

Capacity to Delay Reward Differentiates Obsessive-Compulsive Disorder and Obsessive-Compulsive Personality Disorder

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Background: Although the relationship between obsessive-compulsive disorder (OCD) and obsessive-compulsive personality disorder (OCPD) has long been debated, clinical samples of OCD (without OCPD) and OCPD (without OCD) have never been systematically compared. We studied whether individuals with OCD, OCPD, or both conditions differ on symptomatology, functioning, and a measure of self-control: the capacity to delay reward.

Methods: Twenty-five OCD, 25 OCPD, 25 comorbid OCD + OCPD, and 25 healthy control subjects completed clinical assessments and a validated intertemporal choice task that measures capacity to forego small immediate rewards for larger delayed rewards.

Results: OCD and OCPD subjects both showed impairment in psychosocial functioning and quality of life, as well as compulsive behavior, but only subjects with OCD reported obsessions. Individuals with OCPD, with or without comorbid OCD, discounted the value of delayed monetary rewards significantly less than OCD and healthy control subjects. This excessive capacity to delay reward discriminates OCPD from OCD and is associated with perfectionism and rigidity.

Conclusions: OCD and OCPD are both impairing disorders marked by compulsive behaviors, but they can be differentiated by the presence of obsessions in OCD and by excessive capacity to delay reward in OCPD. That individuals with OCPD show less temporal discounting (suggestive of excessive self-control), whereas prior studies have shown that individuals with substance use disorders show greater discounting (suggestive of impulsivity), supports the premise that this component of self-control lies on a continuum in which both extremes (impulsivity and overcontrol) contribute to psychopathology.

Key Words: Delay discounting, impulsivity, obsessive-compulsive disorder, obsessive-compulsive personality disorder, self-control, temporal discounting

The relationship between obsessive-compulsive disorder (OCD) and obsessive-compulsive personality disorder (OCPD) has long been debated, yet clinical samples of OCD (without OCPD) and OCPD (without OCD) have never been systematically compared. Prevalence and familiarity data support a relationship between the disorders: elevated rates of OCPD (23% to 35%) in subjects with OCD (1–3) (in comparison with rates of OCPD of 1% to 7% in community samples) (1,4,5) and greater frequency of OCPD in first-degree relatives of OCD probands compared with relatives of control probands (6,7). The overlap in some symptom presentations of OCD (e.g., incompleteness symptoms/not just right experiences) with perfectionism in OCPD can make it difficult to differentiate these disorders based on phenotype alone. A clinical guideline that has traditionally been used to distinguish the disorders is based on patients' experience of their symptoms: in OCD, obsessions are considered intrusive, distressing, and generally ego-dystonic; OCPD traits and symptomatic behaviors are generally considered ego-syntonic and are viewed by affected individuals as

appropriate and correct. Advances in cognitive neuroscience now make it possible to evaluate the relationship between these disorders based on domains of neural functioning.

One core distinction between OCD and OCPD may be in the domain of self-control. Self-control has been defined as "the ability to evaluate and subsequently respond flexibly in search of a specific goal or outcome under changing environmental conditions" (8). Diminished self-control (i.e., impulsivity) is thought to have several potentially dissociable cognitive dimensions: 1) an inability to forego an immediate smaller reward in favor of a delayed larger reward (delay discounting); 2) an inability to use available information to reflect on the consequences of actions; and 3) a deficit in suppressing prepotent motor responses (9,10). Much has been learned about impulsivity and its role in mental disorders such as substance use disorders, pathological gambling, attention-deficit/hyperactivity disorder, and borderline personality disorder. Excessive self-control (or overcontrol) has also been linked to negative outcomes, including social isolation, poor interpersonal functioning, perfectionism, rigidity, and lack of emotional expression (11). However, research has not focused on how excessive self-control contributes to the development and maintenance of psychopathology.

Based on its phenotype of perfectionism, a desire to control one's environment and cognitive and behavioral inflexibility (12), OCPD appears to be characterized by excessive self-control. The aim of the present study was to compare individuals with OCD (without OCPD) with individuals with OCPD (without OCD) for the first time on symptomatology, psychosocial functioning, and one dimension of self-control: the capacity to delay reward (13). To assess the capacity to delay reward, we used a validated intertemporal choice task that measures capacity to forego small immediate rewards for larger delayed rewards. On this task, individuals have been shown to differ in the rate at which they discount future rewards (discount factor) (14), which is stable over

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time and trait-like (15). Greater delay discounting (lower discount factor) has been associated with impulsivity in psychiatric illnesses such as substance use disorders (16) and borderline personality disorder (17). Moreover, functional neuroimaging studies of delay discounting in healthy individuals have shown that limbic regions, including the ventral striatum and ventromedial prefrontal cortex, are preferentially activated by decisions involving immediately available rewards, whereas activations of the dorsolateral prefrontal cortex (DLPFC) and parietal cortex are associated with selections of larger, delayed rewards (18). We chose to focus on this component of impulsivity because a recent study (19) demonstrated excessive capacity to delay reward using a delay discounting paradigm in patients with the restricting subtype of anorexia nervosa, who are known to have high rates of OCPD (20). Given the descriptive phenotype of OCPD and our clinical experience with these patients, we hypothesized that individuals with OCPD, both with and without comorbid OCD, would show increased capacity to delay reward compared with both healthy control subjects and individuals with OCD. We also hypothesized that individuals with OCPD would show impairment in psychosocial functioning and quality of life, comparable with those with OCD.

