



Difficulties in emotion regulation and symptom dimensions in patients with obsessive-compulsive disorder

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Abstract

The present research aimed to investigate the difficulties in emotion regulation (DER) among patients with obsessive-compulsive disorder (OCD) and to predict obsessive-compulsive (OC) symptom dimensions based on DER dimensions. Eighty outpatients with OCD and 80 normal controls completed the Yale-Brown Obsessive Compulsive Scale (Y-BOCS), the Obsessive Compulsive Inventory-Revised (OCI-R), the Difficulties in Emotion Regulation Scale (DERS) and the Depression Anxiety Stress Scales (DASS-21). OCD patients revealed significantly higher scores on DER dimensions including lack of emotional clarity, limited access to emotion regulation strategies and non-acceptance of emotional responses than healthy controls. Partial correlations indicated significant associations between OC dimensions such as checking/doubting, obsessing, mental neutralizing, and ordering with non-acceptance of emotional responses, checking/doubting with lack of emotional awareness, and ordering with limited access to emotion regulation strategies. Results indicated that non-acceptance of emotional responses was a significant predictor of checking/doubting, obsessing, mental neutralizing and ordering. These findings revealed that DER, especially non-acceptance of emotional responses, may constitute evidence to improve our understanding of OCD.

Keywords Difficulties in emotion regulation · Symptom dimensions · Obsessive-compulsive disorder

Introduction

Obsessive-compulsive disorder (OCD) is categorized by obsessions (persistent and intrusive anxiety-producing thoughts) and compulsions (repeated behaviors to control related anxiety) (American Psychiatric Association 2013).

Emotion regulation may explain the psychopathology of OCD (Stern et al. 2014). Cognitive-behavioral models of OCD indicate that dysfunctional beliefs lead individuals to negatively appraise intrusive thoughts, and consequently this appraisal results in increased perceptions of threat and distress (Frost and Steketee 2002; Clark 2004). Individuals use

neutralization efforts to diminish perceived threat and mitigate distress (Clark 2004). According to Cisler and Olatunji (2012), it is possible that emotion regulation intensifies emotional reactivity in anxiety and related disorders. Based on this demonstration, in OCD context, emotion regulation may influence the degree to which intrusive thoughts lead to prolonged negative affective states.

Emotion regulation (ER) is a process through which individuals modify the type or strength of their emotional response through conscious and unconscious processes to fit environmental demands (Aldao et al. 2010). According to Gratz and Roemer (2004), the difficulties in emotion regulation (DER) is considered to be the impaired abilities to the ER including awareness/understanding of emotions, acceptance of emotions, control of impulsive behaviors/acting in accordance with an individual's goals, and applying suitable ER strategies.

Young people with OCD likely have difficulties in emotion regulation. Obsessive thoughts may be related to strong emotions. The fact that individuals with OCD go to great lengths to block out thoughts suggests an intolerance of or difficulty in regulating emotions. The same applies to compulsions: difficulty tolerating emotional states may lead to an urgent need to act in order to avoid the intensity of negative emotions

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(Robinson and Freeston 2014). Findings evidence that OC symptoms and other indicators of dysregulation are associated with each other (Aldao et al. 2010). Therefore, they can concurrently pave the way for studies that have the potential to identify whether emotional dysregulation is a cause or a consequence of OCD-related problems (Aldao et al. 2010). Hence, it seems that DER is particularly important in OCD (Abramowitz et al. 2009).

Coleman et al. (2011) revealed that individuals diagnosed with OCD showed more fear of negative emotions and negative reactivity to emotions; also, they found that maladaptive management of emotions was correlated with checking behaviors. Belloch et al. (2009) reported that getting angry at oneself, a type of non-acceptance, was specific to the OCD individuals. de la Cruz et al. (2013) showed that adults with OCD obtained significantly higher scores on the DER dimensions on the Difficulties in Emotion Regulation Scale (DERS) such as difficulties in impulse control, lack of emotional clarity, non-acceptance, and limited access to ER strategies than normal subjects. Stern et al. (2014) found that OC symptoms such as washing, checking, doubting, ordering, obsessions, hoarding, and neutralizing were significantly associated with poor understanding of emotions in an undergraduate sample. Fergus and Bardeen (2014) in a community sample of adults showed that suppressing emotions, difficulties in impulse control, and absence of emotional clarity were linked to OC symptoms. Allen and Barlow (2009) suggested that improvements in emotion regulation skills were related to decreases in OCD severity. Also, they found the association of limited access to strategies with OC symptoms.

Some studies have shown the relations of emotional problems to hoarding disorder and its intensity (Timpano et al. 2011, 2014). Although hoarding is not currently categorized as an OCD dimension and is considered as a kind of discrete diagnosis named hoarding disorder in DSM-5 (Mataix-Cols et al. 2010, 2013), approximately 15% to 40% of OCD patients show hoarding behaviors (Mataix-Cols et al. 2008).

Although the studies such as de la Cruz et al. (2013), Stern et al. (2014) Fergus and Bardeen (2014) and Belloch et al. (2009) showed the association of DER with OCD, these studies have significant limitations. First, de la Cruz et al. (2013) used a simple comparison between OCD patients and healthy individuals without controlling for factors such as age, education, depression, anxiety and stress as covariates. Second, Stern et al.'s (2014) and Fergus and Bardeen's (2014) studies were performed on normal samples. Third, Belloch et al. (2009) did not specifically examine DER in OCD patients. DER may be correlated with mood states. For example, a number of studies have indicated the relations of DER to symptoms of anxiety (Goldsmith et al. 2013), depression (Mennin et al. 2007), and stress (Goldsmith et al. 2013). Also, Kim et al. (2014) reported that OCD patients had less

education than normal controls. Additionally, the association of age with emotion regulation was proven (Blanchard-Fields et al. 2004; Silvers et al. 2012; Scheibe et al. 2015). Therefore, the present study attempted to cover these limitations. Moreover, the current study with a large sample of clinical OCD patients adds more literature regarding the associations of DER dimensions with OC symptoms by controlling for important factors related to DER and OCD.

Aims and Hypotheses

This study had two aims: (1) to assess differences between OCD patients and normal subjects regarding DER dimensions by controlling for age, education, depression, anxiety and stress as covariates, and (2) to predict OC dimensions through DER dimensions by controlling for age, education, depression, anxiety, stress and OCD severity. Therefore, considering these aims, based on the above-mentioned literature (e.g., de la Cruz et al. 2013), we hypothesized that OCD patients show higher scores on DER dimensions than normal controls after controlling for covariates (hypothesis 1); and according to past studies (e.g., Belloch et al. 2009; de la Cruz et al. 2013; Stern et al. 2014; Fergus and Bardeen 2014), we hypothesized that DER dimensions predict OC dimensions after controlling for covariates (hypothesis 2).

