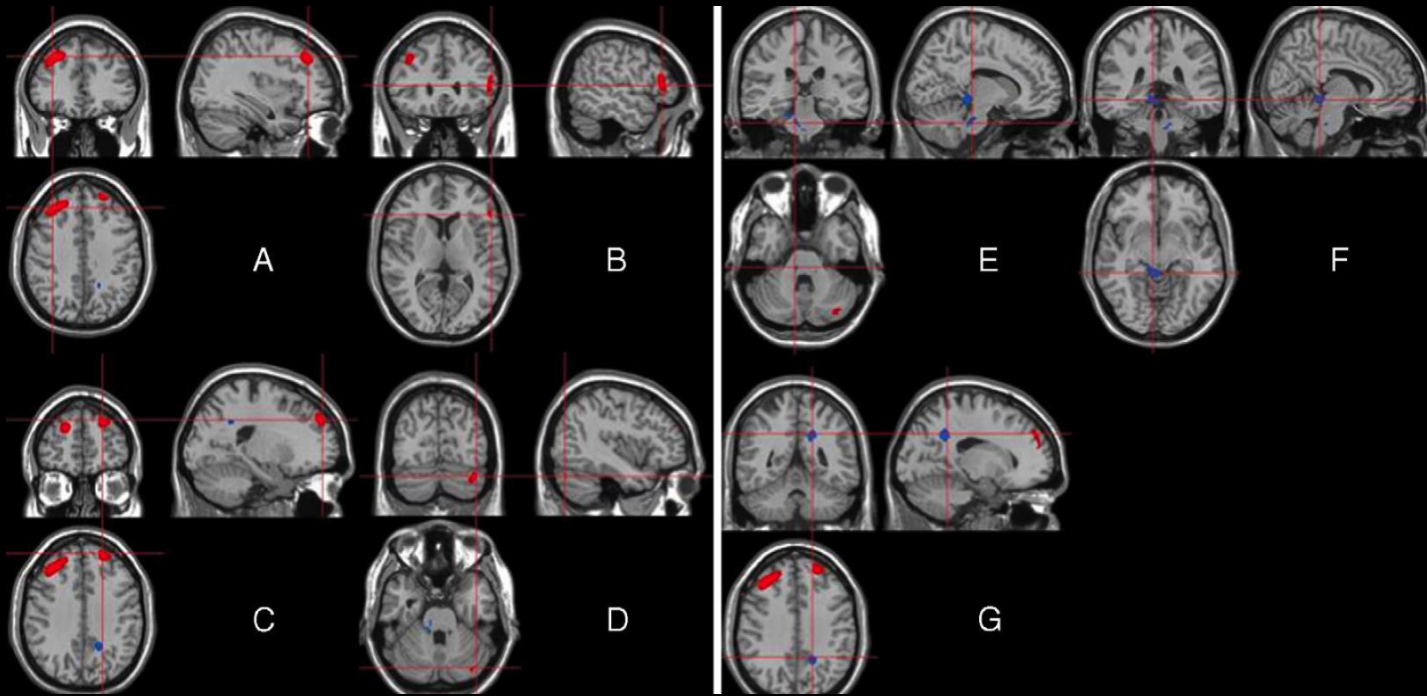
Fobia Sociale



dorsal attention network (DAN); central executive network (CEN); default mode network (DMN); core network (CN); self-referential network (SRN); somato-motor network (SMN); visual network (VN) and auditory network (AN).

