Variability in Emotion Regulation in Paediatric Obsessive-Compulsive Disorder: associations with symptom presentation and response to treatment

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Abstract

This study explored whether variability in emotion regulation was associated with several clinical correlates of OCD and an attenuated response to treatment. Participants in this study were 137 youth (and their parents) aged 7 to 17 years with a primary diagnosis of OCD. Parents completed study questionnaires and children received intensive CBT with exposure and response prevention treatment. A median split of responses to the baseline Emotional Control (EC) index of the BRIEF, resulted in two groups of children – those with relatively greater and poorer EC. The results indicated that children in the relatively poorer EC group had significantly greater OCD severity, more family accommodation, internalising and externalising symptoms. They were also more likely to have a comorbid diagnosis of oppositional defiant disorder or social phobia. Additionally, children with relatively greater EC were more likely to have attained response or remission of their symptoms immediately following treatment. Similarly, at three months following treatment there were fewer responders to treatment among the lower EC group relative to the higher EC group; however, there was no significant difference for treatment remission between groups. Therefore, EC may be an indicator for a more severe presentation of OCD and a poorer response to treatment.

KEY WORDS: Obsessive-Compulsive Disorder, Emotion Regulation, Exposure and Response Prevention

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Cognitive-behavioural theories of obsessive-compulsive disorder (OCD) emphasise the central role of obsessional beliefs in the development and maintenance of symptoms. Indeed, the role of obsessional thinking and belief biases in the clinical expression of OCD is well established (Farrell, Waters, & Zimmer-Gembeck, 2012; Myers, Fisher, & Wells, 2009; Rachman, 1993; Salkovskis, 1998). Cognitive models propose that inflated responsibility beliefs (Salkovskis, Forrester, & Richards, 1998), thought-action-fusion beliefs (Rachman, 1993) and meta-cognitive beliefs (Myers, Fisher, & Wells, 2009) maintain maladaptive thought appraisals which perpetuate an individual's experience of distress. This subjective experience of emotional distress in patients with OCD drives pathological, time consuming neutralising behaviours, in the form of excessive rituals (overt and/or covert), as well as extreme avoidance behaviours, often resulting in debilitating impairment. Whilst decades of research have closely examined the role of cognition and belief biases in OCD, by contrast very limited research has examined the role of emotions, and in particular emotion regulation (ER), in the maintenance of OCD. Given that compulsions represent a maladaptive strategy of regulating one's subjective and intolerable distress, the degree to which individuals with OCD may experience difficulties in emotional control (EC), an index of ER, warrants further attention.

Emotional Distress in Paediatric OCD and Impact on the Family

In children with OCD, heightened emotional distress is part and parcel of the disorder (Barrett, Healy-Farrell, Piacentini, & March, 2004). Children with OCD often experience extreme emotional distress in response to intrusions, contact with feared stimuli, the process of engaging in excessive rituals, or being interrupted from completing rituals. This distress may take the form of anxiety, disgust, dread, fear, anger and irritability. In severe cases,

emotional distress presents as rage and explosive behaviour. There is a small but growing body of literature examining this extreme expression of emotion, whereby explosive emotional outbursts in children with OCD (Krebs et al., 2013; Storch, Jones, Lewin, Mutch, & Murphy, 2011; Storch et al., 2012) may suggest underlying ER deficits that characterise at least a proportion of these youth. For instance, Storch et al. (2011) conducted a preliminary study examining parents' qualitative accounts of rage experiences in 80 children with OCD. They found that rage was present in 27.5% of the sample and was associated with greater OCD severity and increased frequency of obsessions and compulsions. Interestingly, they found no significant differences in co-morbidities (particularly anxiety, mood, and attention-deficit symptoms) among those who exhibited signs of rage versus those who did not (Storch et al., 2011). In a subsequent study, Storch et al. (2012) explored children's rage attacks, which were conceptualised as recurrent explosive behaviour, among a different sample of youth (n = 86), aged 6 to 16 years with a primary diagnosis of OCD. The findings indicated more than half the sample experienced clinically significant levels of rage, which was associated with greater OCD severity, as well as greater parent-rated functional impairment. Furthermore, they found that rage was a significant and unique predictor of functional impairment beyond OCD severity. Storch et al. (2012) suggested that these episodes of rage were likely to represent the child's inability to regulate their internal distress, and moreover, that the feeling of calmness which were self-reported to follow these episodes provided negative reinforcement for the explosive behaviour.

