In search of specificity: “Not just right experiences” and obsessive–compulsive symptoms in non-clinical and clinical Italian individuals.

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ABSTRACT

The cognitive model of OCD proposes that certain beliefs may contribute to the development and maintenance of this disorder. To date, however, it is not yet clear which beliefs are more relevant for explaining OCD symptomatology; moreover, their causal status is yet to be clearly established. In the effort to identify other constructs and processes related to OCD, the phenomenon labeled “not just right experiences” (NJREs) has received increasing attention. In this study, measures of NJREs (the NJRE-Q-R), OCD symptoms, general distress (i.e., anxiety, and depression), and perfectionism were administered to a large sample of college students and a small sample of OCD and non-OCD patients. The clinical sample completed also a measure of OC beliefs. Results showed that NJREs could be reliably measured through a self-report format in non-clinical and clinical Italian individuals. A specific association between NJREs severity and OCD symptoms was found in the non-clinical sample, after controlling for anxiety, depression and perfectionism. The NJRE-Q-R Severity scale clearly discriminated OCD patients from patients with other anxiety disorders or depression. Lastly, the NJREs measure differentiated the clinical groups when OC beliefs were controlled, whereas OC beliefs did not discriminate among the groups after NJREs severity was controlled. The concept of NJREs may contribute to improve current psychological and biological model of OCD.

Keywords: not just right experiences; cognitive theory of obsessions; psychological processes; obsessive-compulsive disorder.

INTRODUCTION

Obsessive compulsive disorder (OCD) is characterized by persistent, intrusive, and distressing obsessions (persistent thoughts, impulses, or images) or compulsions (repetitive, excessive behaviors or mental acts) and associated with marked impairments in quality of life (Eisen et al., 2006; Parkin, 1997). OCD has a chronic course, with symptom intensity typically remaining elevated once it has reached clinical levels (e.g., Mataix-Cols et al., 2002).

The cognitive model of OCD has been extensively studied (e.g., Frost & Steketee, 2002). It proposes that certain beliefs contribute to the development and maintenance of this disorder by facilitating maladaptive interpretations of common intrusive thoughts (Frost & Steketee, 2002; Salkovskis, 1985, 1996). Whereas early experimental work has shown that manipulating OC-related beliefs leads to changes in OC behavior (e.g., Bouchard, Rheaume, & Ladouceur, 1999; Jones & Menzies, 1998; Ladouceur, Rheaume, & Aublet, 1997; Lopatka & Rachman,1995; Rassin, Merckelbach, Muris, & Spaan, 1999), it is still not clear which beliefs are more relevant and/or useful for explaining OCD symptomatology. For instance, a study of large clinical (248 patients with OCD, 105 patients with anxiety disorders without OCD) and non-clinical samples (87 non-clinical adults and 291 university students) showed that three cognitive domains (responsibility, control of thoughts, importance of thoughts) discriminated OCD patients from patients with anxiety disorders (Obsessive Compulsive Cognitions Working Group, OCCWG, 2003). Other studies reported different and contrasting results in exploring the relationship between OC beliefs and OCD symptoms (Belloch, Morillo & Garcia-Soriano, 2007; Sica et al., 2004; Sica, Taylor, Arrindell & Sanavio, 2006).

Also, which factor structure best represents the most commonly-used measure of OC beliefs content (the Obsessive Beliefs Questionnaire;OCCWG, 2003) remains in

question (see Careau, O'Connor, Turgeon, & Freeston, 2003; Dorz et al.,2009; Faull, Joseph, Meaden, & Lawrence, 2004; OCCWG, 2005; Taylor, McKay, & Abramowitz, 2005).

Of more relevance, the causal role of OC beliefs in producing OC symptoms has yet to be clearly established. One longitudinal study indicated that parents' tendency to negatively interpret intrusive infant-related thoughts early in the postpartum period mediated the relationship between pre-childbirth OC beliefs and late postpartum OC symptoms (Abramowitz, Nelson, Rygwall & Khandker, 2007). However, a recent 6-month longitudinal study found that OC-beliefs were of only modest value in predicting OC symptoms variation among college students (Coles, Pietrefesa, Schofield, & Cook, 2008).

One reason for these inconsistent findings may lie in the lack of specificity of OC beliefs (Steketee, Frost, & Wilson, 2002). For example, in some studies the correlations between OC beliefs and measures of general distress (e.g., anxiety, depression, worry) were approximately similar to those with OCD symptom measures (OCCWG, 2003; 2005; see also Tolin, Worhunsky, & Maltby, 2006). According to other authors, belief domains may not play a role in some OCD symptom subtypes (Calameri et al.,2006; Taylor et al., 2006). Lastly, some studies found an association between the OC domains and cultural features such as superstitiousness and religiosity (Sica, Novara, & Sanavio, $2002_{(a)}$; Sica, Novara, & Sanavio, $2002_{(b)}$), a result which raises doubts about the specificity of these cognitive domains for psychopathology (see also Julien et al., 2006 and the review by Julien, O'Connor & Aardema, 2007).

