



# 'Impulsive compulsivity' in obsessive-compulsive disorder: A phenotypic marker of patients with poor clinical outcome

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## ABSTRACT

Although traditionally obsessive-compulsive disorder (OCD) and impulse control disorders (ICD) have represented opposing ends of a continuum, recent research has demonstrated a frequent co-occurrence of impulsive and compulsive behaviours, which may contribute to a worse clinical picture of some psychiatric disorders. We hypothesize that individuals with 'impulsive' OCD as characterized by poor insight, low resistance, and reduced control towards their compulsions will have a deteriorative course, greater severity of hoarding and/or symmetry/ordering symptoms, and comorbid ICD and/or substance use disorders (SUD). The sample consisted of 869 individuals with a minimum score of 16 on the Yale-Brown Obsessive Compulsive Scale (Y-BOCS). Of these, 65 had poor insight, low resistance, and reduced control towards compulsions ('poor IRC') and 444 had preserved insight, greater resistance and better control over compulsions ('good IRC'). These two groups were compared on a number of clinical and demographic variables. Individuals with poor IRC were significantly more likely to have a deteriorative course ( $p < 0.001$ ), longer duration of obsessions ( $p = 0.017$ ), greater severity of symmetry/ordering ( $p < 0.001$ ), contamination/cleaning ( $p < 0.001$ ) and hoarding ( $p = 0.002$ ) symptoms, and comorbid intermittent explosive disorder ( $p = 0.026$ ), trichotillomania ( $p = 0.014$ ) and compulsive buying ( $p = 0.040$ ). Regression analysis revealed that duration of obsessions ( $p = 0.037$ ) and hoarding severity ( $p = 0.005$ ) were significant predictors of poor IRC. In the absence of specific measures for impulsivity in OCD, the study highlights the utility of simple measures such as insight, resistance and control over compulsions as a phenotypic marker of a subgroup of OCD with impulsive features demonstrating poor clinical outcome.

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## 1. Introduction

Traditionally, obsessive-compulsive disorder (OCD) and impulse control disorders (ICD) are conceptualized as representing opposite ends of a continuum of persistent and maladaptive behaviours, with the former being high on harm-avoidance and the latter on risk-seeking traits (Fineberg et al., 2010; Stein et al., 1994). However, recent research has suggested that the relationship between the two

groups of disorders may be more complex and not mutually exclusive. Evidence exists for the presence of compulsive features in ICD (Bienvenu et al., 2000; du Toit et al., 2001; Fontenelle et al., 2005; Grant and Potenza, 2006; Matsunaga et al., 2005) and for impulsive aspects in OCD (Ettelt et al., 2007; Stein et al., 1994; Summerfeldt et al., 2004). These findings have led to the speculation that impulsivity and compulsivity may share common psychopathological and/or neurobiological mechanisms (Fontenelle et al., 2005, 2011; Matsunaga et al., 2005). The possibility of strong links between OCD and ICDs also has implications for the ongoing debate relating to the optimal classification of disorders in the upcoming classification systems. The DSM – V Anxiety, Obsessive-Compulsive Spectrum, Post-Traumatic and Dissociative Disorders Workgroup has been

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considering several disorders, including ICDs, in a potential group of Obsessive-Compulsive Spectrum Disorders (OCSs) based on shared pathophysiology, etiology, comorbidity and family prevalence rates, in order to enhance clinical assessment and treatment approaches (Phillips et al., 2010; Stein et al., 2010).

Previous research has also demonstrated that comorbid ICD in individuals with OCD is associated with a worse clinical picture, i.e., earlier age at onset, greater number and severity of symptoms, poorer insight, insidious onset of symptoms, poorer functioning and quality of life, need for a greater number of serotonin reuptake inhibitor (SRI) trials, and poorer treatment response at long-term follow-up (Fontenelle et al., 2005; Grant et al., 2006; Matsunaga et al., 2005). Individuals with OCD and ICD also more frequently endorse symptoms belonging to hoarding and symmetry dimensions (Fontenelle et al., 2005; Grant et al., 2006). Consequently, some have suggested that individuals with OCD and comorbid ICD may represent a distinct subtype of OCD (Lovato et al., 2011; Tavares and Gentil, 2007). In this context, it is important to identify those individuals who are likely to be part of this putative ‘impulsive’ subtype.