Methods

Participants

Eighty outpatients with principal diagnoses of OCD (age range = 18–54 years) were recruited randomly for this study from the outpatient clinic of Dr. S.M.S.A in Tehran, Iran since October 2015 to March 2016. The psychiatric diagnoses were determined by an experienced psychiatrist (Dr. S.M.S.A) based on the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Patient version (SCID-I/P; First et al. 2002a). Participants were excluded if they suffered from psychotic symptoms, mental retardation, neurological diseases and medical illness. All patients were taking selective serotonin reuptake inhibitors (SSRIs) such as clomipramine (45%), paroxetine (11%), sertraline (6%), and fluvoxamine (38%). Concomitant medications were anxiolytics (45%). Also, 80 healthy controls (42 males and 38 females) were recruited randomly among undergraduate students of Tehran University. They did not have any prior or present background of neurological and psychiatric diagnoses according to the Structured Clinical Interview for DSM-IV-TR Axis I Disorders, Non-Patient version (SCID-I/NP; First et al. 2002b). In order to motivate these students to participate in the study, they were informed that this research is in the

direction of scientific goals. Also, they became aware that the results would be informed to them.

Clinical Measures

Yale-Brown Obsessive Compulsive Scale (Y-BOCS; Goodman et al. 1989): The self-report Y-BOCS with 10 items assesses OCD severity through obsessions (items 1–5) and compulsions (items 6–10) subscales. Each item is scored on a scale ranging from 0 to 4. The Persian version of Y-BOCS developed by Esfahani et al. (2012) was used in the current research with Cronbach's alpha equal to 0.94 (Khosravani et al. 2017a). The Cronbach's alpha of the Y-BOCS was 0.90 in the present research.

Obsessive Compulsive Inventory-Revised (OCI-R; Foa et al. 2002): The 18-item OCI-R as a self-report instrument assesses six OC symptom dimensions including washing concerns, obsessing, checking/doubting, hoarding, ordering, and mental neutralizing on a 5-point Likert scale rating from 0 to 4. The psychometric properties of the scale were supported (Foa et al. 2002; Moritz and Russu 2013). In the present research, we used the Persian version of the OCI-R (Ghassemzadeh et al. 2011). Psychometric properties of the Persian translation of the OCI-R have been confirmed (Ghassemzadeh et al. 2011). The Cronbach's alphas for the Persian version of the total OCI-R, washing concerns, checking/doubting, obsessing, mental neutralizing, ordering and hoarding were reported 0.89, 0.87, 0.81, 0.82, 0.86, 0.60 and 0.86 respectively (Khosravani et al. 2017b). In this study, the Cronbach's alphas of the total OCI-R and its subscales were 0.91, 0.87, 0.83, 0.82, 0.86, 0.84, and 0.86 respectively.

The DERS (Gratz and Roemer 2004): It is a 36-item self-report instrument which evaluates six dimensions of DER named non-acceptance of emotional responses (e.g., "When I am upset, I feel guilty"), difficulties in goal-directed behaviors (e.g., "When I am upset, I have difficulty thinking about anything else"), impulse control difficulties (e.g., "When I am upset, I become out of control"), lack of emotional awareness (e.g., "I am attentive to my feelings"), limited access to emotion regulation strategies (e.g., "When I am upset, I start to feel very bad about myself"), and lack of emotional clarity (e.g., "I have no idea how I am feeling"). The DERS has good test-retest reliability, construct and predictive validity (Gratz and Tull 2010). The DERS Persian version (Mazaheri 2015) was applied in the present study. The psychometric properties of the DERS Persian version were supported (Mazaheri 2015). In the present study, the Cronbach's alphas of the total DERS and its above-mentioned subscales were 0.89, 0.80, 0.75, 0.74, 0.75, 0.86 and 0.76 respectively.

Depression Anxiety Stress Scales-21 (DASS-21; Lovibond and Lovibond 1995): This measure is a self-report questionnaire which contains 21 items. This scale examines depression (7 items), anxiety (7 items) and

stress (7 items). Each item is measured on a four-point scale between 0 and 3. The Cronbach's alphas for DASS-21, depression, anxiety and stress were 0.97, 0.90, 0.95 and 0.93, respectively (Crawford and Henry 2003). In the current study, we used the Persian version of the DASS-21 developed by Asghari et al. (2008) with Cronbach's alphas 0.91, 0.89 and 0.88 for depression, anxiety and stress respectively (Khosravani et al. 2017c). In this study, the Cronbach's alphas of 0.91, 0.89 and 0.88 were found for depression, anxiety and stress respectively.

Statistical Analyses

Differences between OCD patients and normal controls concerning socio-demographic characteristics were evaluated via chi-square and t-test. The multiple, separate analyses of variance (ANOVAs) as well as the analysis of covariance (ANCOVA) were used to examine hypotheses 1. In ANOVAs, all six DER dimensions were dependent on variables and OCD was an independent variable. Pearson's (r) and partial (pr) correlations were used to survey the associations of DER dimensions with OC symptom dimensions in OCD patients. To study hypothesis 2, multiple linear regression analyses (stepwise method) were performed to predict OC symptom dimensions via DER dimensions. In the regression analyses, all DER dimensions were entered as predictor variables and OC symptom dimensions were outcome variables. Also, age, education, OCD severity, depression, anxiety and stress were entered as covariate variables. The SPSS-22 (IBM Corporation, Armonk, NY, USA) was used to analyze the data in the present research. The Cronbach's α coefficient was used to measure the reliability of the applied scales to this research. The data were found to be normal by using the Kolmogorov-Smirnov test. The examination of statistical assumption for liner regression analyses showed that multicollinearity was not observed among predictor variables (associations among DER dimensions as predictor variables were less than 0.90 and all variance inflation factors (VIFs) were lower than 10). Also, there were no missing values. To control type 1 error inflation, the false discovery rate correction was performed (Benjamini and Hochberg 2000). The value of 0.014 was assigned as its alpha coefficient for 6 tests (one per DERS).

Results

Demographic and Clinical Characteristics

The demographic and clinical characteristics are presented in Table 1. Patients with OCD had significantly less education than normal controls ($p < 0.001$) and so education was used as

Table 1 Socio-demographic and clinical characteristics of patients with obsessive-compulsive disorder and normal controls (mean \pm S.D.)

Characteristics	OCD outpatients ($n = 80$)	Normal controls ($n = 80$)	Statistics	
			t or χ^2	p
Age, years	30.43 \pm 9.46	31.40 \pm 8.23	0.95	0.41
Male/female	42/38	42/38	0.15	0.69
Education, years	12.83 \pm 4.93	17.45 \pm 1.89	180.60	< 0.001*
Age at OCD onset, years	25.18 \pm 8.53	—	—	—
Illness duration, years	3.61 \pm 2.94	—	—	—
Y-BOCS total score	25.78 \pm 9.13	—	—	—
Obsession	13.64 \pm 4.73	—	—	—
Compulsion	11.84 \pm 4.91	—	—	—
DASS-21 total score	39.81 \pm 10.35	13.80 \pm 11.13	15.27	< 0.001*
Depression	13.21 \pm 4.15	3.79 \pm 4.16	14.33	< 0.001*
Anxiety	13.05 \pm 3.65	3.62 \pm 3.32	17.03	< 0.001*
Stress	13.55 \pm 3.49	6.26 \pm 4.75	11.06	< 0.001*
OCI-R	39.03 \pm 15.16	—	—	—
Washing concerns	6.55 \pm 3.01	—	—	—
Checking/doubting	6.46 \pm 2.58	—	—	—
Obsessing	7.20 \pm 2.58	—	—	—
Mental neutralizing	5.56 \pm 3.23	—	—	—
Ordering	7.51 \pm 4.64	—	—	—
Hoarding	5.74 \pm 3.05	—	—	—

DASS-21: Depression Anxiety Stress Scales-21; Y-BOCS: Yale-Brown Obsessive Compulsive Scale; OCI-R: Obsessive Compulsive Inventory-Revised

Depression, anxiety, and stress were assessed by DASS-21

OCD severity was measured by Y-BOCS

* $p < 0.001$

a covariate. Moreover, these patients earned significantly higher scores on depression, anxiety, and stress by the DASS-21 than normal controls ($p < 0.001$). Mean \pm S.D. of age at onset and illness duration in OCD patients were 25.18 \pm 8.53 and 3.61 \pm 2.94 years, respectively.