In an effort to identify other constructs and processes relevant to OCD, some scholars have turned their attention to the phenomenon labeled "not just right experiences" (NJREs). This is defined as "the subjective sense that something isn't just as it should be", an unsettled feeling because something in the individual or in the world around them is not right (Coles, Frost, Heimberg, & Rhéaume, 2003). One reason for interest in this construct

is that it well fits clients' descriptions of their OCD symptoms. In addition, clinicians have long observed NJREs among clients with OCD. In 1903 Janet wrote of "an inner sense of imperfection" and described the experience as follows: "they feel that actions that they perform are incompletely achieved or that they do not produce the sought-for satisfaction" (Pitman, 1987_b, p. 226). Other authors have described analogous phenomena in different terms: *sense of incompleteness* (Rasmussen & Eisen, 1992), *feeling of knowing* (Rapoport, 1991), *just right perceptions* (Leckman,Walker, Goodman, Pauls, & Cohen, 1994), *sensory phenomena* (Miguel et al., 2000; see Summerfeldt, 2004, for an excellent introduction to this concept).

NJREs seem also to capture the perfectionistic-like quality of OCD. It has long been suggested that perfectionistic thinking may be linked to obsessions and compulsions (McFall & Wollersheim, 1979). Studies with non-clinical samples have found perfectionistic attitudes such as "concern over mistakes" and "doubts about actions" to be positively correlated with total scores on self report measures of OCD features, even when controlling for responsibility or general distress (e.g., Frost, Marten, Lahart, & Rosenblate, 1990; Rhéaume, Freeston, Dugas, Letarte, & Ladouceur, 1995; Tolin, Brady, & Hannan, 2008). Recently, Wu and Cortesi (2009) examined the relationship between perfectionism and OCD in a large non-clinical sample. They concluded that the association between perfectionism and OC symptoms was higher than the association between perfectionism and depression. Actually, NJREs-like concepts (sensations of imperfection) have frequently been discussed in empirical work on individuals with OCD (Baer, 1994; Calamari, Wiegartz, & Janeck, 1999; see also Tozzi et al. 2004).

Concepts similar to NJREs have been also included in some theoretical models of OCD. The cybernetic model of OCD (Pitman, 1987a) proposes that the core problem in OCD is a mismatch between the perceptual input and internal reference signals (i.e., expectations). Summerfeldt and colleagues posit the existence of two continuous

orthogonal core dimensions—harm avoidance and incompleteness—that cut across overt symptoms and, in combination, may underlie most manifestations of OCD (Summerfeldt, Richter, Antony & Swinson, 1999). The intriguing model by Szechtman and Woody (2004) contends that OCD stems from an inability to generate the normal "feeling of knowing" that would otherwise signal task completion and terminate the expression of a security motivational system.

Additionally, biological models of OCD seem highly compatible with the concept of NJREs. Dysregulated activity in frontostriatal system is proposed to underlie the enhanced response monitoring often observed in patients with OCD (e.g., Brieter et al., 1996; Gehring, Himle, & Nisenson, 2000) and may manifest as persistent "error signals" erroneously prompting the individual to (fruitless) corrective action (Maltby, Tolin, Worhunsky, O'Keefe & Kiehl, 2005; Pitman, 1987_a; Schwartz, 1999; Szechtman & Woody, 2004; Van Veen & Carter, 2002).

It is therefore a bit surprising that NJREs have been so little studied. In a study, 63% of 40 individuals with OCD with or without Tourette's Disorder endorsed repetitive behaviors preceded by feelings of things not being just right (Miguel et al., 2000). In two studies with large undergraduate samples, Coles et al. (2003) reported that NJREs were significantly related to OCD features. Further, NJREs were significantly more strongly correlated with OCD symptoms than other domains of psychopathology (e.g., social anxiety, worry, depression). Lastly, experimentally induced NJREs produced distress and urges to change something, but not feared consequences, in undergraduate students (Coles, Heimberg, Frost, & Steketee, 2005). This is consistent with conceptualizations of compulsions aimed at reducing a sensation of something being not just right or feeling incomplete. In the same study, many significant relationships were revealed between NJREs and OCD-related constructs, while none were found with non-OCD-related constructs (Coles et al., 2005).

The Current Study

Given the promising role of NJREs in OCD, the present study sought to add to the limited evidence regarding the association between NJREs and obsessive-compulsive features. To our knowledge, this is one of the first studies of non-English speaking individuals.

Our first purpose was to evaluate the psychometric properties of an existing measure of NJREs in Italian non-clinical and clinical individuals. For this purpose, measures of NJREs, OCD symptoms, general distress (anxiety, depression) and perfectionism were administered to a large sample of college students and a small sample of OCD patients. These samples permitted us to investigate the psychometric properties of the NJRE-Q-R (Coles et al., 2005) used in several previous studies, as well as to examine its association with OCD and non OCD symptoms. In addition, we wanted to ascertain whether NJREs represented a form of perfectionism.