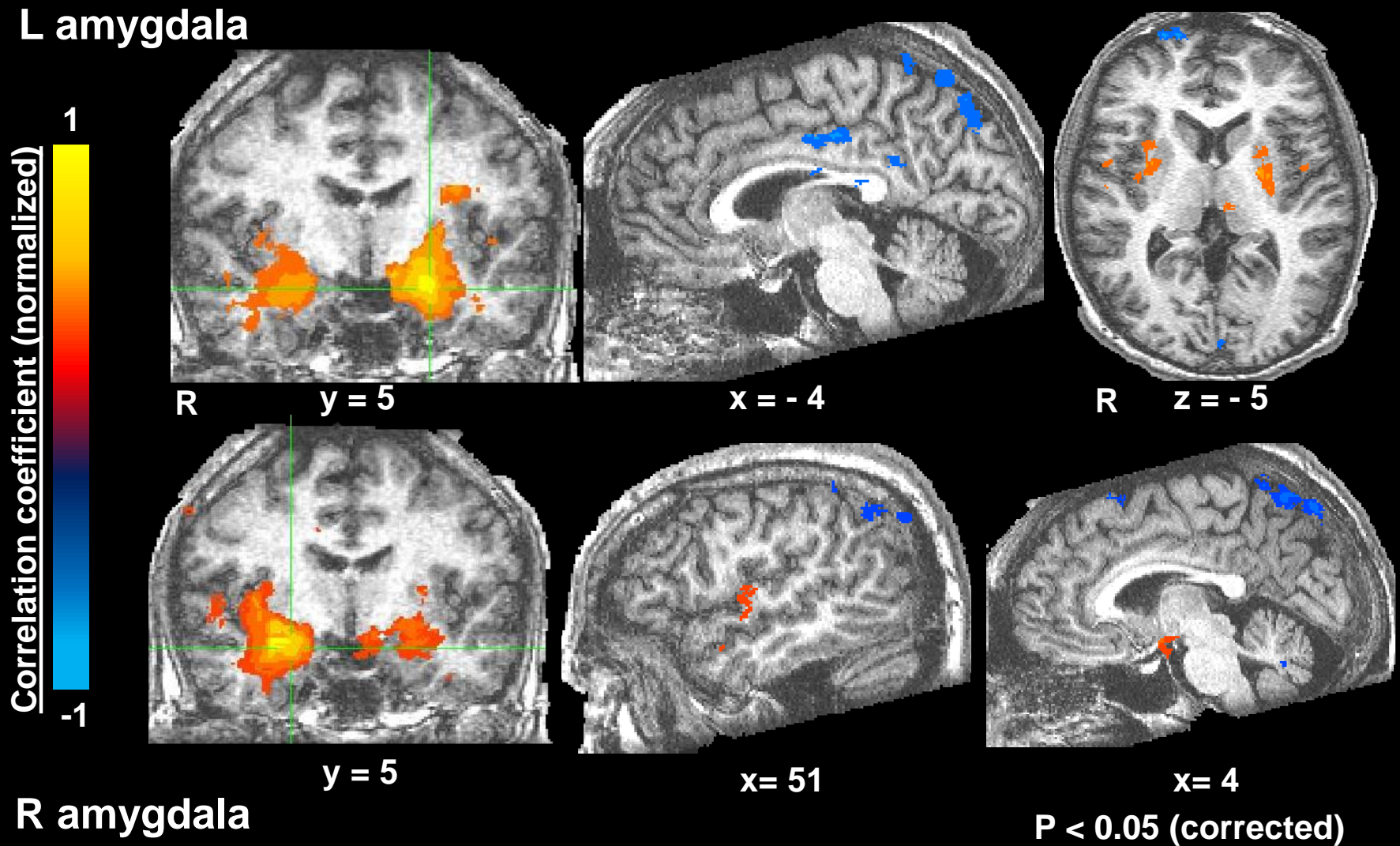
Fobia Sociale

SPECT resting state perfusion in phobics vs. controls

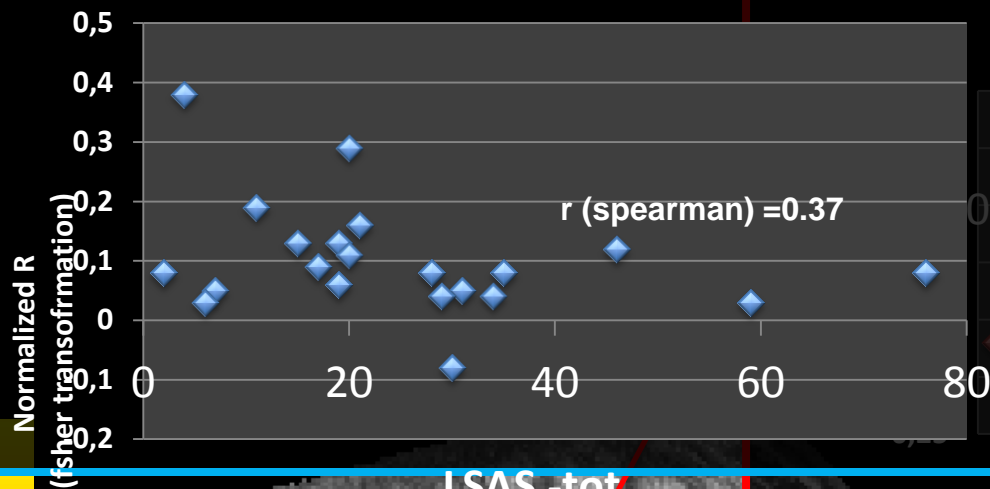