Krebs et al. (2013) also examined explosive behaviour in children with OCD (n = 387) using both parent and child report. They found that more than a third of children in their sample exhibited explosive behaviours, and furthermore, these behaviours were two to three times more likely to occur in children with OCD relative to healthy controls. Interestingly, they found that OCD severity was not a unique predictor of explosive behaviour; whereas

higher levels of comorbid depressive symptoms were. These extreme displays of emotion dysregulation in children with OCD are not only crippling for the child, but they also significantly and negatively impact on the entire family unit. Indeed, family members often begin to engage in pathological reassurance giving, assisting with rituals and modifying normal family routines in an attempt to prevent these OCD-fuelled, explosive emotional outbursts from occurring, or to calm the child down when they do occur. This process, referred to as family accommodation, has been associated with substantial impairments for the entire family and increased symptom severity for the child in the long-term (Peris et al., 2008; Stewart et al., 2008; Storch et al., 2007). Given the high frequency with which family accommodation occurs (e.g., 70-75% of families, Storch et al., 2007) and its negative impact on child outcomes, greater understanding of the mechanisms that drive accommodation behaviours is needed.

Among the most widely supported theoretical models of ER is Gross' (1998) process model of ER. This model of ER describes an information-processing framework in which five strategies (situation selection, situation modification, attentional deployment, cognitive change and response modulation) are distinguished by the point at which they are likely to be enacted in the process of generating emotions (Gross, 1998; Gross & Thompson, 2007). Interestingly, the process model of ER provides a theoretical explanation for the process of family accommodation in paediatric OCD. Gross and Thompson (2007) describe one aspect of ER through the process of *situation modification*, whereby changes are made to aspects of an individual's external environment or situation, in order to change the emotional impact that it could potentially have. Thus, situation modification may explain family accommodation in paediatric OCD, highlighting that emotion dysregulation and parental attempts to regulate their child's distress may be at the core of family accommodation.

Emotion Regulation Deficits and OCD

Emotion regulation is a broad psychological process whereby an individual uses specific strategies to modify the magnitude and/or duration of an emotional response in order to cope (Gross, 1998; 2013). Given that this regulatory process is interactive, occurring between the individual and their environment, the way in which individuals regulate their emotions is highly context dependent and different methods of regulation may have different consequences (Gross, 2013). While there are various definitions in the literature describing emotion dysregulation, there is a general consensus that dysregulation refers to a failure in the ER process that inadvertently leads to problematic emotional states and behavioural responses (Gross, 2013). Dysregulation of emotion is associated with a poor understanding of one's emotions, which then may lead to more negative and more intense emotional and behavioural responses (McGuire et al., 2013; Mennin, Heimberg, Turk, & Fresco, 2013).

Children with OCD who are more emotionally dysregulated may represent the previously described subset of youth who exhibit co-occurring explosive behaviours and may be more resistant to treatment. Unfortunately, while ER has been widely studied in relation to anxiety disorders in children (Penza-Clyve & Zeman, 2002; Suveg & Zeman, 2004; Zeman, Shipman, & Suveg, 2002), there has been limited empirical focus examining ER in paediatric OCD (Bender, Pons, Harris, Esbjorn, & Reinholdt-Dunne, 2015; Berman, Shaw, Curley, & Wilhelm, 2018). Bender et al. (2015) found that among a sample of clinically anxious children (n = 16, aged 8 to 12 years), those with OCD had greater difficulty understanding emotions and experienced more emotion dysregulation than children with other presentations of anxiety. More recently, Berman et al. (2018) examined the role of emotional suppression (attempts to ignore the emotion one is experiencing and avoid its expression) in a sample of 27 youth aged 8 to 18 years, most of whom met diagnostic criteria for OCD. These authors found that children's use of emotional suppression mediated the relationship between

obsessive beliefs and OC symptom severity, after controlling for child age and anxiety/depression severity. While these studies have highlighted important associations between OCD and ER in general, neither study explored the potential implications of ER deficits for treatment response.