Comparison of DER Dimensions Between OCD Patients and Normal Controls

The results of multiple, separate ANOVAs revealed a significant difference between patients with OCD and normal controls in all DER dimensions on the DERS ($p < 0.001$) (Table 2). OCD patients earned higher scores on all DER dimensions than normal subjects ($p < 0.001$). Also, the results of ANCOVA showed that compared to normal controls, OCD patients reported higher levels of non-acceptance of emotional responses ($F = 10.56$, $p < 0.001$), lack of emotional awareness ($F = 1.25$, $p < 0.05$), and limited access to emotion regulation strategies ($F = 5.27$, $p < 0.05$), by controlling for depression, anxiety, stress, education and age as covariates (Table 2). Thus, the present findings are partly consistent with hypothesis 1.

Relationships Between DER Dimensions and OC Symptoms

Pearson's correlations (r) showed that non-acceptance of emotional responses, limited access to emotion regulation strategies, and impulse control difficulties were positively related to all six OC symptom dimensions of washing concerns ($p < 0.01$), checking/doubting ($p < 0.01$), obsessing ($p < 0.01$), mental neutralizing ($p < 0.01$), ordering ($p < 0.01$) and hoarding ($p < 0.01$). Difficulties engaging in goal-directed behavior showed significant and positive correlations with washing concerns ($p < 0.01$), obsessing ($p < 0.01$), checking/doubting ($p < 0.05$) and ordering ($p < 0.05$). Lack of emotional awareness had positive relationship to checking/doubting ($p < 0.05$). Lack of emotional clarity was positively associated with all six OC symptom dimensions, except for ordering ($p < 0.01$) (Table 3).

In order to control the effects of age, education, depression, anxiety, stress and OCD severity on the relations of DER dimensions to OC symptoms, partial correlation (pr) was performed. The results revealed that age and gender were not significantly related to OC dimensions. Non-acceptance of emotional responses was positively related

Table 2 Comparison between OCD patients and normal controls in DER subscales (mean \pm S.D.)

Characteristics	OCD outpatients (<i>n</i> = 80)	Normal controls (<i>n</i> = 80)	<i>F</i> ^a	<i>F</i> ^b
DER Dimensions on the DERS				
Non-acceptance of emotional responses	17.33 \pm 4.54	9.65 \pm 4.20	95.05***	10.56**
Difficulties engaging in goal directed behavior	16.27 \pm 3.83	11.49 \pm 4.68	50.23***	0.18
Impulse control difficulties	17.55 \pm 4.40	12.59 \pm 4.82	46.28***	0.92
Lack of emotional awareness	17.80 \pm 4.22	14.46 \pm 5.04	20.64***	1.25*
Limited access to emotion regulation strategies	23.74 \pm 6.42	15.71 \pm 5.22	75.29***	5.27*
Lack of emotional clarity	14.38 \pm 2.96	9.89 \pm 3.80	69.52***	0.02

All degrees of freedom = 1125

^a Analysis of variance (ANOVA)

^b Analysis of covariance (ANCOVA) by controlling for age, education, depression, anxiety, and stress as covariates

DER: difficulties in emotion regulation; DERS: Difficulties in Emotion Regulation Scale; OCD: obsessive-compulsive disorder; DASS-21: Depression Anxiety Stress Scales-21

**p* < 0.05

***p* < 0.01

****p* < 0.001

to checking/doubting (*p* < 0.05), obsessing (*p* < 0.01), mental neutralizing (*p* < 0.01) and ordering (*p* < 0.01). Lack of emotional awareness had positive correlation with checking/doubting (*p* < 0.05). Limited access to emotion regulation strategies had significant and positive relation to ordering (*p* < 0.05). Other DER dimensions did not have any significant relations to OC symptoms (Table 3).

Multiple regression analyses were also performed to predict OC symptom dimensions by DER dimensions. The results indicated that after controlling for the effects of age, education, depression, anxiety, stress and OCD severity, non-acceptance of emotional responses was a significant predictor for each of the checking/doubting, obsessing, mental neutralizing, and ordering dimensions. Non-acceptance of emotional responses was the significant predictor of checking/doubting, accounting for 16% ($\Delta R^2 = 0.46 - 0.30 = 0.16$) of the total variance for this dimension ($\beta = 0.53$, $t = 5.46$, $p < 0.001$), 32% of the total variance for obsessing ($\Delta R^2 = 0.42 - 0.06 - 0.04 = 0.32$, $\beta = 0.34$, $t = 2.87$, $p < 0.001$), 22% of the total variance for mental neutralizing ($\Delta R^2 = 0.60 - 0.34 - 0.04 = 0.22$, $\beta = 0.36$, $t = 4.68$, $p < 0.001$) and 10% of the total variance for ordering ($\Delta R^2 = 0.27 - 0.17 = 0.10$, $\beta = 0.36$, $t = 2.15$, $p < 0.01$) after controlling for the effects of age, education, OCD severity, depression, anxiety, and stress (Table 4). Thus, hypothesis 2 was partially confirmed; so that among six DER dimensions, non-acceptance of emotional responses was the significant predictor of four OC symptom dimensions including checking/doubting, obsessing, mental neutralizing and ordering.

Discussion

The present study aimed to investigate the DER dimensions of patients with OCD and to clarify the relations of DER dimensions to OC symptom dimensions and clinical variables.

Differences between OCD patients and healthy subjects regarding DER dimensions.

