



# Crossed obsessive-compulsive personality disorder and impaired theory of mind in temporal lobe epilepsy

Annalisa Parente<sup>1</sup> · Irene Pappalardo<sup>1</sup> · Flavio Villani<sup>1</sup> · Anna Rita Giovagnoli<sup>1</sup>

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## Abstract

People with epilepsy often suffer psychiatric symptoms or exhibit maladaptive personality characteristics which can impact them more than seizures. This case illustrates a selective association of a Theory of Mind dysfunction, including an impaired comparison of reality and others' behavior, with an obsessive-compulsive personality disorder in a patient with left temporal lobe epilepsy and crossed cognitive functions. The patient revealed visual memory deficits and impaired interpretation of other people's behavior, mental rigidity, and a tendency to formulate inflexible judgements. Moreover, she shows impairment in understanding and sharing the emotional states of others in reference to herself (Empathic Quotient); her social relations are limited to her parents. Patients with right temporal lobe epilepsy frequently report persistent and rigid actions and thoughts, and this can have substantial psychological and social consequences for everyday life. We suggest that this could be a case of crossed cognitive functions, in particular ToM, and crossed psychobehavioral functions linked to right-hemisphere damage.

**Keywords** TLE · Obsessive-compulsive personality disorder · Theory of Mind · Crossed cognitive functions

## Introduction

Behavioral changes in patients with epilepsy have been observed for many years. Early studies suggest a relationship between epilepsy and the development of maladaptive personality characteristics such as obsessive traits, particularly in temporal lobe epilepsy (TLE) patients [1]. Many clinical studies demonstrated a relationship between obsessive-compulsive disorder (OCD) and TLE, supporting the hypothesis that there are, at least in some cases, common pathophysiological components [2]. Some TLE patients experience

involuntary obsessive thoughts that are very similar to those typically observed in OCD. Conversely, other studies have reported the presence of electroencephalographic (EEG) abnormalities in OCD patients that are very similar to those of TLE patients. The temporolimbic and amygdalar dysfunction anatomofunctional hypothesis of OCD is supported by EEG, neuropsychological, and neuroimaging data [3]. The hemispheric dysfunction model of OCD is based on the hypothesis that right-hemisphere hypoactivity would result in an altered information integration and misinterpretation of neutral external stimuli [3]. Functional magnetic resonance imaging (fMRI) studies have revealed that the right temporo, limbic, and amygdalar regions are consistently activated in OCD patients, but not in healthy subjects, in response to several significant and specific stimuli [4]. Individuals with obsessive-compulsive personality disorder (OCPD) exhibit cognitive impulsivity, inflexibility, and disinhibition [2], which may impact upon their ability to interact with others and ultimately disrupt social functioning. Social abilities include social cue interpretation, emotion perception, attributional style, and Theory of Mind (ToM) that is an ability to attribute others' mental states, such as desires, intentions, and beliefs, allowing to predict or explain their behavior. Personality disorder traits may negatively impact upon these abilities and epilepsy patients are particularly exposed to this risk. Several case studies

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✉ Annalisa Parente  
annalisa.parente@istituto-besta.it

Irene Pappalardo  
irmpappalardo@gmail.com

Flavio Villani  
flavio.villani@istituto-besta.it

Anna Rita Giovagnoli  
annarita.giovagnoli@istituto-besta.it

<sup>1</sup> Department of Diagnostics and Applied Technology, Fondazione IRCCS Istituto Neurologico Carlo Besta, Via Celoria 11, 20133 Milan, Italy

detailed the co-occurrence of epilepsy and OCD [5], while others revealed altered ToM in epilepsy patients [6], but no studies referred to the co-occurrence of OCPD and impaired ToM in TLE patients. The possible involvement of the right temporal lobe in OCPD remains controversial. We report on the case of a patient with drug-resistant left TLE, with right-hemisphere dominance for language, affected by OCPD and impaired ToM and visual memory.