We chose an undergraduate nonclinical sample for this aim to provide a wide range of scores on measures of OCD symptoms (Coles et al., 2008; OCCWG, 2005), given theoretical assumptions that OC phenomena lie on a continuum from normality to psychopathology (e.g., Burns, Formea, Keortge, & Sternberger, 1995; Sternberger & Burns, 1990). Moreover, previous research has demonstrated the utility of student samples in advancing theories of OCD (see Gibbs, 1996, for a review).

Our second purpose was to compare OC beliefs and NJREs in accounting for OCD symptoms. Toward this aim, three small clinical samples (OCD, non-OCD anxiety disorders and mood disorders individuals) completed the Italian version of a well validated measure of OC beliefs, the NJRE-Q-R, and symptom measures of OCD, perfectionism and general distress. We tested two hypotheses: 1) the NJRE-Q-R would discriminate OCD from non-OCD patients after general distress and perfectionism were taken into

account; 2) a measure of OC beliefs would not discriminate OCD from non-OCD patients after controlling for NJREs, but the NJRE-Q-R would discriminate among clinical samples after OC beliefs were controlled.

METHOD

Participants and Procedures

The student sample contained 412 undergraduate students (18.9% male) recruited at the University of Padova in nothern Italy. All participants were Caucasian and single. The mean age of the sample was 22.3 years (SD=2.5; range=18-35) and the mean years of education was 15.1 (SD=1.9; range= 8-18). Undergraduates were recruited during public lectures by Psychology faculty. Participants completed self-report measures in groups with a psychologist present to respond to requests for clarification.

Clinical samples included patients with DSM-IV diagnosed obsessive-compulsive disorder (OCD group), any DSM-IV diagnosed anxiety disorder except OCD or simple phobia (Anxious group), and depressive disorder (Depressed group). All diagnoses represented the most severe problem of patients. Patients with secondary comorbid Axis-I diagnoses were included. Patients with a current or past psychotic disorder, dementia, mental retardation, a current substance use disorder or Axis-II diagnosis were excluded. In addition, anxious patients were excluded if they had a current or past OCD.

These clinical participants were outpatients recruited from two outpatient mental health clinics and five different private practice settings in Northern and Central Italy. During the routine assessment phase, patients were interviewed by a member of our research team (all Ph.D. level psychologists experienced in diagnosing psychiatric disorders) using the Structured Clinical Interview for DSM-IV (First, Spitzer, Gibbon, &

Williams, 1996), to establish DSM-IV diagnoses. Although inter-rater reliability for the main diagnosis was not examined formally, each case was audio-recorded and carefully reviewed in supervisory meetings; all diagnoses were reached by rater consensus. After screening, suitable patients were invited to complete measures administered individually.

All clinical and non-clinical individuals participated on a voluntary basis and gave their written consent before taking part to the study. This study was approved by the human subjects review committee of the University of Padova. The sequence of self-report measures was rotated to control for order effects.

Overall, sixty patients were recruited for our study: four (2.4%) were excluded because had one or more Axis-II diagnosis and three (1,8%) refused to participate after screening process. The final sample consisted of 30 OCD patients, 12 anxious patients and 11 depressed patients (all were Caucasian). The frequency of each principal anxiety disorder diagnosis in the anxious group was 8 (67%) generalized anxiety disorder, 3 (25%) panic disorder without agoraphobia, and 1 (8%) panic disorder with agoraphobia. In the depressed group the frequency of each principal depressive disorder diagnosis was: 7 (63.6%) major depressive disorder, and 4 (36.4%) dysthymic disorder. Table 1 provides descriptive statistics on various demographic variables for the three clinical groups. Groups were equivalent with respect to all demographic variables (all *p*s>.05), with the exception of age and education: depressed patients were older and had fewer years of education than OCD and anxious patients. As expected, the OCD sample scored significantly higher than anxious and depressed groups on the Obsessive Compulsive Inventory-Revised (OCI-R; Foa et al., 2002; Sica et al., 2009), a standard measure of the OCD severity. The clinical groups did not differ significantly on the Beck Anxiety Inventory (Beck et al., 1988; Sica et al., 2006; Sica & Ghisi, 2007) or the Beck Depression Inventory-Second Edition (Beck et al., 1996; Ghisi et al., 2006; Sica & Ghisi, 2007).