The findings indicated that OCD patients gained higher scores on all DER dimensions without controlling for age, education, depression, anxiety and stress as covariates than normal controls, but after controlling for these covariates, OCD patients had higher levels in lack of emotional clarity, non-acceptance and limited access to ER strategies than normal controls. These results were in line with the previous studies (de la Cruz et al. 2013). Therefore, based on our finding, it can be concluded that non-acceptance, limited access to ER strategies, and lack of clarity may be specific to OCD patients in presence or absence of the effects of age, education, depression, anxiety and stress. Similar to our results, Levitt et al. (2004) by examining coping and emotion regulation in OCD patients and healthy individuals documented that OCD patients exceeded healthy subjects concerning maladaptive coping and avoidance. These authors also concluded that lack of adaptive coping was found to associate strongly with resistance to OCD symptoms via controlling for depression. DER is considered to be a common factor throughout the spectrum of emotional problems (Berking and Wupperman 2012). Timpano et al. (2009) revealed that hoarding behaviors were correlated with more difficulties in tolerating distress

Table 3 Pearson's correlations(*r*) and partial correlations (*pr*) between OCD symptom dimensions and DER subscales in patients with obsessive-compulsive disorder (*n* = 80)

	Washing concerns	Checking/doubting	Obsessing	Mental neutralizing	Ordering	Hoarding
DER Dimensions on the DERS						
Non-acceptance of emotional responses, <i>r</i> (<i>pr</i>)	0.45** (0.16)	0.53** (0.25*)	0.57** (0.31**)	0.56** (0.32**)	0.44** (0.33**)	0.55** (0.19)
Difficulties engaging in goal directed behavior, <i>r</i> (<i>pr</i>)	0.34** (0.19)	0.27* (0.10)	0.35** (0.15)	0.07 (0.01)	0.25* (0.15)	0.12 (0.01)
Impulse control difficulties, <i>r</i> (<i>pr</i>)	0.37** (0.15)	0.35** (0.10)	0.42** (0.17)	0.29** (0.10)	0.33** (0.21)	0.33** (0.05)
Lack of emotional awareness, <i>r</i> (<i>pr</i>)	0.02 (0.01)	0.23* (0.22*)	0.01 (0.01)	0.09 (0.8)	0.19 (0.06)	0.13 (0.10)
Limited access to emotion regulation strategies, <i>r</i> (<i>pr</i>)	0.37** (0.05)	0.45** (0.15)	0.42** (0.05)	0.37** (0.04)	0.38** (0.25*)	0.43** (0.02)
Lack of emotional clarity, <i>r</i> (<i>pr</i>)	0.38** (0.09)	0.31** (0.07)	0.39** (0.10)	0.48** (0.19)	0.13 (0.09)	0.46** (0.07)
Gender, <i>r</i> (<i>pr</i>)	0.11 (0.10)	0.16 (0.13)	-0.12 (-0.11)	0.13 (0.12)	0.19 (0.17)	0.03 (0.02)
Age, <i>r</i> (<i>pr</i>)	-0.32** (-0.15)	-0.08 (-0.001)	-0.24* (-0.08)	-0.17 (-0.00)	-0.04 (-0.001)	-0.09 (-0.002)

pr: partial correlations with controlling for age, education, depression, anxiety, stress and OCD severity as covariates

r: Pearson's correlations without controlling for covariates

DER: difficulties in emotion regulation; DERS: difficulties in emotion regulation scale

**p* < 0.05

***p* < 0.01

and greater fear of internal feelings related to anxiety. However, according to Abramowitz et al. (2009), experiential avoidance and DER appear to be particularly significant in OCD.

The Relations of DER Dimensions with OC Symptoms

Partial correlations revealed that the dimensions of checking/doubting, obsessing, mental neutralizing and ordering were correlated with non-acceptance of emotional responses. Checking/doubting had a significant and positive relevance to lack of emotional awareness. Ordering was associated with limited access to emotion regulation strategies after controlling for age, education, depression, anxiety, stress and OCD severity. These data were consistent with past studies (Stern et al. 2014; Fergus and Bardeen 2014; de la Cruz et al. 2013). Also, multiple regression analyses revealed that non-acceptance of emotional responses was the significant predictor for each of the checking/doubting, obsessing, mental neutralizing, and ordering dimensions, after controlling for the effects of age, education, depression, anxiety, stress and OCD severity. These results were in accordance with past studies (Belloch et al. 2009). Belloch et al. (2009) showed that in OCD adults, getting angry at oneself as a type of non-acceptance was exclusive to the OCD sample.

Non-acceptance, suppression and avoidance of emotional responses lead to repetition, intrusiveness as well as disturbing thoughts, emotions and expectations. Much research attention has been paid to the role of emotional suppression. Purdon (1999) proposed that intrusive thoughts and emotional distress might increase via suppressing inner experiences. The

propensity to prevent undesirable inner states or non-acceptance is thought to elevate distress and symptoms, for example via disturbance in learning, extinction and low life quality connected to avoidance (Hayes et al. 1996) or via elevated discomforting thoughts through the 'rebound effect' deriving from suppressing thoughts (Wegner 1994).

When people suppress their emotions, they will experience more negative emotions, less positive emotions, social problems, and poor qualities of life; then, such experiences make them more vulnerable to anxiety and mood disorders (Gross and John 2003). There is evidence that individuals with intensified OC symptoms tend more likely to avoid novelty (Coles et al. 2006). Also, one possible explanation for the observed correlations between higher levels of OC symptoms and non-acceptance of emotional responses may be that people with heightened OC symptoms have a more common fear of any perceived loss of control (e.g., experiencing emotion; Moulding and Kyrios 2006). Therefore, patients with OCD may not accept the emotional responses because of fear and anxiety, avoiding this fear and anxiety, and loss of their perceived control.

Stern et al.'s (2014) speculated that a motivation to avoid emotions might underlie OCD. It means compulsions may be used to reduce emotional distress engendered by an intrusive thought. Consistent with this rationale, OC symptoms had unique associations with difficulties in controlling behavior while experiencing negative emotions. The tendency to compulsive actions in response to negative emotions has been demonstrated to correlate with maladaptive behaviors as efforts to decrease, or avoid, negative emotional experiences (Cyders and Smith 2008). Marcks and Woods (2005) reported

Table 4 Final models for the three steps of regression analyses to predict OC dimensions by controlling for age, education, depression, anxiety, stress and OCD severity in OCD patients ($n = 80$)

	R ²	F	R ² change	B.SE	SE	β	t	p
Predicting washing concerns								
Final model	0.47	34.37						
Constant				3.78	1.16		3.27	0.12
Y-BOCS			0.41	0.20	0.03	0.61	7.36	<0.001***
age			0.06	-0.08	0.03	-0.25	-2.96	<0.01**
Predicting checking/ doubting								
Final model	0.46	67.04						
Constant				1.57	0.63		2.47	0.16
Y-BOCS			0.30	0.19	0.02	0.68	8.19	<0.001***
Non-acceptance of emotional responses			0.16	0.30	0.06	0.53	5.46	<0.001***
Predicting obsessing								
Final model	0.42	18.26						
Constant				2.34	1.25		1.87	0.07
Non-acceptance of emotional responses			0.32	0.19	0.07	0.34	2.87	<0.001***
DASS-21			0.06	0.08	0.03	0.33	2.77	<0.01**
Age			0.04	-0.06	0.02	-0.20	-2.28	<0.05*
Predicting mental neutralizing								
Final model	0.60	56.89						
Constant				0.95	1.10		0.87	0.39
Y-BOCS			0.34	0.25	0.03	0.69	9.19	<0.001***
Non-acceptance of emotional responses			0.22	0.20	0.09	0.36	4.68	<0.001***
Education			0.04	-0.14	0.05	-0.21	-2.76	<0.05*
Predicting ordering								
Final model	0.27	28.20						
Constant				0.84	1.33		0.63	0.53
Y-BOCS			0.17	0.26	0.05	0.52	5.31	<0.001***
Non-acceptance of emotional responses			0.10	0.37	0.17	0.36	2.15	<0.01**
Predicting hoarding								
Final model	0.55	47.70						
Constant				-1.91	0.93		-2.05	0.04
Y-BOCS			0.52	0.20	0.03	0.59	6.20	<0.001***
DASS-21			0.03	0.07	0.03	0.23	2.40	<0.05*

β = standardized coefficient; Y-BOCS: Yale-Brown Obsessive Compulsive Scale; DASS-21: Depression Anxiety Stress Scales-21; OCD: obsessive-compulsive disorder

Depression, anxiety, and stress were assessed by DASS-21

OCD severity was measured by Y-BOCS

* $p < 0.05$

** $p < 0.01$

*** $p < 0.001$

that non-clinical subjects who use a strategy based on acceptance rather than repression, experience a kind of reduction in their level of sadness associated with intrusive thoughts.