Another approach to understand the impulsive component of the OCD phenotype is to focus on impulsive features embedded in the OCD symptom expression. According to Buss and Plomin's conceptualization, impulsivity is described as ‘giving in to urges, impulses or motivational states’ as opposed to ‘resisting urges’. This concept can be investigated in OCD by focussing on the resistance and control dimensions of the Yale-Brown Obsessive Compulsive Scale (Y-BOCS). Curiously, previous studies have suggested that resistance to symptoms, together with control over symptoms (Deacon and Abramowitz, 2005), decreases the internal consistency of the Y-BOCS (Woody et al., 1995) and loads on a third factor, independently from obsessive and compulsive constructs (Boyette et al., 2011; Kim et al., 1994). Importantly, Deacon and Abramowitz (2005) demonstrated a clear double dissociation between two factors in the Y-BOCS – ‘Severity’ and ‘Resistance/Control’. The former, consisting of items 1–3 and 6–8 on the Y-BOCS, was correlated with measures of obsessions and compulsions, depression and anxiety symptoms and functional impairment, but unrelated to insight; the latter, comprising the four items related to resistance and control over obsessions and compulsions, was related only to insight and functional impairment at home, but unrelated to other clinical symptoms. Other studies have also shown that the degree of conviction in the obsessional belief (insight) is related to the individual's resistance to compulsions (Eisen et al., 1998; Grenier et al., 2010) and that all three measures, insight, resistance and control, co-vary with symptomatic improvement (Ito et al., 1995).

We propose that a subgroup of OCD patients exhibiting poor insight, reduced resistance and low control towards their symptoms (particularly compulsive behaviours), may demonstrate impulsive features that are associated with poorer clinical prognosis. It has been suggested that individuals with OCD exhibiting impulsive features may value and derive a degree of reward from their maladaptive OCD-related behaviours, and only reluctantly seek treatment (Fontenelle et al., 2011). We have attempted to isolate this specific subsyndrome within the OCD phenotype using the Y-BOCS and Brown Assessment of Beliefs Scale (BABS) items. In this study we tested the hypothesis that OCD patients with a core phenotype that resembles SUD or ICD (as shown by the combination of poor insight into illness, low resistance and reduced control over obsessive-compulsive symptoms), will have characteristic clinical features, including greater severity of hoarding and/or symmetry/ordering symptoms, deteriorative course of illness, and comorbid ICD and/or SUD.

## 2. Methods

### 2.1. Sample

The sample consisted of adult outpatients with OCD recruited from seven sites located in five Brazilian states, between August 2003 and August 2008. Subjects with DSM-IV OCD as their main psychiatric diagnosis, aged between 18 and 65 years were included; those who met criteria for schizophrenia or any other condition that could compromise their understanding of the protocol questions, or were unable to understand and provide informed consent were excluded. Informed consent was obtained from all participants, and the Ethics Committee from all participating sites approved the study. We selected subjects with a total score of at least 16 on the Y-BOCS. This is the generally accepted cutoff for clinically significant OCD warranting treatment (Frost et al., 1995). Of the 1001 subjects whose data was available, 869 subjects met this criterion.