Measures

The *Not Just Right Experiences-Questionnaire-Revised (*Coles et al., 2005) is composed of 19 items. The first 10 items present sample NJREs (e.g., ‘‘I have had the sensation after getting dressed that parts of my clothes …did not feel just right.’’ ‘‘I have had the sensation while organizing my desk that my papers and other things didn’t look just right.’’) and instruct respondents to indicate whether they experienced these within the past month. The next two items ask respondents to indicate which NJRE occurred most recently and when it last occurred (past few hours to past month). Lastly, respondents rate the frequency, intensity, immediate distress, delayed distress, rumination, urge to respond, and sense of responsibility associated with the most recent NJRE on a scale from 1 (absence) to 7 (extreme). The sum of ratings for these last seven items comprises the NJRE-Q-R Severity scale. Coles et al. (2003) found good internal consistency (Cronbach’s alpha=.79) for the 10 sample NJRE items, and all 19 items showed good convergent and discriminant validity evident in stronger correlations with OCD symptoms than with depressive symptoms, trait anxiety, social anxiety, or worry.

Standard steps outlined in the psychology literature guided the translation process for the NJRE-Q-R (e.g., Brislin, 1986). In the first step, three independent researchers translated the questionnaire from English to Italian and then reached agreement on a common version. Idiomatic Italian at the sixth-grade level was used for this step. In addition, the researchers reviewed the common version to ensure there were no colloquialisms, slang, or esoteric phrases that would make interpretation difficult. The shared form was then back-translated by a bilingual person with an extensive knowledge of psychological research. The back-translation proved to be nearly identical to the original one. As a final step, the NJRE-Q-R items of the Italian version were rated by 5 experts in anxiety disorders. Each expert rated the items on a 5-point scale (1=not at all, 5=

extremely) for clarity (the extent to which the item is clearly described). As experts' ratings indicated excellent clarity (mean across all items=4.5; DS=0.7), no further item refinement was necessary.

Other Measures of Psychopathology

All participants completed a background information questionnaire and the following measures:

The *Obsessive Compulsive Inventory-Revised* (OCI-R; Foa et al., 2002) is a widely used 18-item self-report questionnaire assessing the severity of OC symptoms on 5-point Likert scale. The items are grouped into six subscales (washing, checking, ordering, obsessing, hoarding, and mental neutralizing) and a total score is also derived. Initial reports supported the reliability and validity of this instrument, and showed strong convergence with established measures of OCD, moderate to high internal consistency across the six subscales, and adequate to high test-retest stability (Foa et al., 2002). The Italian version of OCI-R (Sica et al., 2009) was administered to 340 community controls, 52 OCD patients, and 36 anxious patients. The findings indicated good internal consistency and a 30-day retest reliability ranged from .76 to .99, as well as good convergent, divergent, and criterion validity (Sica et al., 2009). In the present study, the alpha coefficient for the total OCI-R was .84 in the student sample and .90 in the clinical sample. Moreover, in accord to the Italian validation study (Sica et al., 2009), alpha coefficients for the OCI-R subscales exceed .70 except mental neutralizing (alpha=.50) in student sample, whereas all coefficients were above .85 in clinical sample.

The *Beck Anxiety Inventory* (*BAI*; Beck Epstein, Brown & Steer, 1988) is a 21-item self-report with excellent psychometric properties that measures the severity of anxiety. The Italian version of the BAI was administered to 654 undergraduates, 831 community controls and 64 anxious patients. The findings indicated good internal consistency

(Cronbach's alpha = .89) and a 30-day retest reliability of .62, as well as good convergent, divergent, and criterion validity (Sica, Coradeschi, Ghisi, & Sanavio, 2006; Sica & Ghisi, 2007). In the present study, the alpha coefficient for the BAI was .84 in the student sample and .90 in the clinical sample.

The *Beck Depression Inventory-Second Edition* (*BDI-II*; Beck, Steer & Brown, 1996). The BDI-II is a 21-item self-report scale that assesses the severity of affective, cognitive, motivational, vegetative, and psychomotor components of depression. The BDI-II has excellent reliability and validity and is widely used in clinical research. The Italian version of the BDI-II was administered to 733 undergraduates, 354 community controls and 135 depressed patients. The findings indicated a good internal consistency (Cronbach's alpha = .80) and a 30-day retest reliability of .76, as well as good convergent, divergent, and criterion validity (Ghisi, Flebus, Montano, Sanavio, & Sica 2006; Sica & Ghisi, 2007). In the present study, the alpha coefficient for the BDI-II was .85 in the student sample and .87 in the clinical sample.

The *Multidimensional Perfectionism Scale* (Hewitt & Flett, 1991, 2004) is a 45-item self-report measure of perfectionistic tendencies. Consisting of three subscales of 15-items each, the questionnaire measures self-oriented perfectionism (e.g., I must always be successful at school or work), other-oriented perfectionism (e.g., It is not important that the people close to me are successful), and socially prescribed perfectionism (e.g., The people around me expect me to succeed at everything I do). Extensive evidence attests to the reliability and validity of the MPS (Hewitt & Flett, 1991, 2004). The Italian version of the MPS was administered to 348 undergraduates (43.7% females). The findings indicated good internal consistency (Cronbach's alpha ranging from .75 to .88; Sica, 2004). In the present study the alpha coefficients for MPS subscales ranged from .74 to .91 in the student sample and from .69 to .88 in the clinical sample.