The present study demonstrated the relationship between lack of emotional awareness and checking/doubting. Intrusive doubt is a common and central feature in OCD (Summerfeldt 2007; Szechtman and Woody 2004; Boyer and Liénard 2006).

Similar to our results, new models of OCD proposed that the extensive doubts in OCD derived from impaired “subjective conviction” or “feeling of knowing”. “Feeling of knowing” has been specified by Szechtman and Woody (2004) as “a subjective conviction functionally separate from knowledge of objective reality (p. 115)” in relation to OCD. These researchers have assumed that unlike healthy subjects, the

behavioral outcomes of OCD subjects cannot induce this internal feeling and leaves them in a persistent mode of doubt and anxiety concerning their security and capability to eschew possible harm. Boyer and Liénard (2006) indicated the association between OC symptoms and lack of “satiety feedback feelings” resulting in doubt and uncertainty on the correct implementation of actions, as a precaution in reaction to determination of possible risks. Lastly, Summerfeldt (2007) also implied a lack of “feeling of knowing” in OCD subjects, which particularly causes incompleteness and “not just right” experiences. It is possible that individuals with OCD have lack of emotional awareness, whereas meta-cognitive processes including extreme self-monitoring and self-questioning result in doubting/checking regarding lack of emotional awareness.

Limited access to suitable strategies was found to be higher in adults with OCD vs. healthy subjects (de la Cruz et al. 2013). Abramowitz et al. (2007) suggested that compared to adults with OCD, individuals with co-morbid OCD and depression exhibited more negative interpretations regarding obsessions and further overestimated their thoughts. The co-occurrence of obsessive-compulsive and depression may enhance negative evaluation of a situation. The consequence of this type of evaluation may result in limited access to effective strategies. This finding aligns with the previous study demonstrating the link of depression to rumination as the non-adaptive ER strategy (Garnefski and Kraaij 2006). In the present study, 77.4% ($n = 62$) of OCD patients showed depression symptoms (severe to very severe) based on the DASS-21 cut-off scores.

In this study after controlling for age, education, depression, anxiety, stress and OCD severity, except for non-acceptance of emotional responses, other DER dimensions did not predict OC symptom dimensions. Also, there were no differences between OCD patients and normal controls regarding some DER aspects such as problems performing goal-directed behaviors, difficulties in impulse control and lack of emotional clarity. Moreover, the OC symptoms of washing concerns and hoarding were predicted by none of DER dimensions. One possible reason can be due to the effects of medications such as SSRIs on depression, anxiety, stress and OCD severity, because all patients received SSRIs. Since depression, anxiety and stress were associated with DER (Mennin et al. 2007; Goldsmith et al. 2013), some medications including SSRIs may improve some DER features by reducing depression, anxiety (Worthington III et al. 2005; Jakubovski et al. 2015), stress (Stein et al. 2000) and OCD severity (Soomro et al. 2008; Bloch et al. 2010). Emotion-related brain areas (Duman and Monteggia 2006) are regulated by antidepressant drugs (Castrén 2004; Warner-Schmidt and Duman 2006). Non-significant results for hoarding in this study have suggested that hoarding is a distinct aspect of OCD. This result may further confirm the

differentiation of hoarding from OCD (Mataix-Cols et al. 2010). Similarly, de la Cruz et al. (2013) did not observe unique correlations between hoarding on the OCI-R (Foa et al. 2002) and DER dimensions. However, these conclusions are probabilistic and require further research.

Overall, the present study with a relatively large sample size demonstrated that the existence of DER including non-acceptance of emotional responses in OCD patients may contribute to OC symptom dimensions beyond the effects of age, education, depression, anxiety, stress and OCD severity.

Implications of this Study

One therapeutic implication of finding obsessive-compulsive symptoms to be marked by emotion regulation difficulties is that emotion regulation abilities might be improved prior to individuals with OCD undergoing exposure-based therapies (de la Cruz et al. 2013), as it is the case in such treatments for individuals to be exposed to feared intrusive thoughts. Indeed, research indicates that emotional acceptance decreases emotional discomfort and increases willingness to participate in distressing tasks (Levitt et al. 2004). As such, improving emotion regulation abilities before completing exposure-and-response prevention may increase engagement in exposures and facilitate symptom reduction for OCD patients. Given that our results demonstrate that non-acceptance of emotional response is the unique predictor for OC symptom dimensions, a potential therapeutic implication of this finding could be the use of acceptance and commitment therapy (ACT; Hayes et al. 1999). ACT may tend individuals to participate in difficult activities when encountering with undesirable emotions (Levitt et al. 2004), which culminates in change in OCD. Also, it has been found that ACT and SSRI together reduce OCD severity (Rohani et al. 2018). It has been shown that ACT compared with progressive relaxation training (PRT) has effective influences on decreasing OCD severity (Twohig et al. 2010). In addition, ACT intervention was found to reduce compulsions, anxiety and depression in OCD patients (Twohig et al. 2006).

Limitations of the Present Research

There were some limitations in the present study. First, the results were extracted by using a cross-sectional design. So, causal conclusions are not possible to be derived. Second, there were no psychiatric control groups for comparison between OCD patients and other psychiatric disorders in DER. Third, the classification of DER dimensions, OC symptom dimensions, and other clinical factors relied on self-report instruments. Fourth, the use of a control group including undergraduate students is another limitation. Fifth, comorbid Axis II disorders (e.g., borderline personality disorder) which are considered as significant facets in the study of DER could not be

assessed in this research. Further studies are needed to find any differences in DER between OCD patients with and without personality disorders. Lastly, conclusions relied on treatment-seeking outpatients are not generalizable to all patients with OCD. In the current study, all OCD patients were taking SSRIs. Medication may influence emotion regulation in OCD patients. It was found that medications, particularly SSRIs, can promote emotion regulation (Harmer and Cowen 2013) and dysfunctional emotion processing (Harmer 2012). SSRIs, by decreasing the processing of negative affective perception versus positive emotional (Harmer et al. 2004) and reducing psychological distress (e.g., depression, anxiety and stress), might improve emotion regulation difficulties. In addition, medications were found to improve emotion perception (Penn et al. 2009).

Conclusions

The findings of this study suggested that the DER dimension of non-acceptance of emotional responses could be related to OC symptoms. These findings revealed that non-acceptance of emotional responses might constitute evidence to improve our understanding of OCD.

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Compliance with Ethical Standards

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the Helsinki declaration (2013) and its later amendments or comparable ethical standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

Conflict of Interest The author(s) declare that they have no conflict of interest.