Warwik et al., 2008

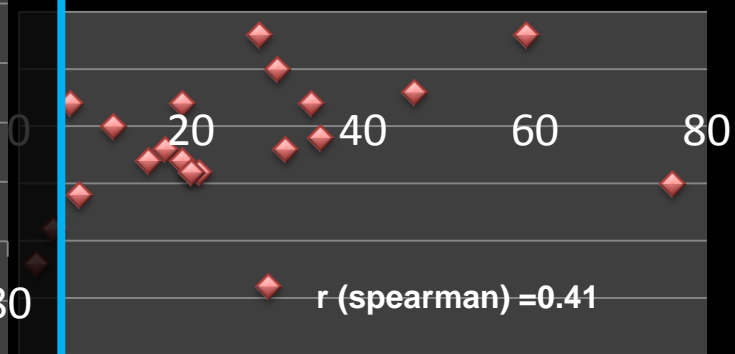
Fobia Sociale



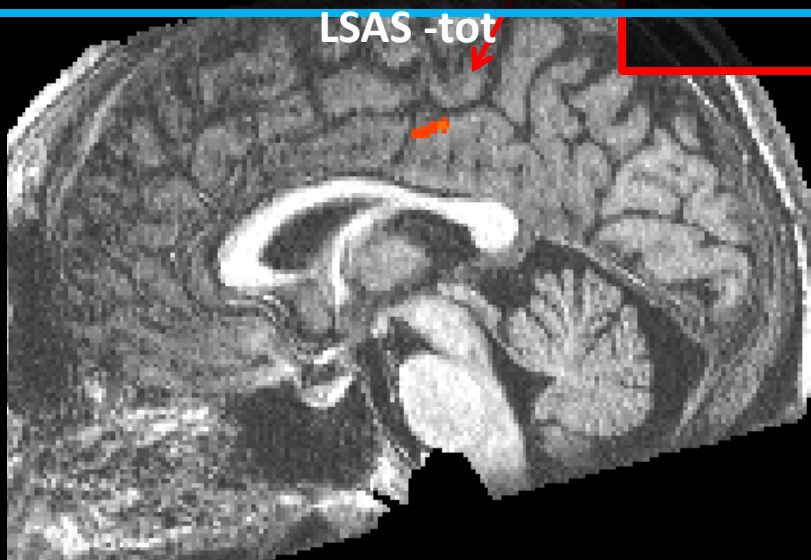
LAM - RAM