Methods and Materials

Overview

The institutional review board of the New York State Psychiatric Institute/Columbia University approved the study, and subjects provided written informed consent before testing. Subjects were recruited by advertisements, our clinic website, clinician referral, and word of mouth. All study procedures occurred on 1 day.

Participants

Participants were adult outpatients (ages 18 to 60) who presented to the Anxiety Disorders Clinic at New York State Psychiatric Institute/Columbia University. Eligible subjects had no significant medical problems and no current or past neurological disorder. Participants were excluded for prominent suicidal ideation, drug or alcohol abuse in the last 6 months, and lifetime mania, psychosis, and substance dependence. A total of 100 volunteers participated, grouped by principal diagnosis: 1) Twenty-five individuals who met DSM-IV OCD criteria with clinically significant symptoms (as defined by Yale-Brown Obsessive Compulsive Scale [Y-BOCS] total score ≥ 16) and had no history of OCPD. OCD subjects with principal hoarding symptoms were excluded. OCD was the only current Axis I diagnosis for 19 (76%) OCD subjects, while 3 had a comorbid depressive disorder (major depressive disorder, dysthymia) and 4 had a co-occurring anxiety disorder (generalized anxiety disorder, panic disorder, specific phobia). 2) Twenty-five individuals who met DSM-IV OCPD criteria and had no history of OCD. No current Axis I diagnosis was present in 13 (52%) OCPD subjects; 12 had a co-occurring anxiety disorder (generalized anxiety disorder, specific phobia, social phobia). OCPD was the only Axis II diagnosis for 18 (72%) OCPD subjects; 7 also met criteria for avoidant personality disorder. 3) Twenty-five individuals who met DSM-IV criteria for OCD with clinically significant symptoms (as defined by Y-BOCS total score ≥ 16) and OCPD. OCD + OCPD subjects with principal hoarding symptoms were excluded. OCD was the only current Axis I diagnosis for 22 (88%) OCD + OCPD subjects, while 3 had a co-occurring anxiety disorder (generalized anxiety disorder,

specific phobia). OCPD was the only Axis II diagnosis for 23 (92%) OCD + OCPD subjects; 2 also met criteria for avoidant personality disorder. 4) Twenty-five healthy control subjects (HC) with no current or lifetime DSM-IV Axis I or II diagnoses and no exposure to psychotropic medications; none reported a history of OCD or OCPD in first-degree relatives as assessed by the Family History Screen (21). Healthy control subjects were recruited who matched the other groups on age, sex, race, and years of education.

Across the patient groups ($n = 75$), 25 (33.3%) were currently taking psychiatric medications (OCD: 52%, OCPD: 16%, OCD + OCPD: 32%); all were on a stable dose for at least 8 weeks (mean = 144.9, SD = 103.0): 18 were taking serotonin reuptake inhibitors (SRI), 6 were taking an SRI with a non-SRI (i.e., another antidepressant, $n = 3$; benzodiazepine, $n = 2$; other anxiolytic, $n = 1$), and 1 was taking a benzodiazepine alone.

Procedures

Clinical Assessment. Independent evaluators (clinical researchers with extensive experience in OCD and OCPD and trained to reliability) conducted patient assessments. Psychiatric and personality disorder diagnoses were confirmed by the Structured Clinical Interview for DSM-IV Axis I Disorders–Patient version (22) and the Structured Clinical Interview for DSM-IV Axis II Personality Disorders (SCID-II) (23), respectively. OCPD severity was operationalized as the total number of DSM-IV OCPD symptoms coded as present and clinically significant on the SCID-II. Standardized reading tests [Wechsler Test of Adult Reading (24); North American Adult Reading Test (25)] were used to provide an estimate of verbal IQ (exclusion if IQ ≤ 85).

The 17-item Hamilton Depression Rating Scale (26) was administered to assess depressive severity. For subjects with OCD, current symptoms and symptom severity were evaluated using the Y-BOCS (27) (range 0–40 with higher scores representing greater severity). In all groups, dimensional scores of obsessive-compulsive behaviors were obtained with the Obsessive-Compulsive Inventory-Revised (OCI-R) (28). In addition to the total score, six subscale scores were calculated: washing, obsessing, checking, ordering, hoarding, and neutralizing. The total score ranges from 0 to 72, and each subscale ranges from 0 to 12. The subscales have been shown to be valid indicators of severity of each behavioral dimension (29). Psychosocial functioning was assessed using the Social Adjustment Scale–Self-Report (SAS-SR) (30). The overall adjustment scale provides a total score based on six life domains: work, social and leisure, extended family, primary relationship, parental, and family unit. Quality of life was assessed using the Quality of Life Enjoyment and Satisfaction Questionnaire–Short Form (Q-LES-Q-SF) (31). The total score is expressed as a percentage of the maximum possible score of 70. Higher scores on the SAS-SR and lower scores on the Q-LES-Q-SF indicate poorer functioning and quality of life, respectively.

The demographics questionnaire provided self-report information on education, employment, and household income. Because a primary outcome measure in this study assesses decision making around monetary choices, socioeconomic status was assessed in several ways: household income, employment status, and degree of education. Household income was measured on a scale with the following categories, 1 = $< \$25,000$, 2 = $\$25,000$ to $44,999$, 3 = $\$45,000$ to $69,999$, 4 = $\$70,000$ to $100,000$, 5 = $> \$100,000$. Employment status was categorized as unemployed, employed part-time, or employed full-time. Education level was assessed both as years of education and highest level of

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