References

- Abramowitz, J. S., Storch, E. A., Keeley, M., & Cordell, E. (2007). Obsessive-compulsive disorder with comorbid depression: What is the role of cognitive factors? *Behaviour Research and Therapy*, *45*, 2257–2267. <https://doi.org/10.1016/j.brat.2007.04.003>.
- Abramowitz, J. S., Lackey, G. R., & Wheaton, M. G. (2009). Obsessive-compulsive symptoms: the contribution of obsessional beliefs and experiential avoidance. *Journal of Anxiety Disorders*, *23*, 160–166. <https://doi.org/10.1016/j.janxdis.2008.06.003>.
- Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychology Review*, *30*(2), 217–237. <https://doi.org/10.1016/j.cpr.2009.11.004>.
- Allen, L. B., & Barlow, D. H. (2009). Relationship of exposure to clinically irrelevant emotion cues and obsessive-compulsive symptoms. *Behavior Modification*, *33*(6), 743–762. <https://doi.org/10.1177/0145445509344180>.
- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). Arlington: American Psychiatric Publishing.
- Asghari, A., Saed, F., & Dibajnia, P. (2008). Psychometric properties of the Depression Anxiety Stress Scales-21 (DASS-21) in a non-clinical Iranian sample. *International Journal of Psychology*, *2*(2), 82–102. <https://www.researchgate.net/publication/274721545>.
- Belloch, A., Morillo, C., & Garcia-Soriano, G. (2009). Strategies to control unwanted intrusive thoughts: which are relevant and specific in obsessive-compulsive disorder? *Cognitive Therapy and Research*, *33*(1), 75–89. <https://doi.org/10.1007/s10608-007-9141-2>.
- Benjamini, Y., & Hochberg, Y. (2000). On the adaptive control of the false discovery rate in multiple testing with independent statistics. *Journal of Educational and Behavioral Statistics*, *25*(1), 60–83. <https://doi.org/10.2307/1165312>.
- Berking, M., & Wupperman, P. (2012). Emotion regulation and mental health: recent findings, current challenges, and future directions. *Current Opinion in Psychiatry*, *25*(2), 128–134. <https://doi.org/10.1097/ycp.0b013e3283503669>.
- Blanchard-Fields, F., Stein, R., & Watson, T. L. (2004). Age differences in emotion-regulation strategies in handling everyday problems. *The Journals of Gerontology Series B: Psychological Sciences and Social Sciences*, *59*(6), P261–P269. <https://doi.org/10.1093/geronb/59.6.P261>.
- Bloch, M. H., McGuire, J., Landeros-Weisenberger, A., Leckman, J. F., & Pittenger, C. (2010). Meta-analysis of the dose-response relationship of SSRI in obsessive-compulsive disorder. *Molecular Psychiatry*, *15*(8), 850–855. <https://doi.org/10.1038/mp.2009.50>.
- Boyer, P., & Liénard, P. (2006). Precaution systems and ritualized behavior. *Behavioral and Brain Sciences*, *29*(6), 635–641. <https://doi.org/10.1017/s0140525x06009332>.
- Castrén, E. (2004). Neurotrophic effects of antidepressant drugs. *Current Opinion in Pharmacology*, *4*(1), 58–64. <https://doi.org/10.1016/j.coph.2003.10.004>.
- Cisler, J. M., & Olatunji, B. O. (2012). Emotion regulation and anxiety disorders. *Current Psychiatry Reports*, *14*(3), 182–187. <https://doi.org/10.1007/s11920-012-0262-2>.
- Clark, D. A. (2004). *Cognitive-behavioral therapy for OCD*. New York: Guilford.
- Coleman, S. L., Pietrefesa, A. S., Holaway, R. M., Coles, M. E., & Heimberg, R. G. (2011). Content and correlates of checking related to symptoms of obsessive compulsive disorder and generalized anxiety disorder. *Journal of Anxiety Disorders*, *25*, 293–301. <https://doi.org/10.1016/j.janxdis.2010.09.014>.
- Coles, M. E., Schofield, C. A., & Pietrefesa, A. S. (2006). Behavioral inhibition and obsessive-compulsive disorder. *Journal of Anxiety Disorders*, *20*, 1118–1132. <https://doi.org/10.1016/j.janxdis.2006.03.003>.
- Crawford, J. R., & Henry, J. D. (2003). The Depression Anxiety Stress Scales (DASS): Normative data and latent structure in a large non-clinical sample. *British Journal of Clinical Psychology*, *42*(2), 111–131. <https://doi.org/10.1348/014466503321903544>.
- Cyders, M. A., & Smith, G. T. (2008). Emotion-based dispositions to rash action: Positive and negative urgency. *Psychological Bulletin*, *134*(6), 807. <https://doi.org/10.1037/a0013341>.
- Duman, R. S., & Monteggia, L. M. (2006). A neurotrophic model for stress-related mood disorders. *Biological Psychiatry*, *59*, 1116–1127. <https://doi.org/10.1016/j.biopsych.2006.02.013>.
- Esfahani, S. R., Motaghypour, Y., Kamkari, K., Zahireadin, A., & Janbozorgi, M. (2012). Reliability and Validity of the Persian Version of the Yale-Brown Obsessive-Compulsive Scale (Y-BOCS). *Iran Journal of Psychiatry and Clinical Psychology*,