Lastly, the clinical sample completed also the Italian version of the *Obsessive Beliefs Questionnaire* (OBQ; Obsessive Compulsive Cognitions Working Group, 1997; 2003; 2005). The original OBQ is a self-report instrument consisting of 87 items representing dysfunctional beliefs assessed in 6 domains identified by OCCWG as central to OCD. Each item is rated on a 7-point scale ranging from 1 (disagree very much) to 7 (agree very much). The Italian version of the OBQ (Dorz et al., 2009) was derived from a confirmative factorial analysis on a sample of 752 university students (63.4% females) and comprised 46 items divided in five domains/subscales: excessive responsibility for omission, excessive responsibility for commission, over-importance of thoughts, excessive control of thoughts and perfectionism. The Italian version of the OBQ has shown good internal consistency for the five scales (Cronbach's alpha ranging from .68 to .86) as well as good validity. In the present study the alpha coefficient for the OBQ total was .95 in the clinical sample.

Distributions of the variables were examined for normality prior to statistical analyses, and there was not evidence of significant skewness among our samples.

RESULTS

NJREs in Students and OCD Patients

Eighty-three percent of undergraduates reported having experienced at least one of the 10 NJREs described in the NJRE-Q-R. The percentage of undergraduates experiencing at least one of the 10 NJREs was 13% within the past few hours, 21% within the past day, 36% within the past week, and 13% within the past month. The most common were: "When talking to people, I have had the sensation that my words did not sound just right" (60.7% of participants), "I have had the sensation while writing something down that the words did not look just how I wanted them to look" (38%) and "I have had

the sensation while folding my clothes that they did not look the way folded clothes should look" (33%).

All OCD participants reported having experienced at least one of the 10 NJREs described in the NJRE-Q-R. The percentage of OCD participants experiencing at least one of the 10 NJREs was 50% within the past few hours, 24% within the past day, 24% within the past week, and 2% within the past month. The most common NJREs were: "After washing my hands once, I have had the sensation that they did not feel just the way clean hands are supposed to feel" (73%); "When talking to people, I have had the sensation that my words did not sound just right" (57%), and "I have had the sensation while organizing my desk that my papers and other things didn't look just right" (50%).

Psychometric Properties of the NJRE-Q-R Severity Scale

In order to explore the latent structure of the Italian version of the NJRE-Q-R, a principal-axis extraction method was performed on the student sample. The unrotated matrix yielded one factor with an eigenvalue greater than 1.0., explaining 65% of total variance. All the NJRE-Q-R items loaded significantly on the single factor (loading values>.65), providing support for a unidimensional measure of NJRE.

Cronbach's alpha for the NJRE-Q-R Severity scale was high in both the undergraduate (.87) and OCD sample (.89), further confirming that items converged on a common construct. Pearson's *r* was computed on a subsample of 50 undergraduates to assess test-retest reliability at a 1-month interval. Temporal stability was good (.76), especially in view of the relatively long time frame for retest. Means and standard deviations for total and single item scores for both groups are shown in Table 2. All scores were significantly higher for clinical individuals.

Relationship of NJREs to OCD Features and Other Psychopatology

As shown in Table 3 all correlations between the NJRE-Q-R Severity scale and other symptom measures were generally small. NJRE-Q-R Severity was significantly correlated with all the OCI-R scales except Mental Neutralizing. The correlation with OCI-R total score was significantly higher than correlations with the other symptom measures (all *z* values >1.96, p<.05).

To examine the unique contribute of NJREs in predicting OCD symptoms, a hierarchical multiple regression analysis was performed. In the first step of the analysis, BAI, BDI-II and MPS scores were entered. In the second step we entered the NJRE-Q-R Severity score. The independent variable was the OCI-R total score. Result for the final equations is shown in Table 4 (tolerance values for these equations were above .90, indicating that multicollinearity was not a problem; Norusis, 1988). The NJRE-Q-R scale accounted for a significant amount of unique variance in OCI-R, even after controlling for general distress and perfectionism.

Lastly, correlations between the NJRE-Q-R Severity and OCI-R subscales remained significant after controlling for anxiety (BAI), depression (BDI-II) and perfectionism (MPS): partial *r*s were .25 for washing, .23 for checking, .21 for ordering, .21 for obsessing and .20 for hoarding. These two last results demonstrated a specific association between NJREs and OCD symptoms.

Discriminant Power of the NJRE-Q-R Severity scale

Before comparing the three clinical groups on the NJRE-Q-R Severity scale, Cronbach's alpha was computed for anxious and depressed patients. Reliability was high for both groups (Anxious= .87; Depressed= .86).