### 2.2. Measures

A detailed description of the study methodology is available in Miguel et al. (2008). Briefly, all subjects were interviewed by trained personnel using an extensive protocol. The clinical assessment consisted of standardized instruments, as follows. The Structured Clinical Interview for Diagnosis of Axis I (SCID I) (First et al., 1997), a semi-structured interview for making major DSM-IV Axis I diagnoses, was used to confirm the diagnosis of OCD and also assess presence of other comorbid disorders. The Y-BOCS Rating Scale (Goodman et al., 1989) was used to evaluate symptom severity with scores ranging from 0 to 20 each on obsessions and compulsions. The Dimensional Y-BOCS (DY-BOCS) (Rosario-Campos et al., 2006) is a scale to evaluate severity in each of six dimensions of OCD symptoms – aggressive, sexual/religious, symmetry/ordering/counting, contamination/cleaning, hoarding, and miscellaneous. The Brown Assessment of Beliefs Scale (BABS) (Eisen et al., 1998) is a clinician-rated tool that measures insight into obsessive-compulsive symptoms on six dimensions – conviction, perception of others' beliefs, explanation of different views, fixity of ideas, attempts to disprove ideas, and insight. Each item is rated from 0 to 4, the maximum score being 24, with higher scores indicating poorer insight. All the above instruments are routinely used with OCD in clinical and research settings and have satisfactory psychometric properties.

### 2.3. Analyses

Statistical analysis was conducted using PASW Statistics (Version 18.0). We examined the association amongst insight, resistance and control using Spearman's correlation coefficient. All three variables have significant positive correlations with one another (resistance & control,  $\rho = 0.586$ ; resistance and insight,  $\rho = 0.209$ ; control and insight,  $\rho = 0.154$ ;  $p < 0.001$  for all the above). In light of these significant positive correlations as well as previous studies demonstrating a strong association amongst these variables (Deacon and Abramowitz, 2005; Eisen et al., 1998; Grenier et al., 2010; Ito et al., 1995) we selected subjects who had high scores on all three variables (‘poor IRC’), or low scores on all three variables (‘good IRC’) for our analysis based on the following cutoffs. Poor insight on the BABS was defined as a total score of 12 or more, along with a Conviction score of 3 or more (Eisen et al., 1998). Subjects were classified as having poor resistance and reduced control if they had a score of 4 each on resistance (‘Completely and willingly yields to all compulsions’) and control (‘No control, drive to perform behaviour experienced as completely involuntary and

overpowering, rarely able to even momentarily delay activity') items of the Y-BOCS. Using the above criteria we classified subjects as having poor insight, low resistance to, and reduced control over core obsessive-compulsive symptoms ('poor IRC';  $n = 65$ ), or good insight, high resistance to, and control over symptoms ('good IRC';  $n = 444$ ). Thus subjects included in the poor IRC group had scores above the defined cutoffs on all three components – insight, resistance and control, while the good IRC group consisted of subjects with scores below the cutoffs on all three components. The sample sub-groups are represented in Fig. 1. The intermediate group of patients ( $n = 360$ ) was not included in the comparative analysis.

To test our hypothesis, we compared the two groups of subjects with the data of the whole sample ( $n = 869$ ) as a point of reference. The categorical variables were expressed as absolute and relative frequencies. The continuous variables were expressed as mean  $\pm$  standard deviation. Since the Kolmogorov–Smirnov test revealed that the distribution was not normal, comparisons were performed using the Mann–Whitney  $U$  test for continuous variables, and the Chi square test for categorical variables. The level of significance was set at  $p < 0.05$  for the univariate analysis. The significant variables ( $p < 0.05$ ) were then entered into a logistic regression model (stepwise, forward likelihood ratio method) with IRC as the dependent variable.

### 3. Results

#### 3.1. Demographic characteristics

The final sample of 869 individuals comprised predominantly young Caucasian adults of which slightly more than half was female. The demographic characteristics of the whole sample and comparisons between individuals with good and poor IRC are represented in Table 1. As can be seen, the two groups did not significantly differ on age, gender, education and occupation.

#### 3.2. Clinical characteristics

Individuals who had poor IRC were characterized by greater severity of illness, longer duration of obsessions, higher scores on symmetry/ordering, contamination/cleaning and hoarding symptom dimensions, as well as a more deteriorative course of illness (Table 2). Deteriorative course was defined as a course classified either as 'chronic progressive worsening' or 'worsening with plateau'. The remaining classifications, 'continuous/chronic', 'waxing and waning', 'episodic' and 'other' were grouped as non-deteriorative course.

