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Ethical sensitivity in obsessive-compulsive disorder and generalized anxiety disorder: The role of reversal learning

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ABSTRACT

Background and objectives: In obsessive-compulsive disorder (OCD), amplified moral sensitivity may be related to the orbitofrontal–striatal circuit, which is also critical in reversal learning. This study examined three questions: (1) What aspects of ethical sensitivity is altered in OCD?; (2) What is the relationship between ethical sensitivity and reversal learning?; (3) Are potential alterations in ethical sensitivity and reversal learning present in generalized anxiety disorder (GAD)?
Methods: Participants were 28 outpatients with OCD, 21 individuals with GAD, and 30 matched healthy controls. Participants received the Ethical Sensitivity Scale Questionnaire (ESSQ), rating scales for clinical symptoms, a reversal learning task, and the Wisconsin Card Sorting Test (WCST).
Results: We found higher ethical sensitivity scores in OCD compared with healthy controls in the case of generating interpretations and options and identifying the consequences of actions. Individuals with OCD displayed prolonged reaction times on probabilistic errors without shift and final reversal errors. Participants with GAD did not differ from healthy controls on the ESSQ, but they were slower on reversal learning relative to nonpatients. In OCD, reaction time on final reversal errors mediated the relationship between ethical sensitivity and compulsions. WCST performance was intact in OCD and GAD.
Limitations: Small sample size, limited neuropsychological assessment, self-rating scale for ethical sensitivity.
Conclusion: Prolonged reaction time at switching reinforcement contingencies is related to increased ethical sensitivity in OCD. Slow affective switching may link ethical sensitivity and compulsions.

1. Introduction

The resurgence of the increased moral sensitivity theory of obsessive-compulsive disorder (OCD) emerged as a fruitful meeting between psychodynamic and neurocognitive approaches (Freud, 1905/1955; Kempke & Luyten, 2007). Current cognitive theories posit that potentially harmful and immoral intrusive thoughts, images, or impulses elicit an inflated sense of personal responsibility, leading to compulsive behaviors, such as checking, ordering, or counting, to prevent unfavorable consequences (Salkovskis, 1985; Salkovskis, Forrester, & Richards, 1998). Mancini and Gangemi (2004) proposed that OCD is dominated by a feeling of fear of guilt that would stem from behaving irresponsibly. Patients with OCD often display dysfunctional appraisal about the power of their internal representations, believing that the mere appearance of an intrusive thought is morally the same as actions and behaviors driven by that thought (moral thought–action fusion) (Rachman, 1997; Shafran & Rachman, 2004).

Recent progress in social neuroscience may provide a direct link between these theories and the neuronal mechanisms of OCD symptoms. Harrison et al. (2012) used functional magnetic resonance imaging (fMRI) in order to measure brain activation in OCD during the processing of moral dilemmas. Relative to controls, patients with OCD displayed increased activation of the medial orbitofrontal cortex, left dorsolateral prefrontal cortex, and middle temporal gyrus. Critically, the global severity of OCD symptoms predicted the extent of activation in the orbitofrontal–striatal system during the processing of moral dilemmas, which is broadly consistent with the common pathophysiological and functional neuroanatomical models of the illness (Evans, Lewis, & Iobst, 2004; Harrison et al., 2012; Menzies et al., 2008).

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From a neuropsychological point of view, reversal learning is one of the most promising tools to investigate the functional integrity of the orbitofrontal–striatal system in OCD (Chamberlain et al., 2008; Freyer et al., 2011; Remijnse et al., 2006, 2009; Valerius, Lumpp, Kuelz, Freyer, & Voderholzer, 2008). Remijnse et al. (2006) used fMRI to study brain responses during reversal learning and “affective switching”, when participants changed their behavior by reversing reward-punishment contingencies in a simple visual discrimination task (i.e., choosing a cartoon tie over a bus and vice versa). When decisions were followed by reward, patients with OCD exhibited decreased activation of right orbitofrontal cortex and caudate nucleus compared with controls. Similarly, lower activations were found during reversal in the left orbitofrontal cortex, dorsolateral prefrontal cortex, and insula. Chamberlain et al. (2008) demonstrated reduced activation of the lateral orbitofrontal cortex not only in OCD patients, but also in their healthy biological relatives, providing evidence that changes during reversal learning may be an endophenotype. At the behavioral level, results are mixed with varying degrees and types of accuracy and reaction time deficits on reversal learning tasks in OCD (Freyer et al., 2011; Remijnse et al., 2006, 2009; Valerius et al., 2008).

The consideration of external contingencies and corrective feedback from the social environment, as it is modeled in reversal learning and affective switching, have a vital role in moral behavior, and this process is linked to different regions of the prefrontal cortex (Sinnott-Armstrong, 2008). For example, individuals with moral deficiency and antisocial traits consistently show reversal learning impairments and abnormal ventromedial prefrontal cortex functions during the task (Budhani, Richell, & Blair, 2006; Finger et al., 2008). Braun, Léveillé, and Guimond (2008) reported neurological patients with lesions to the orbitofrontal and striatal regions who exhibited either antisocial or OCD-like symptoms. Altogether, these results suggest that the orbitofrontal–striatal system may play a role in disorders associated with altered moral sensitivity, including antisocial personality disorder at one extreme, and perhaps OCD at the other.