Multivariate analysis of variance (MANOVA) was performed using the NJRE-Q-R Severity total and the single item scores as the dependent variables, patient group as the independent variable and the BAI, BDI-II and MPS scores as covariates. This assessed sample effects on NJRE-Q-R severity, controlling for general distress and perfectionism. Although the three groups differed in age and educational level, the NJRE-Q-R severity score did not correlate significantly with age (Pearson's *r*=-.15) or educational level (Pearson's *r*=.15) in this sample. Accordingly, age and educational level were not used as covariates in the model.

The MANOVA resulted significant (Pillai's $\underline{F}_{(14,79)}$=3.6, $\underline{p}$<.001). Therefore, a series of covariance analyses (with BAI, BDI-II and MPS scores as covariates) was performed on NJRE-Q-R Severity total and the single item scores, using Student-Newman-Keuls (SNK) test for post-hoc comparisons.

Results showed that the OCD sample scored significantly higher than anxious and depressed patients on all scores (Table 5). Moreover, the NJRE-Q-R Severity total and single items scores did not distinguish anxious from depressed patients. To evaluate the magnitude of the significant results, eta squared values (η^2) were also computed by comparing the three groups in pairs. According to Cohen (1988), η^2=0.1 corresponds to a small effect size, η^2=0.6 to a medium effect and η^2=1.4 to a large effect size. Results suggested that the magnitude of the differences was generally low to medium both when OCDs were compared to anxious patients and when OCDs were compared to depressed individuals.

Specificity of the NJRE-Q-R Severity scale

Two covariance analyses were performed to investigate the hypothesized differential role (specificity) of OC beliefs and NJREs in OCD. In the first analysis, the

NJRE-Q-R Severity score was the dependent variable, patient sample was the independent variable, and BAI, BDI-II, and OBQ total scores were covariates. This analysis examined whether NJRE-Q-R Severity discriminated among the three groups after controlling for general distress and OC beliefs. In the second analysis, the OBQ total score served as the dependent variable, patient sample was the independent variable, and BAI, BDI-II, and NJRE-Q-R Severity were covariates. This analysis explored whether the OBQ discriminated among the three groups once the effect of general distress and NJREs was controlled. Results favoured our hypothesis: whereas NJRE-Q-R Severity discriminated among clinical groups ($F_{(2,45)}$=15, p<.001), the OBQ did not ($F_{(2,45)}$=0.4, p=.66). Furthermore, in the first analysis no symptom measures used as covariates were significant, further indicating the specificity of the NJREs measure.

DISCUSSION

Our study demonstrated that NJREs could be reliably measured through a self-report format in both non-clinical and clinical Italian individuals: the NJRE-Q-R Severity scale demonstrated unidimensionality, excellent internal homogeneity and good temporal stability.

Low correlations, albeit significant, between NJREs and OCD features were found in student sample. It is important to stress that small correlation values were expected since the NJRE-Q-R Severity is not a symptom scale but rather a measure of a complex construct. In fact, similar values were found in a previous Italian study, wherein a modified version of NJRE-Q-R Severity scale administered to 104 undergraduates showed

correlations with the Padua Inventory subscales ranging from .02 to .24 (Mancini, Gangemi, Perdighe & Marini, 2008). The negligible correlation between NJREs and mental neutralizing can be further explained by the poor reliability of this last measure in our and other non-clinical samples. Sica et al. (2009) argued that because neutralizing is rare in non-OCD individuals, the diminished alpha coefficients for this subscale in non clinical samples may reflect a restricted range rather than structural inadequacy. On the other hand, it is important to note that the content of the items of this scale – all dealing with numbers and counting complaints – may fail to capture many clinically relevant neutralization phenomena (Gonner, Leonhart & Ecker, 2008).

In any case, our results provide support for a specific relationship between NJREs and OCD. First, the correlation with OCI-R total score was significantly higher than correlations with the other symptom measures; second, after controlling for anxiety, depression and perfectionism the NJRE-Q-R Severity remained significantly associated with OCD symptoms. This finding also suggests that NJREs are not just another form of perfectionism.

Inspection of correlations revealed that NJRE-Q-R Severity was equally related to the various types of OCD symptoms. Perhaps, this measure detects a general vulnerability for OCD and is therefore less sensitive to OCD heterogeneity. Alternatively, a ceiling effect due to the nature of the sample may be present: a non-clinical sample may have prevented detection of differences in OCD symptoms and consequently differential associations with NJREs.

The NJRE-Q-R Severity scale clearly discriminated OCD patients from patients with other anxiety disorders or depression. A central result was that the NJREs measure was able to differentiate the clinical groups over and above OC beliefs, whereas the opposite was not true. Even though this result warrants more research, this is one of the first

studies which demonstrates that NJREs may have a more specific role than OC beliefs in OCD symptoms.