A between-group comparison of the prevalence of comorbid Axis I disorders revealed that individuals with poor IRC had a greater likelihood of comorbid intermittent explosive disorder, trichotillomania and compulsive buying (Table 3). We also compared the two groups on family history of SUDs [data on ICDs was not available], and found no significant differences between good IRC and poor IRC.

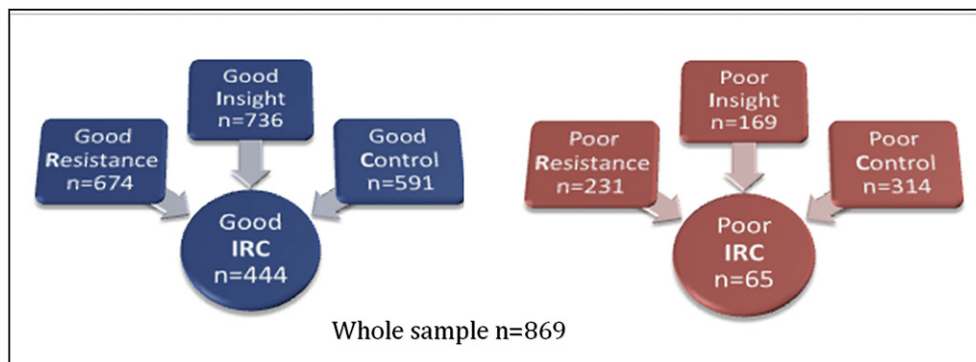
Regression analysis using all of the significant variables from the univariate analysis (i.e., Y-BOCS total score, BABS total score, duration of obsessions, current symmetry/ordering score, current contamination/cleaning score, current hoarding score, presence of deteriorative course, intermittent explosive disorder, trichotillomania, and compulsive buying) revealed that besides the Y-BOCS total and BABS total scores, only longer duration of obsessions and higher current hoarding score predicted poor IRC (Table 4).

### 4. Discussion

We speculated that individuals with poor insight, low resistance and reduced control over their obsessive-compulsive symptoms (i.e., poor IRC) might represent an "impulsive-compulsive" subtype of OCD. Accordingly, we observed that OCD patients with poor IRC were likely to have more severe illness and deteriorative course, longer duration of obsessions, and endorse symptoms belonging to symmetry/ordering, contamination/cleaning and hoarding dimensions. They also had a greater tendency to have certain ICDs such as trichotillomania, intermittent explosive disorder and compulsive buying, which are frequently reported as comorbid in OCD. These results add to previous studies suggesting that the impulsive subtype may be associated with poorer prognostic factors. The findings also underscore the utility of a simple method of identifying a possible impulsive subtype of OCD.

Our findings are largely congruent with the poorer prognostic factors observed in individuals with co-occurring OCD and ICD in other studies – lower age at onset, greater severity, poor insight, need for more SRI trials and poorer outcome with treatment (Fontenelle et al., 2005; Grant et al., 2006; Matsunaga et al., 2005).

We have earlier postulated that with progression and chronicity, some OCD behaviours may become more 'impulsive', take on a hedonic quality, and be associated with a greater involvement of ventral striatal circuits (Fontenelle et al., 2011). Our present findings demonstrate that clinical factors associated with chronicity are linked to an impulsive subtype in OCD. It has also been suggested that compulsions may often be performed automatically (Starcevic et al., 2011), in the absence of obsessional or anxiety symptoms, and may be driven by either positive or negative reinforcement (Robbins et al., 2012). There is preliminary evidence from the



**Fig. 1.** Representation of sample sub-groups. **Note:** Poor insight: BABS total score  $\geq 12$  and Conviction subscore  $\geq 3$ . If either score is below cutoff, subject classified as Good insight. Poor resistance: Score = 4 on Resistance item of Y-BOCS. Scores 0–3 classified as Good resistance. Poor control: Score = 4 on Control item of Y-BOCS. Scores 0–3 classified as Good control.

**Table 1**

Comparison of socio-demographic characteristics of patients with good and poor insight, resistance and control (IRC) over the OCD symptoms.