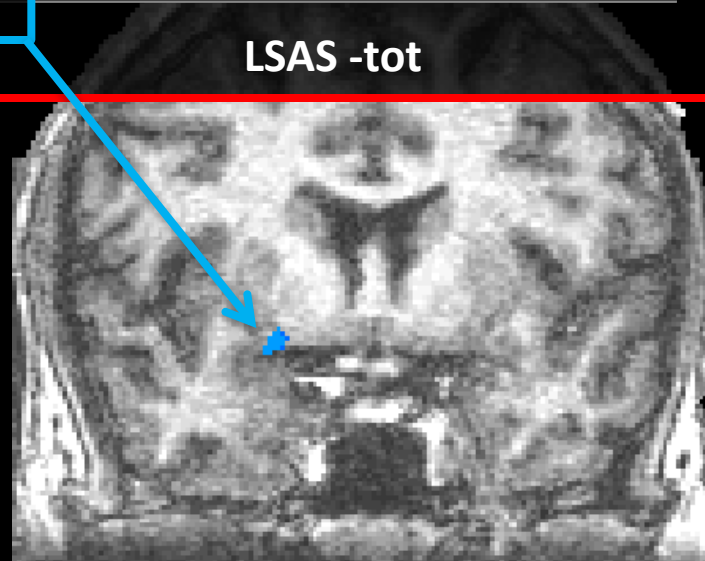
LAM - PCC



T value



$x = -1$

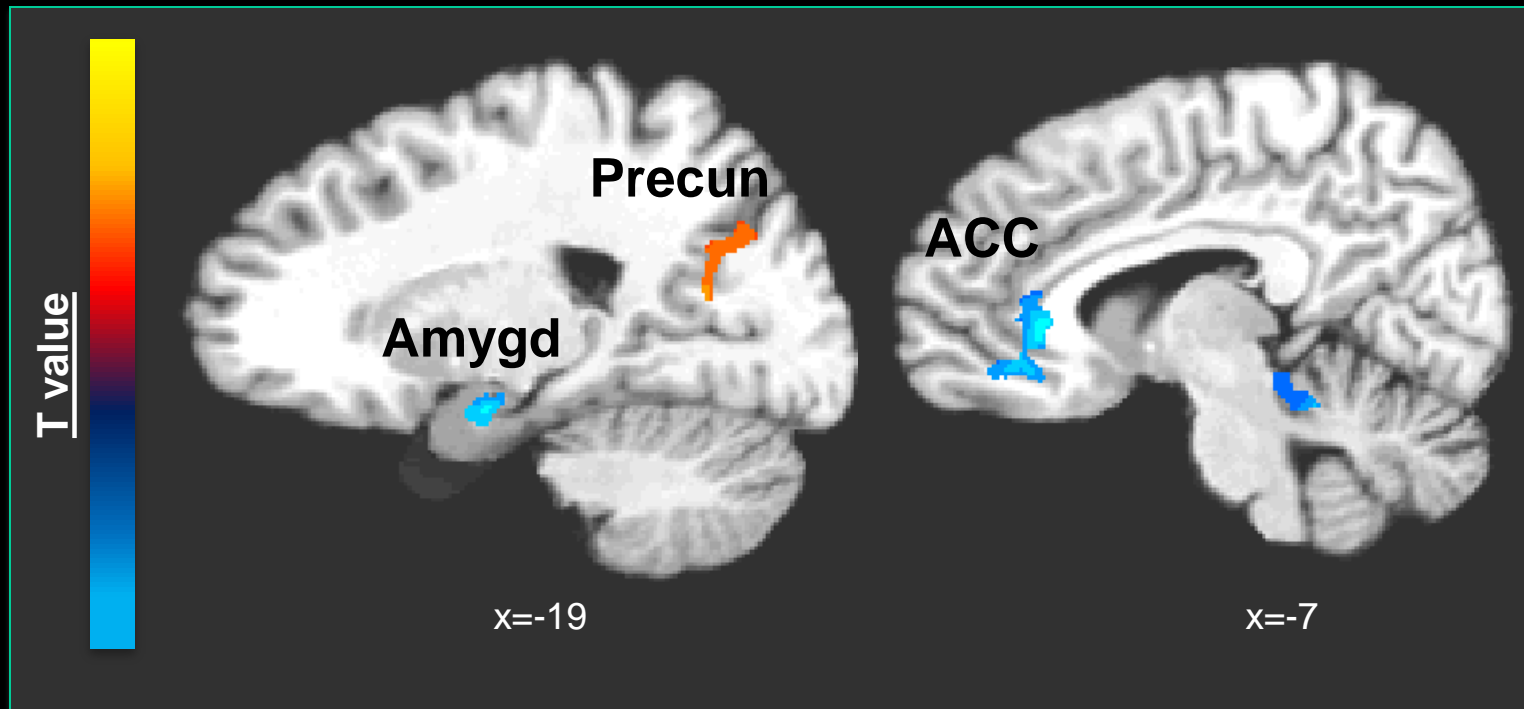


$y = 1$

$p < 0.001$ (corrected)