- 17(4), 297–303 (In Persian). http://ijpcp.iuims.ac.ir/browse.php?a_code=A-10-1-449&slc_lang=en&sid=1.
- Fergus, T. A., & Bardeen, J. R. (2014). Emotion regulation and obsessive-compulsive symptoms: A further examination of associations. *Journal of Obsessive-Compulsive and Related Disorders*, 3(3), 243–248. <https://doi.org/10.1016/j.jocrd.2014.06.001>.
- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (2002a). *Structured Clinical Interview for DSM-IV-TR axis I disorders, Research Version, Patient edition (SCID-I/P)*. New York: Biometrics Research Department, New York Psychiatric Institute.
- First, M. B., Spitzer, R. L., Gibbon, M., & Williams, J. B. W. (2002b). *Structured Clinical Interview for DSM-IV-TR axis I disorders, Research Version, Non-patient edition (SCID-I/NP)*. New York: Biometrics Research Department, New York Psychiatric Institute.
- Foa, E. B., Huppert, J. D., Leiberg, S., Langner, R., Kichic, R., Hajcak, G., & Salkovskis, P. M. (2002). The Obsessive-Compulsive Inventory: development and validation of a short version. *Psychological Assessment*, 14(4), 485–495. <https://doi.org/10.1037/1040-3590.14.4.485>.
- Frost, R. O., & Steketee, G. (2002). *Cognitive approaches to obsessions and compulsions: theory, assessment and treatment*. Oxford: Elsevier.
- Gamefski, N., & Kraaij, V. (2006). Relationships between cognitive emotion regulation strategies and depressive symptoms: A comparative study of five specific samples. *Personality Individual and Differences*, 40, 1659–1669. <https://doi.org/10.1016/j.paid.2005.12.009>.
- Ghassemzadeh, H., Shams, G., Abedi, J., Karamghadiri, N., Ebrahimkhani, N., & Rajabloo, M. (2011). Psychometric properties of a Persian-language version of the obsessive-compulsive inventory-revised: OCI-R-Persian. *Psychology*, 2(03), 210–215. <https://doi.org/10.4236/psych.2011.23032>.
- Goldsmith, R. E., Chesney, S. A., Heath, N. M., & Barlow, M. R. (2013). Emotion regulation difficulties mediate associations between betrayal trauma and symptoms of posttraumatic stress, depression, and anxiety. *Journal of Traumatic Stress*, 26(3), 376–384. <https://doi.org/10.1002/jts.21819>.
- Goodman, W. K., Price, L. H., Rasmussen, S. A., Mazure, C., Fleischmann, R. L., Hill, C. L., Heninger, G. R., & Charney, D. S. (1989). The Yale-Brown obsessive compulsive scale: I. Development, use, and reliability. *Archives of General Psychiatry*, 46(11), 1006–1011. <https://doi.org/10.1001/archpsyc.1989.01810110048007>.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional assessment of emotion regulation and dysregulation: Development, factor structure, and initial validation of the difficulties in emotion regulation scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41–54. <https://doi.org/10.1023/b:joba.0000007455.08539.94>.
- Gratz, K. L., & Tull, M. T. (2010). Emotion regulation as a mechanism of change in acceptance and mindfulness-based treatments. In R. Baer (Ed.), *Assessing mindfulness and acceptance: Illuminating the process of change* (pp. 105–133). Oakland: New Harbinger Publications.
- Gross, J. J., & John, O. P. (2003). Individual differences in two emotion regulation processes: implications for affect, relationships, and well-being. *Journal of Personality and Social Psychology*, 85(2), 348. <https://doi.org/10.1037/0022-3514.85.2.348>.
- Harmer, C. J. (2012). Emotional processing and antidepressant action. *Current Topics in Behavioral Neurosciences*, 14, 209–222. https://doi.org/10.1007/7854_2012_210.
- Harmer, C. J., & Cowen, P. J. (2013). ‘It’s the way that you look at it’—a cognitive neuropsychological account of SSRI action in depression. *Philosophical Transactions of the Royal Society B: Biological Sciences*, 368(1615), 20120407. <https://doi.org/10.1098/rstb.2012.0407>.
- Harmer, C. J., Shelley, N. C., Cowen, P. J., & Goodwin, G. M. (2004). Increased positive versus negative affective perception and memory in healthy volunteers following selective serotonin and norepinephrine reuptake inhibition. *American Journal of Psychiatry*, 161(7), 1256–1263. <https://doi.org/10.1176/appi.ajp.161.7.1256>.
- Hayes, S. C., Wilson, K. G., Gifford, E. V., Follette, V. M., & Strosahl, K. (1996). Experiential avoidance and behavioral disorders: A functional dimensional approach to diagnosis and treatment. *Journal of Consulting and Clinical Psychology*, 64(6), 1152. <https://doi.org/10.1037/0022-006X.64.6.1152>.
- Hayes, S. C., Strosahl, K. D., & Wilson, K. G. (1999). *Acceptance and Commitment Therapy: An experiential approach to behavior change*. New York: The Guilford Press.
- Jakubovski, E., Varigonda, A. L., Freemantle, N., Taylor, M. J., & Bloch, M. H. (2015). Systematic review and meta-analysis: dose-response relationship of selective serotonin reuptake inhibitors in major depressive disorder. *American Journal of Psychiatry*, 173(2), 174–183. <https://doi.org/10.1176/appi.ajp.2015.15030331>.
- Khosravani, V., Bastan, F. S., Ardestani, M. S., & Ardakani, R. J. (2017a). Early maladaptive schemas and suicidal risk in an Iranian sample of patients with obsessive-compulsive disorder. *Psychiatry Research*, 255, 441–448. <https://doi.org/10.1016/j.psychres.2017.06.080>.
- Khosravani, V., Ardestani, M. S., Bastan, F. S., & Kamali, Z. (2017b). The relationship between alexithymia and symptom dimensions in patients with obsessive-compulsive disorder. *Journal of Obsessive-compulsive and Related Disorders*, 14, 127–133. <https://doi.org/10.1016/j.jocrd.2017.04.001>.
- Khosravani, V., Kamali, Z., Ardakani, R. J., & Ardestani, M. S. (2017c). The relation of childhood trauma to suicide ideation in patients suffering from obsessive-compulsive disorder with lifetime suicide attempts. *Psychiatry Research*, 255, 139–145. <https://doi.org/10.1016/j.psychres.2017.05.032>.
- Kim, J. E., Lee, S. W., & Lee, S. J. (2014). Relationship between early maladaptive schemas and symptom dimensions in patients with obsessive-compulsive disorder. *Psychiatry Research*, 215(1), 134–140. <https://doi.org/10.1016/j.psychres.2013.07.036>.
- de la Cruz, L. F., Landau, D., Iervolino, A. C., Santo, S., Pertusa, A., Singh, S., & Mataix-Cols, D. (2013). Experiential avoidance and emotion regulation difficulties in hoarding disorder. *Journal of Anxiety Disorders*, 27(2), 204–209. <https://doi.org/10.1016/j.janxdis.2013.01.004>.
- Levitt, J. T., Brown, T. A., Orsillo, S. M., & Barlow, D. H. (2004). The effects of acceptance versus suppression of emotion on subjective and psychophysiological response to carbon dioxide challenge in patients with panic disorder. *Behavior Therapy*, 35(4), 747–766. [https://doi.org/10.1016/s0005-7894\(04\)80018-2](https://doi.org/10.1016/s0005-7894(04)80018-2).
- Lovibond, P. F., & Lovibond, S. H. (1995). The structure of negative emotional states: Comparison of the Depression Anxiety Stress Scales (DASS) with the Beck Depression and Anxiety Inventories. *Behaviour Research and Therapy*, 33(3), 335–343. [https://doi.org/10.1016/0005-7967\(94\)00075-u](https://doi.org/10.1016/0005-7967(94)00075-u).
- Marcks, B. A., & Woods, D. W. (2005). A comparison of thought suppression to an acceptance-based technique in the management of personal intrusive thoughts: A controlled evaluation. *Behaviour Research and Therapy*, 43(4), 433–445. <https://doi.org/10.1016/j.brat.2004.03.005>.
- Mataix-Cols, D., Nakatani, E., Micali, N., & Heyman, I. (2008). Structure of obsessive-compulsive symptoms in pediatric OCD. *Journal of the American Academy of Child & Adolescent Psychiatry*, 47(7), 773–778. <https://doi.org/10.1097/chi.0b013e31816b73c0>.
- Mataix-Cols, D., Frost, R. O., Pertusa, A., Clark, L. A., Saxena, S., Leckman, J. F., Stein, D. J., Matsunaga, H., & Wilhelm, S. (2010). Hoarding disorder: a new diagnosis for DSM-V? *Depression and Anxiety*, 27(6), 556–572. <https://doi.org/10.1002/da.20693>.
- Mataix-Cols, D., Billotti, D., Fernández de la Cruz, L., & Nordstletten, A. E. (2013). The London field trial for Hoarding Disorder.