Variable	Good IRC (n = 444)	Poor IRC (n = 65)	Significance (p value)	Whole sample (n = 869)
Age (years) – mean (SD)	34.1 (12.6)	37.5 (13.9)	0.073	34.9 (12.8)
Gender			0.228	
Male	195 (43.9%)	23 (35.4%)		358 (41.2%)
Female	249 (56.1%)	42 (64.6%)		511 (58.8%)
Educational level			0.332	
Literate	1 (0.2%)	0 (0%)		2 (0.2%)
Basic education	46 (10.4%)	8 (12.3%)		94 (10.8%)
Intermediate education	159 (35.9%)	30 (46.2%)		335 (38.6%)
Higher education	221 (49.9%)	25 (38.5%)		390 (44.9%)
Post-graduate	17 (3.8%)	2 (3.1%)		47 (5.4%)
Occupation			0.062	
Working	195 (43.9%)	20 (30.8%)		364 (41.9%)
Retired/due to disease	43 (9.7%)	10 (15.4%)		97 (11.2%)
Student	90 (20.3%)	11 (16.9%)		151 (17.4%)
Unemployed	65 (14.6%)	17 (26.2%)		143 (16.5%)
Housewife	42 (9.5%)	7 (10.8%)		95 (10.9%)
Others	9 (2.0%)	0 (0%)		19 (2.2%)

clinical setting that some individuals with OCD display an increase in positive affect in anticipation of the realization of compulsions (Oostermeijer, 2010), raising the possibility that at least in a subset of individuals, compulsions may take on hedonic value (Fontenelle et al., 2011). Impulsivity has been linked to a ventral striatal cerebral loop, based on rodent, primate and human neuroimaging and lesion studies (Robbins et al., 2012). In the specific context of OCD, deep brain stimulation of the ventral striatum (nucleus accumbens) has been shown to improve obsessive-compulsive symptoms (Denys et al., 2010), however it has also been linked to an increase in impulsivity in a case report of two subjects (Luigjes et al., 2011). Previous studies of the neural underpinnings of compulsions with an impulsive component (hoarding behaviours) have also shown an association with ventral areas of the brain (An et al., 2009; Tolin et al., 2009). Based on evidence from the above studies, we suspect that ‘impulsive compulsions’ in OCD may be associated with

a greater involvement of ventral striatal circuits (Fontenelle et al., 2011).

Further, we found that specific symptom dimensions such as hoarding, symmetry/ordering and contamination/cleaning were associated with poor IRC. Previous studies have found that co-occurring OCD and ICD are associated with aggressive obsessions (Matsunaga et al., 2005), hoarding obsessions and compulsions, symmetry obsessions and repeating rituals (Grant et al., 2006) and counting compulsions (Fontenelle et al., 2005). While all the above studies used the Y-BOCS symptom checklist to assess presence of specific symptom dimensions, the present study used the DY-BOCS, which provides total scores for each of six symptom clusters. Interestingly in the DY-BOCS, symmetry obsessions, and ordering, arranging, counting, and repeating rituals are all grouped under the symmetry/order/arrangement dimension. Another study using the DY-BOCS has similarly found higher severity of aggressive,

**Table 2**

Comparison of clinical features of patients with good and poor insight, resistance and control (IRC) over the OCD symptoms.