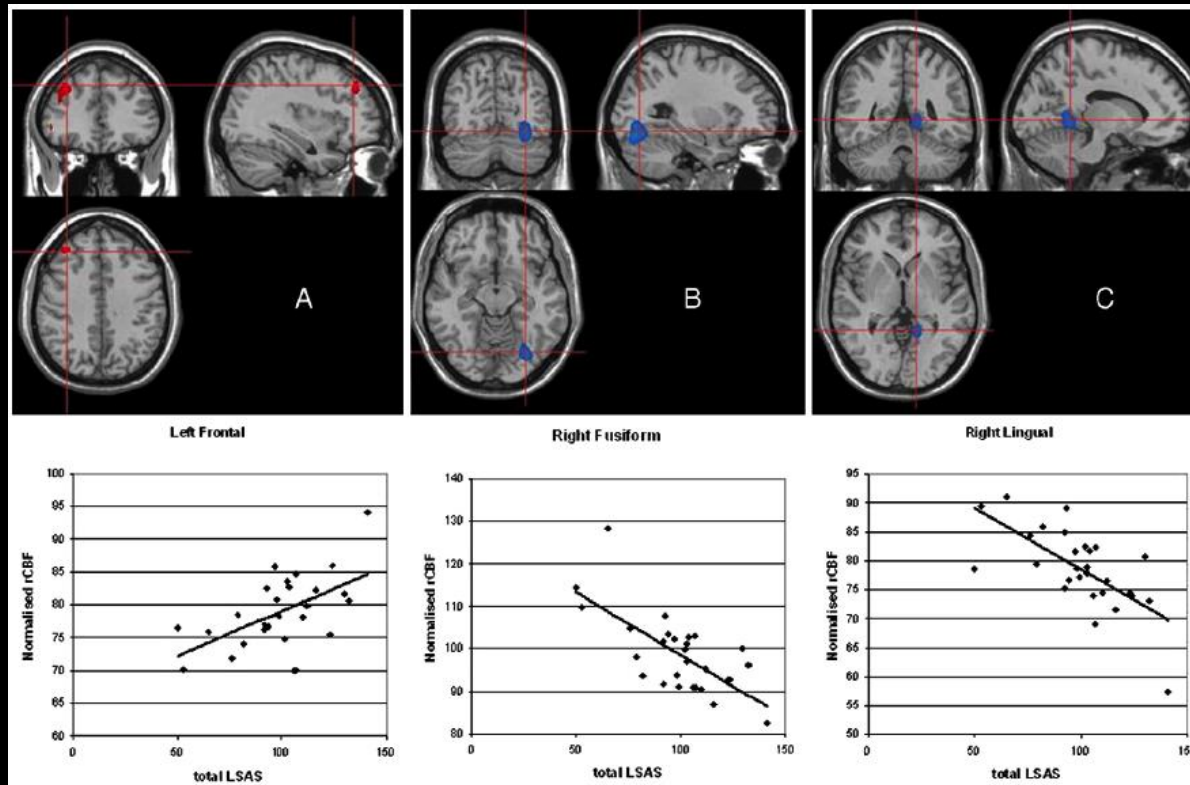
Fobia Sociale

Hurst Exponent measurements and LSAS from controls to phobics



Fobia Sociale

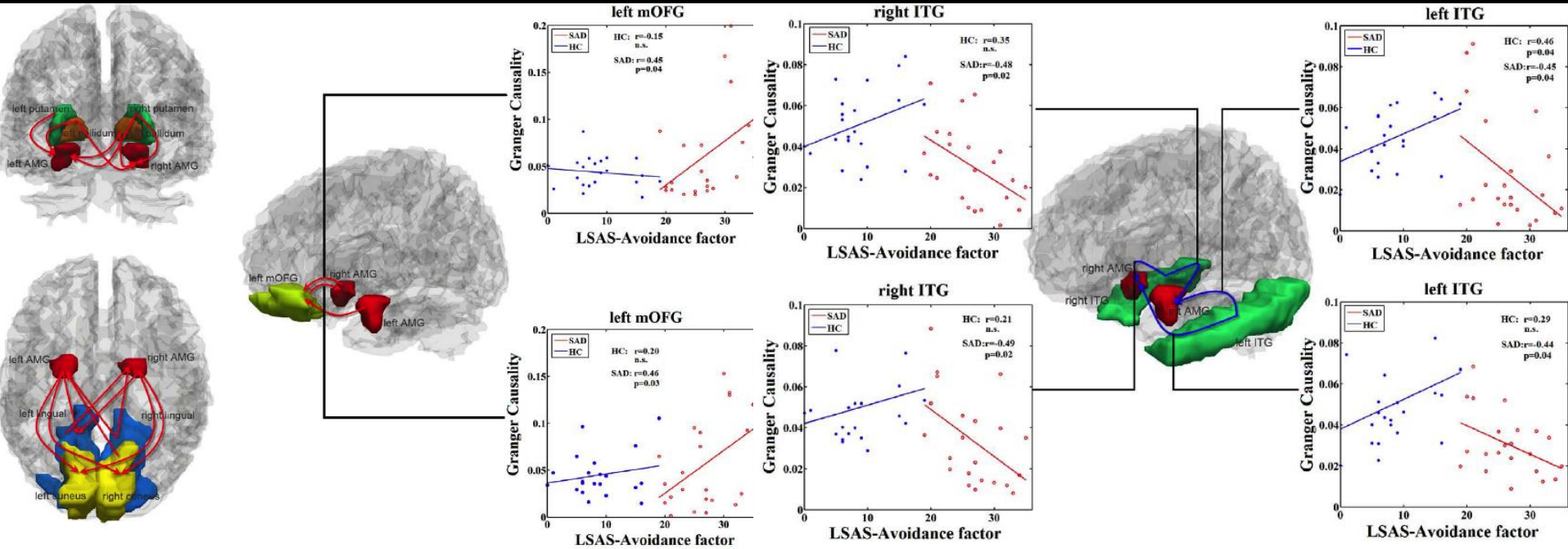
SPECT resting state perfusion in Social phobia and LSAS scores



Warwik et al., 2008

Fobia Sociale

Granger causality measures and LSAS in phobics and controls



Liao et al., 2010



**Amygdala, insula,
anterior cingulate**

Disregolazione
emozionale