Overall, our results indicate a potential specific role of NJREs in OCD and are consistent with previous empirical work (Coles et al., 2003, 2005). Of course, the correlational nature of the present study cannot establish whether NJREs may be causal for OCD or a simple epiphenomena . However, should the role of NJREs in OCD be established, how can this construct improve our knowledge of OCD? First, NJREs could be formally incorporated into OCD psychological models, given its seemingly specific relationship to OC features. Indeed, many clinical descriptions of OCD indicate NJRE-like concepts as an important component of this disorder. For instance, Summerfeldt et al. (1999) remarked that many compulsions seem aimed at reducing distress rather than at avoiding feared consequences; Feinstein, Faloon, Petkova and Liebowitz (2003) found evidence distinguishing washing compulsions that reduce "uncomfortable feelings" of contamination from those that reduce fears of harm. A recent study of Pietrafesa and Coles (2009) found that self-reported levels of incompleteness (i.e., NJREs) and harm avoidance uniquely predicted participants' ratings of their experiences while performing OCD-relevant behavioral tasks. Therefore, further precision in distinguishing the motivations behind symptoms (e.g., fear reduction Vs. NJREs) may help clarify the heterogeneous nature of OCD.

In addition, further research can explore whether compulsions aimed at harm avoidance versus producing a just-right sensation are mediated by the same neuroanatomical substrates. If variations are found, they may have important implications for pharmacotherapy and other biological approaches to treatment.

NJREs may play an important role in predicting treatment outcome. Foa and Kozak (1986) proposed that reductions in OCD symptoms are moderated by reductions in estimates of the probability of feared consequences achieved via repeated

disconfirmations of the expected outcome. Therefore, when a feared consequence is not clearly articulated, the efficacy of corrective exposures may be compromised (Foa, Abramowitz, Franklin, and Kozak, 1999; Rasmussen & Eisen, 1992). It is possible that patients who did not articulate feared consequences may have been distressed by NJREs.

NJREs might also be considered (and investigated) as a putative marker for OCD, in the same way in which the construct Anxiety Sensitivity (AS) is deemed a psychological marker of anxiety disorders in general and panic disorder in particular (e.g., Brown, Smits, Powers, & Telch, 2003; Rapee & Medoro, 1994; Schmidt, Lerew, & Jackson, 1997; Smits, Powers, Cho, & Telch, 2004; see literature on endophenotypes, Chamberlain et al., 2008).

The current study has a number of limitations. The student sample was relatively restricted in educational level, ethnic backgrounds, and socio-economic status and thus our results need to be replicated on normative samples with broader demographic characteristics. Results on clinical individuals are limited by the relatively small size of the samples and by using Axis II comorbidity as a sample exclusion criterion. Actually, in order to have more interpretable data (keeping also in mind the scarcity of empirical research about NJREs) we elected to reduce a complex source of variability such as the presence of personality disorders. On the other hand, the exclusion of AXIS II patients might limit generalizability of findings to 'real world' samples, even though only a few patients were excluded because of this criterion. Also, our small OCD sample did not make possible to investigate NJREs in various OCD subgroups (e.g., washer, checker, etc.). Future studies are needed to examine this issue, considering the possible importance of this differentiation (e.g., Ecker & Gonner, 2008).

As far as the internal structure of NJRE-Q-R is concerned, we acknowledge that relying solely on Eigenvalues to determine the number of factors is not particularly sophisticated, mainly because using the > 1 rule is overinclusive in terms of the number of

factors. Clearly this was not the case here with only 1 factor meeting this criterion, which explained a substantial proportion of the variance.

Lastly, although we examined NJREs in relation to other domains of psychopathology (anxiety and depression), our results require confirmation from studies evaluating NJREs in other clinical conditions such as hypochondriasis or eating disorders. We have sought to reduce the impact of these limitations by careful participant selection in the recruitment process, as well our choice of well validated instruments. In fact, the results appear in line with our hypotheses and consistent with theoretical bases.

In conclusion, the present study continues the tradition of exploring complex constructs and processes in psychopathology (e.g., Riskind & Williams, 2005). No doubt that investigation of such processes will advance our knowledge of vulnerability for psychopathology.

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Table 1. Demographic data and levels of symptomatology across clinical samples.

	OCD (30)	AG (12)	DG (11)	Chi ^{2} or F associated probability	Significant SNK post-hoc comparison (p<.05)
Age	33.6 (12.6)	36.8 (8.4)	50.9 (6.2)	8.5	DG >OCD, AG
Years of education	13.9 (3.3)	11.8 (2)	10.4 (3.3)	5.9	DG <OCD
% of males	40	58.3	36.4	NS	-
% of married/ cohabitant	43.3	50	63.6	NS	-
% of employed	44.8	45.5	27.3	NS	-
% of unemployed	3.4	9.1	0	NS	-
OCI-R	32.4 (12.7)	17.1 (15.4)	15.8 (14.5)	8.6	OCD>AG, DG
BAI	18.5 (12)	25.3 (14.8)	19.3 (6.1)	NS	-
BDI-II	20 (10.1)	19.4 (11.2)	23.7 (4.5)	NS	-

Notes: NS= non significant; standard deviations in brackets; SNK= Student Newman Keuls; OCD= Obsessive-compulsive disorder group; AG= Anxious group; DG= Depressed group; OCI-R= Obsessive Compulsive Inventory- Revised; BAI= Beck Anxiety Inventory; BDI-II Beck Depression Inventory-Second Edition.