Variable	Good IRC (n = 444)	Poor IRC (n = 65)	Significance (p value)	Effect size/Odds ratio	Whole sample (n = 869)
Y-BOCS <sup>a</sup> total score – mean (SD)	24.3 (4.4)	33.4 (4.8)	< <b>0.001</b>	–0.48	27.2 (5.8)
Y-BOCS obsession score – mean (SD)	12.4 (2.6)	16.1 (2.9)	< <b>0.001</b>	–0.38	13.5 (3.2)
Y-BOCS compulsion score – mean (SD)	11.9 (2.6)	17.3 (2.2)	< <b>0.001</b>	–0.52	13.7 (3.3)
Current aggression score – mean (SD)	5.5 (4.9)	5.9 (5.2)	0.513	–0.03	5.8 (5.0)
Current sexual/religious score – mean (SD)	4.4 (4.7)	4.9 (5.3)	0.616	–0.02	4.7 (5.0)
Current symmetry/ordering score – mean (SD)	7.3 (4.3)	9.3 (4.7)	< <b>0.001</b>	–0.17	7.9 (4.5)
Current contamination / cleaning score – mean (SD)	5.8 (4.9)	8.5 (5.3)	< <b>0.001</b>	–0.18	6.8 (5.1)
Current hoarding score – mean (SD)	3.1 (3.9)	5.2 (5.1)	<b>0.002</b>	–0.14	3.4 (4.2)
Course			< <b>0.001</b>	–	
Continuous/chronic	21 (4.7%)	6 (9.2%)			50 (5.8%)
Waxing & waning	165 (37.2%)	13 (20.0%)			259 (29.8%)
Episodic	68 (15.3%)	3 (4.6%)			104 (12.0%)
Worsening with plateau	48 (10.8%)	17 (26.2%)			118 (13.6%)
Chronic progressive worsening	91 (20.5%)	24 (36.9%)			251 (28.9%)
Other	51 (11.5%)	2 (3.1%)			87 (10.0%)
Deteriorative course	Present	41 (63.1%)	< <b>0.001</b>	3.75	369 (42.5%)
Onset of compulsions			0.242	–	
Abrupt	79 (17.8%)	17 (26.2%)			172 (19.8%)
Intermediate	56 (12.6%)	6 (9.2%)			91 (10.5%)
Insidious	309 (69.6%)	42 (64.6%)			604 (69.5%)
Age at onset of compulsions (years) – mean (SD)	12.9 (7.2)	12.6 (7.6)	0.393	–0.04	12.7 (7.4)
Duration of compulsions (years) – mean (SD)	21.5 (12.6)	25.3 (14.4)	0.062	–0.08	22.4 (12.9)
Onset of obsessions			0.530	–	
Abrupt	83 (18.7%)	16 (24.6%)			174 (20.0%)
Intermediate	60 (13.5%)	8 (12.3%)			97 (11.2%)
Insidious	301 (67.8%)	41 (63.1%)			598 (68.8%)
Age at onset of obsessions (years) – mean (SD)	13.2 (7.8)	12.7 (8.2)	0.205	–0.06	13.0 (7.8)
Duration of obsessions (years) – mean (SD)	20.6 (13.5)	25.3 (14.1)	<b>0.017</b>	–0.11	21.8 (13.6)
BABS <sup>b</sup> total score – mean (SD)	4.9 (3.8)	15.9 (3.2)	< <b>0.001</b>	–0.57	7.2 (5.5)
BDI <sup>c</sup> score – mean (SD)	16.3 (10.9)	19.0 (13.1)	0.204	–0.06	17.4 (11.6)
BAI <sup>d</sup> score – mean (SD)	16.2 (11.8)	16.6 (11.5)	0.681	–0.02	16.9 (11.7)

Bold values correspond to  $p < 0.05$ .<sup>a</sup> Yale-Brown Obsessive-Compulsive Scale.<sup>b</sup> Brown Assessment of Beliefs Scale.<sup>c</sup> Beck Depression Inventory.<sup>d</sup> Beck Anxiety Inventory.



**Table 3**

Comparison of the prevalence of comorbid Axis I disorders between patients with good and poor insight, resistance and control (IRC) over the OCD symptoms.