Birbaumer et al., 1998
Stein et al., 2002
Amir et al., 2005
Gentili et al., 2008

Aree visive e attenzionali

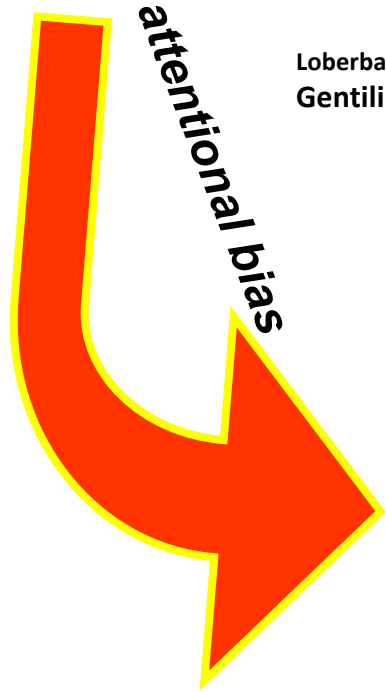
(DLPFC, inferior parietal lobule)

Disregolazione dei network attentivi e attenzionali

Loberbaum et al., 2004
Gentili et al., 2008



attentional bias



Precuneus, resting state networks

self-focused attention

Gentili et al., 2009
Danti, Gentili, et al., 2010
Liao, Gentili et al., 2010