## Case study

L.F. is a 34-year-old, right-handed woman with negative medical and family history concerning neurological or psychiatric diseases. She had febrile seizures at the age of 6 months, in one case followed by prolonged right-limb hemiparesis. At age 2, she started to experience complex partial seizures, sometimes followed by convulsions. Despite an antiepileptic poly-therapy (phenobarbital, valproic acid, carbamazepine, lamotrigine, clobazam, levetiracetam), she never reached seizure control. She complained of monthly seizures characterized by epigastric sensation followed by staring, slowed speech, oral automatisms, and right-hand dystonia that completely solved in few seconds, with contemporary full awareness of these events. Furthermore, she reported sporadic and brief episodes of initial autoscopia followed by unresponsiveness. EEG showed inter-ictal and ictal epileptic activity on the left temporo-mesial region. MRI revealed a left mesial-temporal sclerosis, while fMRI documented right-dominance hemisphere for language. Neuropsychological tests assessed distinct cognitive functions [6]. ToM was analyzed using the Faux Pas test (FPT) [6] that asks a subject to read 10 stories containing a social faux pas (FP) and 10 stories containing minor conflicts but no FP. The Millon Clinical Multiaxial Inventory III (MCMI-III) [7] provided information on personality prototypes, characterological patterns, and behaviors. The Social Network Scale (SNS) [8] was used to evaluate the number of social relations, and the Empathic Quotient (EQ) [9] assessed empathy. Neuropsychological assessment only revealed visual-spatial memory impairments (Table 1). The FPT showed ToM impairments, especially the capacity to exclude non-existent faux pas. FP comprehension was also impaired: the answers to the four questions denoted poor flexibility and a trend towards intellectualization and emotional detachment. The MCMI-III Base Rate (BR) score was higher than 88, denoting a definite OCPD. The anxiety symptomatology BR score was higher than 80 (Fig. 1). The EQ score was significantly lower in comparison with controls, which is typical of Asperger syndrome [8] (Table 1). The SNS revealed very limited social relationships: no contacts with next-door families (score 0), no friends (score 0), with social relations limited to parents and sister (score 21).