- Psychological Medicine*, 43, 837–847. <https://doi.org/10.1017/S0033291712001560>.
- Mazaheri, M. (2015). Psychometric Properties of the Persian Version of the Difficulties in Emotion Regulation Scale) DERS-6 & DERS-5-Revised (in an Iranian Clinical Sample. *Iranian Journal of psychiatry*, 10(2), 115–122. <http://ijps.tums.ac.ir/index.php/ijps/article/view/392>
- Mennin, D. S., Holaway, R. M., Fresco, D. M., Moore, M. T., & Heimberg, R. G. (2007). Delineating components of emotion and its dysregulation in anxiety and mood psychopathology. *Behaviour Therapy*, 38, 284–302. <https://doi.org/10.1016/j.beth.2006.09.001>.
- Moritz, S., & Russu, R. (2013). Further evidence for the efficacy of association splitting in obsessive-compulsive disorder. An internet study in a Russian-speaking sample. *Journal of Obsessive-Compulsive and Related Disorders*, 2(2), 91–98. <https://doi.org/10.1016/j.jocrd.2012.12.002>.
- Moulding, R., & Kyrios, M. (2006). Anxiety disorders and control related beliefs: the exemplar of Obsessive-Compulsive Disorder (OCD). *Clinical Psychology Review*, 26(5), 573–583. <https://doi.org/10.1016/j.cpr.2006.01.009>.
- Penn, D. L., Keefe, R. S., Davis, S. M., Meyer, P. S., Perkins, D. O., Losardo, D., & Lieberman, J. A. (2009). The effects of antipsychotic medications on emotion perception in patients with chronic schizophrenia in the CATIE trial. *Schizophrenia Research*, 115(1), 17–23. <https://doi.org/10.1016/j.schres.2009.08.016>.
- Purdon, C. (1999). Thought suppression and psychopathology. *Behaviour Research and Therapy*, 37, 1029–1054. [https://doi.org/10.1016/S0005-7967\(98\)00200-9](https://doi.org/10.1016/S0005-7967(98)00200-9).
- Robinson, L. J., & Freeston, M. H. (2014). Emotion and internal experience in obsessive compulsive disorder: reviewing the role of alexithymia, anxiety sensitivity and distress tolerance. *Clinical Psychology Review*, 34(3), 256–271. <https://doi.org/10.1016/j.cpr.2014.03.003>.
- Rohani, F., Rasouli-Azad, M., Twohig, M. P., Ghoreishi, F. S., Lee, E. B., & Akbari, H. (2018). Preliminary test of group acceptance and commitment therapy on obsessive-compulsive disorder for patients on optimal dose of selective serotonin reuptake inhibitors. *Journal of Obsessive-Compulsive and Related Disorders*, 16, 8–13. <https://doi.org/10.1016/j.jocrd.2017.10.002>.
- Scheibe, S., Sheppes, G., & Staudinger, U. M. (2015). Distract or reappraise? Age-related differences in emotion-regulation choice. *Emotion*, 15(6), 677–681. <https://doi.org/10.1037/a0039246>.
- Silvers, J. A., McRae, K., Gabrieli, J. D., Gross, J. J., Remy, K. A., & Ochsner, K. N. (2012). Age-related differences in emotional reactivity, regulation, and rejection sensitivity in adolescence. *Emotion*, 12(6), 1235–1247. <https://doi.org/10.1037/a0028297>.
- Soomro, G. M., Altman, D. G., Rajagopal, S., & Oakley Browne, M. (2008). Selective serotonin re-uptake inhibitors (SSRIs) versus placebo for obsessive compulsive disorder (OCD). The Cochrane Library.
- Stein, D. J., Seedat, S., van der Linden, G. J. H., & Zungu-Dirwayi, N. (2000). Selective serotonin reuptake inhibitors in the treatment of post-traumatic stress disorder: A meta-analysis of randomized controlled trials. *International Clinical Psychopharmacology*, 15(2), S31–S39. <https://doi.org/10.1097/00004850-200008002-00006>.
- Stern, M. R., Nota, J. A., Heimberg, R. G., Holaway, R. M., & Coles, M. E. (2014). An initial examination of emotion regulation and obsessive compulsive symptoms. *Journal of Obsessive-Compulsive and Related Disorders*, 3, 109–114. <https://doi.org/10.1016/j.jocrd.2014.02.005>.
- Summerfeldt, L. J. (2007). Treating incompleteness, ordering, and arranging concerns. In M. M. Antony, C. Purdon, & L. J. Summerfeldt (Eds.), *Psychological treatment of obsessive-compulsive disorder: fundamentals and beyond* (pp. 187–207). Washington: American Psychological Association.
- Szechtman, H., & Woody, E. (2004). Obsessive-compulsive disorder as a disturbance of security motivation. *Psychological Review*, 111, 111–127. <https://doi.org/10.1037/0033-295x.111.1.111>.
- Timpano, K. R., Buckner, J. D., Richey, J. A., Murphy, D. L., & Schmidt, N. B. (2009). Exploration of anxiety sensitivity and distress tolerance as vulnerability factors for hoarding behaviors. *Depression & Anxiety*, 26, 343–353. <https://doi.org/10.1002/da.20469>.
- Timpano, K. R., Keough, M. E., Traeger, L., & Schmidt, N. B. (2011). General life stress and hoarding: Examining the role of emotional tolerance. *International Journal of Cognitive Therapy*, 4(3), 263–279. <https://doi.org/10.1521/ijct.2011.4.3.263>.
- Timpano, K. R., Shaw, A. M., Coughle, J. R., & Fitch, K. E. (2014). A multifaceted assessment of emotional tolerance and intensity in hoarding. *Behavior Therapy*, 45(5), 690–699. <https://doi.org/10.1016/j.beth.2014.04.002>.
- Twohig, M. P., Hayes, S. C., & Masuda, A. (2006). Increasing willingness to experience obsessions: Acceptance and commitment therapy as a treatment for obsessive-compulsive disorder. *Behavior Therapy*, 37(1), 3–13. <https://doi.org/10.1016/j.beth.2005.02.001>.
- Twohig, M. P., Hayes, S. C., Plumb, J. C., Pruitt, L. D., Collins, A. B., Hazlett-Stevens, H., & Woidneck, M. R. (2010). A randomized clinical trial of acceptance and commitment therapy versus progressive relaxation training for obsessive-compulsive disorder. *Journal of Consulting and Clinical Psychology*, 78(5), 705–716. <https://doi.org/10.1037/a0020508>.
- Warner-Schmidt, J. L., & Duman, R. S. (2006). Hippocampal neurogenesis: opposing effects of stress and antidepressant treatment. *Hippocampus*, 16(3), 239–249. <https://doi.org/10.1002/hipo.20156>.
- Wegner, D. M. (1994). Ironic processes of mental control. *Psychological Review*, 101(1), 34. <https://doi.org/10.1037/0033-295X.101.1.34>.
- Worthington III, J. J., Kinrys, G., Wygant, L. E., & Pollack, M. H. (2005). Aripiprazole as an augmentor of selective serotonin reuptake inhibitors in depression and anxiety disorder patients. *International Clinical Psychopharmacology*, 20(1), 9–11. <https://doi.org/10.1097/00004850-200501000-00002>.