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

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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
“...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
il ruolo dello sguardo

Hari et al., 2009
face perception...selectivity?

IOG

STS

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

Kaye Horley\textsuperscript{a,b,*}, Leanne M. Williams\textsuperscript{b,c}, Craig Gonsalvez\textsuperscript{a}, Evian Gordon\textsuperscript{b,d}
face perception...selectivity?

McCarthy et al.  
J Cog Neurosci, 1997

Kanwisher et al.  J Neurosci, 1997

3a. Faces > Objects

% signal change

Time (seconds)
face perception...selectivity?

Gautier, et al., 1999
face perception...selectivity?

Gautier, et al., 2000
Bruce & Young model for face recognition

Expression Analysis

Facial Speech Analysis

Directed Visual Processing

Cognitive System

Structural Encoding
- View-centered descriptions
- Expression-independent descriptions

Face Recognition Units

Person Identity Nodes

Name Generation
A Distributed Neural System for Face Perception

Inferior Occipital Gyri
Early perception of facial features

Inf. Occipital Gyri
Early perception of facial features

Superior Temporal Sulcus
Changeable aspects of faces – perception of eye gaze, expression, and lip movement

Lateral Fusiform Gyrus
Invariant aspects of faces – perception of unique identity

Core System: Visual Analysis

Intraparietal Sulcus
Spatially-directed attention

Auditory Cortex
Prelexical speech perception

Amygdala, Insula, Limbic System
Emotion processing, emotional response

Anterior Temporal
Personal identity, name, biographical information

Extended System: Further Processing in Concert with other Neural Systems

Haxby and Gobbini, 2001
Lo studio delle mamme

Proprio figlio

Amici del figlio

sconosciuto
Giro fusiformi

- sconosciuti > propri > familiari

\[
p < 0.025
\]
amigdala

- sconosciuto > proprio > familiare

\[ p < 0.025 \]
theory of mind

Frith et al., 2003

Carrington et al., 2009
mirror neuron system

Iacoboni et al., 2006
Perceived 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

Bonini & Ferrari 2011
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

Zaki et al., 2007
Fobia sociale

Birbaumer et al, 1998
La percezione dei volti con espressioni emotive è seguita da una attivazione differenziale rispetto ai controlli di: amigdala (Birbaumer et al. 1998; Stein et al. 2002; Kilgore et al., 2005; Phan et al., 2006) uncus, giro paraippocampale (Stein et al. 2002) cingolato anteriore (Amir et al. 2005) gli studi disponibili.

Fobia sociale
Fobia sociale

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

Furmark et al. 2005
Percezione di paura

Breiter et al, 1999
prestational anxiety

fear of negative evaluation

MASC (Multidimensional Anxiety Scale for Children)

Killgore et al., 2005
Fobia Sociale

Luan Phan et al., 2006

pt > controls
Fobia Sociale

Veramente neutro?

Cooney et al., 2006
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.
Fobia Sociale
Gentili C, Gobbini MI, Ricciardi E, Vanello N, Pietrini P, Haxby JV, Guazzelli M.

Fobia Sociale
Fobia Sociale

Loberbaum et al., 2004
Neuroanatomia dell’autismo

Amaral et al., 2008
“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
nei pazienti con il precuneo del “default mode network” rimane più attivo durante la valutazione del proprio stato d’animo e delle emozioni di interazione sociale.

Fobia Sociale
Is Social Phobia a "Miscommunication" Disorder? Brain Functional Connectivity during Face Perception Differs between Patients with Social Phobia and Healthy Control Subjects.
Is Social Phobia a "Mis-Communication" Disorder? Brain Functional Connectivity during Face Perception Differs between Patients with Social Phobia and Healthy Control Subjects.

Danti S, Ricciardi E, Gentili C, Gobbini MI, Pietrini P, Guazzelli M.
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).

Liao et al., 2010
Fobia Sociale

SPECT resting state perfusion in phobics vs. controls

Warwik et al., 2008
Fobia Sociale

L amygdala

Correlation coefficient (normalized)

R amygdala

P < 0.05 (corrected)
**LAM - RAM**

- **T value**
- **Normalized R**
- **X** = -1

**LAM - PCC**

- **r (spearman) = 0.37**
- **r (spearman) = 0.41**

**LSAS - tot**

- **p < 0.001 (corrected)**
Fobia Sociale

Hurst Exponent measurements and LSAS from controls to phobics
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
Aree visive e attenzionali
(DLPFC, inferior parietal lobule)
Disregolazione dei network attentivi e attenzionali

Precuneus, resting state networks
self-focused attention

Amygdala, insula, anterior cingulate
Disregolazione emozionale

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

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

Attentional bias

emotional hyperarousal