Current axis I disorder	Good IRC (n = 444)	Poor IRC (n = 65)	Significance (p value)	Odds ratio (CI)	Whole sample (n = 869)
Alcohol use disorder	21 (4.7%)	2 (3.1%)	0.754	0.64	44 (5.1%)
Any non-alcoholic substance abuse	9 (2.0%)	2 (3.1%)	0.639	1.53	18 (2.1%)
Intermittent explosive disorder	24 (5.5%)	9 (13.8%)	<b>0.026</b>	2.79	56 (6.5%)
Kleptomania	12 (2.7%)	2 (3.1%)	0.699	1.13	21 (2.4%)
Pyromania	0 (0%)	1 (1.5%)	0.129	–	2 (0.2%)
Pathological gambling	3 (0.7%)	1 (1.5%)	0.425	2.28	4 (0.5%)
Trichotillomania	11 (2.5%)	6 (9.2%)	<b>0.014</b>	3.97	40 (4.6%)
Compulsive shopping	28 (6.4%)	9 (13.8%)	<b>0.040</b>	2.37	73 (8.5%)
Impulsive-compulsive sexual behaviour	14 (3.2%)	0 (0%)	0.234	–	20 (2.3%)
Impulsive-compulsive internet use	10 (2.3%)	3 (4.6%)	0.227	2.08	22 (2.5%)
Skin-picking	64 (14.5%)	13 (20.0%)	0.268	1.47	137 (15.9%)
Impulsive-compulsive video game use	2 (0.5%)	0 (0%)	1.00	–	3 (0.4%)
Self-mutilation	6 (1.4%)	1 (1.5%)	1.00	1.10	16 (1.9%)

Bold values correspond to  $p < 0.05$ .

hoarding and symmetry symptoms in patients with OCD and ICD compared to those with OCD only (Lovato et al., 2011). Aggressive symptoms did not discriminate between the impulsive and non-impulsive groups in our study. Conversely, there appears to be some consensus regarding the association of impulsivity with hoarding and symmetry symptoms; however differences in findings across studies could be a result of the measure used, as well as sample sizes. There is also reliable evidence for the relationship of hoarding to poor insight (Jakubovski et al., 2011) and poor treatment response (Kishore et al., 2004) along with a suggestion that it might represent a distinct clinical entity (Pertusa et al., 2008; Phillips et al., 2010; Saxena, 2008). Our finding that hoarding is associated with impulsivity in OCD emphasizes the need for clinical and research focus on this dimension.

Our results confirm that individuals with poor IRC, relative to those with good IRC, have a significantly greater rate of comorbid intermittent explosive disorder, trichotillomania and compulsive buying. In fact, other studies have also found significant rates of comorbid ICDs in samples of OCD in general. For instance, Grant et al. (2006) found that approximately 11.6% of the OCD sample had a current ICD, while Matsunaga et al. (2005) found that 29% of their OCD sample had comorbid ICD, including SUD. A previous study (Fontenelle et al., 2005) found approximately 35% with comorbid ICD, which included SUDs, paraphilias and bulimia nervosa/binge-eating disorder – all conceptualized as involving poor impulse control. In the present sample, approximately 31% has a current DSM-IV ICD. Comorbid SUDs were extremely few in our study, corroborating the findings of previous studies (Tavares and Gentil, 2007). Interestingly, du Toit et al. (2001) found that individuals who had OCD along with putative obsessive-compulsive spectrum disorders (OCSs) such as eating disorders, somatoform disorders, tics and impulse control disorders, were more likely to spend significantly greater time on their compulsions, and have poorer resistance to compulsions. The slight differences in the rates of comorbid ICDs observed across studies may be attributed to

differences in classification – current versus lifetime; only ICDs versus ICD and SUD, or ICD, SUD and eating disorders. We therefore suggest that individuals with poor IRC may be particularly prone to display a higher rate of comorbid ICDs.

Our findings underscore the utility of measures of resistance, control and insight as possible clinical predictors of impulsivity in OCD. These measures are derived from two widely used clinical instruments – Y-BOCS and BABS; are quick and practical to administer and score in routine clinical settings. Previously, the Barratt Impulsiveness Scale and Schalling Impulsivity Scales have been used to assess impulsivity in OCD with mixed findings. Ettelt et al. (2007) found higher cognitive impulsivity in OCD compared to a healthy control group, whereas no significant differences in impulsivity have been observed when individuals with OCD were compared to a student control group (Stein et al., 1994), and to other anxiety disorder groups (Summerfeldt et al., 2004). The Multidimensional Impulsive-Compulsive Spectrum Assessment Instrument (MICSAI) (Ferrao et al., 2006) explores psychopathological features of impulsivity and compulsivity, but is not a specific scale to assess impulsivity in OCD; notwithstanding it helps to differentiate some OCD and ICD symptoms. In the absence of more specific measures for impulsivity in OCD, the utility of measures of insight, resistance and control as possible clinical predictors of impulsivity takes on particular significance.