Despite the fact that the results cited above revealed that responses to moral dilemmas, reversal learning, and OCD symptoms might share a common neuronal circuit in the orbitofrontal–striatal system (Harrison et al., 2012; Remijnse et al., 2006), and this neuronal network is important in moral sensitivity in general (Braun et al., 2008; Budhani et al., 2006; Finger et al., 2008), there has been no attempt to examine the relationship between basic neuropsychological functions and different aspects of ethical sensitivity in OCD. In addition, the definition of moral and ethical functions is less exactly delineated in the clinical and neuropsychological literature.

According to Narvaez’s concept (Narvaez, 2005; Narvaez & Endicott, 2009), moral behavior is based on four domains of skills and attitudes: ethical sensitivity, ethical judgment, ethical motivation, and ethical action. The first of these domains, ethical sensitivity, refers to the ability to recognize and understand ethical problems, to deal with conflicts empathically, and to evaluate the consequences of actions. Ethical sensitivity is therefore not a uniform construct, including at least seven areas of skills: (1) *Reading and expressing emotions* means understanding and identifying emotional expressions, as well as learning how to appropriately express emotions and manage aggression in different contexts. (2) *Taking the perspectives of others* refers to the ability to use an alternative perspective, for example, that of other persons from a distinct cultural group or with a different socioeconomic status. (3) *Caring by connecting to others* involves transcending self-interests and providing care to others. (4) *Working with interpersonal and group differences* includes perceiving and adjusting to diversity and multicultural adaptation. (5) *Preventing social bias* involves identifying and countering interpersonal biases. (6) *Generating interpretations and options* refer to skills to re-evaluate routines and to find another way to act. (7) *Identifying the consequences of actions and options* refers to our abilities to reflect to the outcome of actions and behaviors and to create alternative options (Narvaez & Endicott, 2009).

The purpose of this study was to investigate Narvaez’s ethical sensitivity dimensions in OCD and to compare that with reversal learning performance. We hypothesized that, relative to healthy controls, patients with OCD would not show a homogeneously increased ethical sensitivity; instead, we expected higher values in ethical sensitivity dimensions that require enhanced monitoring and controlling capacity (generating interpretations and identifying the consequences of actions). We also hypothesized a relationship between ethical sensitivity and reversal learning. This hypothesis was based on the similarity of brain activation patterns during moral dilemma processing and reversal learning in OCD (Harrison et al., 2012; Remijnse et al., 2006), the fact that individuals with moral deficiency and antisocial traits show abnormal reversal learning and ventromedial prefrontal cortical activation (Budhani et al., 2006; Finger et al., 2008), and the finding that damage to the orbitofrontal–striatal system may be associated with both antisocial traits at one extreme and OCD at the other (Braun et al., 2008). The prediction was that higher ethical sensitivity would be associated with a tendency to less readily change response contingencies in the reversal learning task in OCD, a sign of behavioral rigidity and indecisiveness. Perfectionism, concern about mistakes, and indecisiveness are significantly associated (Taylor, 1998).

In order to evaluate the specificity of the findings, we also included a group of individuals with generalized anxiety disorder (GAD) and examined the possibility that the expected alterations in OCD were mere consequences of anxiety and depressive symptoms.

2. Materials and methods

2.1. Participants

We enrolled 28 outpatient individuals with OCD (obsessions with checking compulsions: $n = 11$; contamination obsessions with washing and cleaning compulsions: $n = 9$; symmetry obsessions with ordering, arranging, and counting compulsions: $n = 8$), 21 outpatients with GAD, and 30 matched healthy controls at the National Psychiatry Center, Budapest, Hungary. Individuals with OCD and GAD were outpatients who received treatment and regular follow-up at the Center coordinated by A.N. The main type of OCD symptoms, as enlisted above, was defined by the treating clinician. Full medical records were available from all patients. Controls were enrolled via email and community networks, or they were acquaintances of the hospital staff. Healthy controls did not meet the diagnostic criteria of Axis I mental disorders as revealed by structured interviews (SCID-CV, see later at assessments) and medical history obtained during a screening interview. All patients received antidepressant medications (selective serotonin reuptake inhibitors and clomipramine). The demographic and clinical characteristics are summarized in Table 1. We used the following psychological and clinical instruments to characterize the participants: the Structured Clinical Interview for DSM-IV Axis I Disorders – Clinician Version (SCID-CV) (First, Spitzer, Gibbon, & Williams, 1996), the Yale-Brown Obsessive Compulsive Scale (YBOCS) (Goodman et al., 1989), the Hamilton Depression Rating Scale (HAM-D) (Hamilton, 1960), the Hollingshead Four-Factor Index for socioeconomic status (Hollingshead, 1975), the Wechsler Abbreviated Scale of Intelligence (WASI) (Wechsler, 1999), and the Wisconsin Card Sorting Test (WCST) (Heaton, Chellune, Talley, Kay, &