**Table 1** Neuropsychological and Social aspects

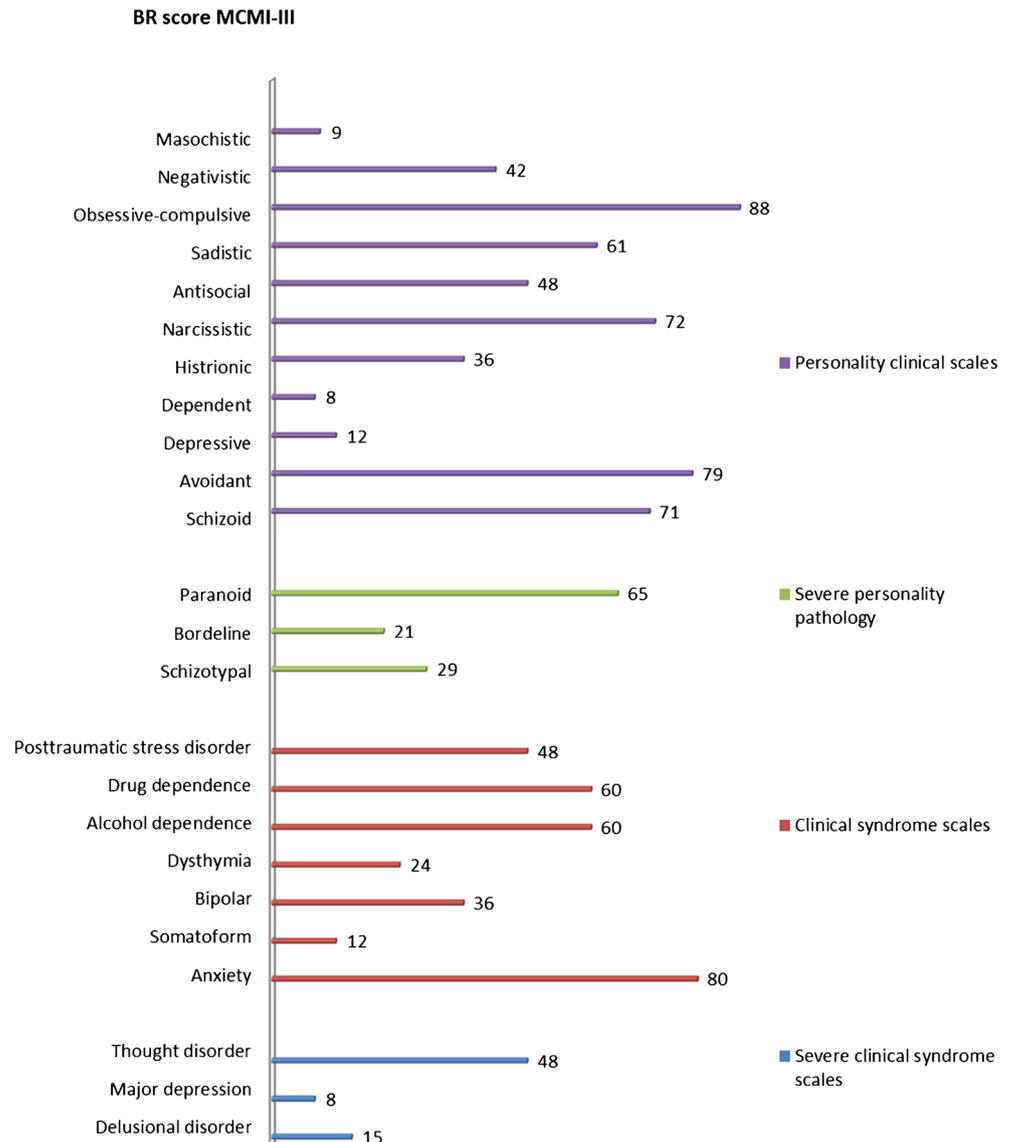
	Score	Cutoff*
Word fluency with cue semantic	60	25
Naming test	57	48
Digit Span	7	3.75
Shot Story	18	8
Rey Auditory Verbal Learning Test		
Immediate recall	66	28.53
Delete recall	14	4.69
Corsi blocks span	4	3.5
Recall Rey Copy	11	9.47
Corsi blocks supraspan	17.28	5.75
Street Completion Test	7	2.25
Benton line	21	19
Rey's complex figure recall	35	28.88
Raven's colored progressive matrices	34	18
Tower of London	30	26.54
Word fluency with cue phonemic	49	17
Attentive matrices	60	31
Trail Making Test A	24	93
Trail Making Test B	32	282
Faux pas	10	9.16**
Non-existent Faux pas	5	9.14**
Empathic Quotient	27	33***

\*The cutoff values are derived from the data of different samples of healthy subjects

\*\*The cutoff values are derived from Giovagnoli et al. 2013 [10]

## Discussion

The development of specific personality characteristics in epilepsy patients is a broad yet unexplored field. L.F. was intelligent, punctual, and efficient at work, but suffered from high levels of anxiety; she had no friends and, in general, had few social relations. Relational inflexibility and impaired recognition of others' mental states emerged at the FPT: even markedly neutral behaviors were seen as source of judgment and distress. The TLE patients with impaired ToM usually show reduced FP identification but generally recognize non-existent FP [6]. The co-occurrence of OCPD may enhance the negative impact of TLE on the detection of no-existent FP. Moreover, L.F. obtained a low EQ score, suggesting impairment in understanding and sharing the emotional states of others in reference to herself. It may be argued that, in the absence of other cognitive impairments, OCPD may mark a patient's modality of mentalization. L.F. showed an "object mode" type of interpretation, perceiving her own thoughts as objective facts and reflection of reality, whereas, in healthy persons, the thoughts are intended as subjective judgements of reality, which allows rapid adaptation to change. To our knowledge, this is the first

**Fig. 1** Millon Clinical Multiaxial Inventory III score

study evaluating the co-occurrence of OCPD and impaired ToM in TLE. The right hemisphere may be involved in patients with OCPD or impaired ToM. Given that LF had a left MTLs and right-hemisphere dominance for language associated with selective impairment of long-term visual memory, we suggest that this could be a case of crossed cognitive functions, in particular ToM, and crossed psycho-behavioral functions linked to right-hemisphere damage.

### Compliance with ethical standards

**Conflict of interest** The authors declare that they have no conflict of interest.

**Ethical publication** We confirm that we have read the Journal's position on issues involved in ethical publication and affirm that this report is consistent with those guidelines.

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