Our findings highlight the importance of identifying individuals with 'impulsive' OCD who are likely to have poorer clinical course and may benefit from more intensive and alternate treatment strategies. In fact, it has been suggested that the treatment of compulsive and impulsive disorders should address the quality of the underlying drives (Fontenelle et al., 2011). Accordingly, there may be a potential role for drugs modulating the glutamatergic, opioidergic, and  $\gamma$ -aminobutyric acid (GABA) ergic systems (e.g. riluzole, naltrexone, or baclofen, among others) in a subset of individuals with OCD who do not find their symptoms irrational, but rather experience them as rewarding, and engage in the behaviours without attempting to resist or control them (Fontenelle et al., 2011). The complex interplay between impulsivity and compulsivity and their associations with symptom severity and treatment outcome has been highlighted in pathological gambling (Blanco et al., 2009). In their study, impulsive and compulsive symptoms responded equally well to paroxetine in pathological gamblers. Furthermore, parallel to recent research demonstrating distinctive neuropsychological deficits in individuals with poor insight OCD (Kashyap et al., 2012), it is likely that studies investigating neuropsychological and neurobiological substrates of impulsivity in OCD will yield substantive results that further our understanding of the impulsive subtype and help develop more focused, theoretically-driven interventions.

**Table 4**

Logistic regression analysis with poor insight, resistance, control (IRC) as the outcome variable.

Predictors	B	Standard error	Significance (p value)	Odds ratio (CI)
Y-BOCS <sup>a</sup> total score	0.670	0.207	0.001	1.95
BABS <sup>b</sup> total score	1.914	0.451	0.000	6.78
Total hoarding score	−0.388	0.140	0.005	0.68
Duration of obsessions	0.084	0.040	0.037	1.09
Compulsive shopping	−3.502	1.792	0.051	0.03
Constant	−40.931	9.955	0.000	0.00

<sup>a</sup> Yale-Brown Obsessive-Compulsive Scale.<sup>b</sup> Brown Assessment of Beliefs Scale.

Our findings need to be interpreted in the context of several limitations. First, no specific instrument of impulsivity was used to validate the measure of insight, resistance and control. Second, relative to the other groups, there were small numbers of individuals with OCD and specific ICDs and SUDs. Moreover, axis II disorders were not assessed and impulsivity traits are common in some personality disorders (e.g. borderline). Finally, it could be argued that we have assessed typical poor insight rather than an impulsive subtype of OCD (Fontenelle et al., 2010). Nevertheless, we feel this is not the case since poor insight, which is also a symptom of SUD (Substance Abuse and Mental Health Services Administration, 2007), is one single dimension of a more broadly defined impulsive OCD, together with poor resistance and motor dyscontrol.

In conclusion, this study supports the notion of an 'impulsive-compulsive' subtype of OCD, based on core symptoms of the disease (insight, resistance and control), which is associated with poorer prognostic factors and specific symptom dimensions. The study also highlights the utility of simple measures of insight, resistance and control, which may help clinicians identify individuals who are likely to have impulsive features and worse course. Future studies focussing on alternative treatment strategies, as well as neuropsychological and imaging findings in these patients are warranted.

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### Contributors

Drs. Kashyap, Fontenelle and Yücel designed the study and participated in all the steps of the preparation process, including statistical analyses and first draft. All authors contributed with the protocol preparation and literature searches. All authors contributed to the article writing and have approved the final version of the manuscript.

### Conflicts of interest – declaration

Himani Kashyap has no conflicts of interest to inform.  
 Albina R. Torres has no conflicts of interest to inform.  
 Murat Yücel has no conflicts of interest to inform.  
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