Table 2. Mean (standard deviation) for items and total score of the NJRE-Q-R Severity scale for undergraduate and OCD samples

	Undergraduates (N=412)	OCD (N=30)
Frequency	3.7 (1.8)	6.2 (0.9)
Intensity	3.0 (1.4)	5.4 (1.3)
Immediate Distress	2.9 (1.6)	5.3 (1.3)
Delayed Distress	2.1 (1.4)	4.0 (1.8)
Rumination	1.9 (1.2)	4.6 (1.7)
Urge to respond	2.7 (1.7)	5.3 (1.8)
Responsibility	2.6 (1.6)	4.8 (1.8)
Total Score	19.0 (8.6)	35.6 (8.3)

Note: Groups differed in all scores at p-level <.001

Table 3. Correlations of NJRE-Q-R Severity scale and symptoms for 412 undergraduates

	NJRE-Q-R Severity
OCI-R Washing	.32
OCI-R Checking	.28
OCI-R Ordering	.30
OCI-R Obsessing	.31
OCI-R Mental Neutralizing	-.03
OCI-R Hoarding	.31
OCI-Total Score	.42
BAI	.33
BDI-II	.26
MPS-Self	.20
MPS-Other	.22
MPS-Social	.30

All correlations significant at $p<.001$ except OCI-R Mental Neutralizing.OCI-R =Obsessive Compulsive Inventory-Revised; BAI= Beck Anxiety Inventory; BDI-II = Beck Depression Inventory – II; MPS= Multidimensional Perfectionism Scale

Table 4. Summary of final regression statistics for general distress, perfectionism and the NJRE-Q-R Severity scale on OCD symptoms as measured by the OCI-R Total score

Predictors	Step 1					Step 2				
	Beta	r	sr	p values	R^2	Beta	r	sr	p values	R^2
BAI	.32	.28	.26	.0001		.26	.23	.20	.0001	
BDI-II	.05	.07	.05	.38		.05	.05	.04	.43	
MPS-Self	.07	.07	.06	.30		.08	.08	.07	.23	
MPS-Other	-.10	-.10	-.09	.13		-.12	-.12	-.10	.06	
MPS-Social	.19	.17	.15	.007	.22	.14	.14	.10	.05	
NJRE-Q-R Severity scale	-	-	-	-	-	.30	.31	.27	.0001	.30

Notes: r = partial correlation; sr = semi-partial correlation; Increment in R^2 from the first to second step=.08; N= 412 undergraduates; BAI= Beck Anxiety Inventory; BDI-II = Beck Depression Inventory – II; MPS= Multidimensional Perfectionism Scale;

Table 5. Group comparisons on the NJRE-Q-R Severity total and single items

	OCD (30)	AG (12)	DG (11)	Analysis of covariance outcome	Significant SNK post-hoc comparison (p<.05)	η^2 values (OCD vs. AG)	η^2 values (OCD vs. DG)
Frequency	6.1 (0.2)	4.2 (0.4)	3.5 (0.5)	$F_{(2,46)}$=15.8	OCD>AG,DG	0.33	0.57
Intensity	5.4 (0.2)	3 (0.4)	3.2 (0.4)	$F_{(2,46)}$=21.3	OCD>AG,DG	0.46	0.39
Immediate Distress	5.2 (0.3)	3.3 (0.4)	3.4 (0.5)	$F_{(2,46)}$=9.2	OCD>AG,DG	0.30	0.23
Delayed Distress	3.9 (0.3)	2.8 (0.5)	1.7 (0.6)	$F_{(2,46)}$=5.8	OCD>AG,DG	0.10	0.24
Rumination	4.5 (0.3)	2.3 (0.5)	1.5 (0.6)	$F_{(2,46)}$=15.9	OCD>AG,DG	0.27	0.40
Urge to respond	5.2 (0.3)	3.2 (0.6)	2.5 (0.6)	$F_{(2,46)}$=10	OCD>AG,DG	0.19	0.30
Responsibility	4.8 (0.3)	2.6 (0.5)	2.7 (0.6)	$F_{(2,46)}$=8.6	OCD>AG,DG	0.25	0.15
Total Score	35.2 (1.5)	21.4 (2.5)	18.5 (2.9)	$F_{(2,46)}$=19.6	OCD>AG,DG	0.40	0.44

Notes: standard error in brackets; all F values associated with p<.01; SNK= Student Newman Keuls; OCD= Obsessive-compulsive disorder group; AG= Anxious group; DG= Depressed group