McGuire et al. (2013) examined impaired self-regulation among a sample of youth (*n* = 144) with OCD using the child behaviour checklist as a measure of dysregulation, and a proportion of this sample (*n* = 97) received CBT treatment. At baseline, they found that youth higher on dysregulation had greater OCD severity and impairment, greater family accommodation and more severe depression than those who were less dysregulated. Furthermore, baseline dysregulation predicted OCD severity, impairment, family accommodation, and premature treatment discontinuation, but was not found to predict treatment response (McGuire et al., 2013). A study by McNamara et al. (2014) is the only one to date that has specifically examined ER as a predictor of treatment response among children with OCD. McNamara et al. (2014) examined emotional control (EC), other executive functioning domains, OCD symptom severity and response to treatment among 56 children (aged 7 to 17 years) with a diagnosis of OCD. Their findings indicated that EC moderated treatment outcome (McNamara et al., 2014) such that children who had poorer EC at baseline experienced less of a reduction in OCD symptom severity following intervention, compared to those with greater EC. Therefore, identifying whether differences in baseline EC characterise children with OCD, and whether these differences have associations with important clinical correlates and varying degrees of treatment response over time, may provide a rationale for augmenting treatment by addressing deficits in ER more specifically to improve treatment outcome.

The Present Study

The current study aimed to examine the role of ER in OCD, specifically examining clinical correlates associated with variability in ER, and the degree to which this might be associated with an attenuated response to treatment. The study examined parent-reported EC, an index of ER, in a paediatric OCD sample (n = 137) using a reliable and well-validated parent-report scale (sub-scale from the Behaviour Rating Inventory of Executive Function, BRIEF; Gioia, Isquith, Guy, & Kenworthy, 2000). The study classified youth in the sample as having relatively poorer EC compared to those with greater EC. EC assessed the child's ability to modulate emotional responses e.g., the child's tendency to react with more emotional intensity to situations than other children. In order to examine differences in the clinical expression of youth with relatively poorer EC, a median split on the EC subscale resulted in two groups of children – those higher in EC (mean t-score = 53.21, SD = 5.59) and those lower on EC (mean t-score = 73.57, SD = 7.02). Therefore, youth classified as having relatively poorer EC did not necessarily obtain an EC score that indicated a clinically significant deficit in EC (clinically significant deficit t-score = 65). The study investigated associations between EC and a range of clinical constructs including OCD severity, family accommodation, internalising and externalising symptoms, comorbidity, and immediate, as well as longer-term treatment response.

Specifically, this study aimed to: (a) examine whether children with relatively poorer EC had significantly more severe OCD, family accommodation, internalising symptoms, and externalising symptoms, relative to children with greater EC; (b) examine whether children with relatively poorer EC were characterised by specific comorbid diagnoses relative to those with greater EC, and finally (c) to examine whether children with relatively poorer EC had a poorer response to treatment, immediately following brief, intensive cognitive-behavioural

therapy with exposure and response prevention (CBT-ERP), and at 3-month follow up. In line with these aims, it was hypothesised that:

H1: children with relatively poorer EC would have significantly more severe OCD, significantly more family accommodation and significantly higher internalising and externalising symptoms, relative to children with higher EC.

H2: children with relatively poorer EC were more likely to have comorbid diagnoses of Oppositional Defiant Disorder (ODD) and Depression/Dysthymia, than other commonly occurring comorbid diagnoses (specifically, Attention Deficit/Hyperactivity Disorder, Autism Spectrum Disorder, Generalised Anxiety Disorder, Separation Anxiety Disorder, Social Phobia, Panic Disorder, Agoraphobia and Specific Phobia) relative to those with greater EC.

H3: children with relatively poorer EC would have a poorer response to treatment, immediately following intervention and at 3-month follow up, compared to children with higher EC.

Method

Participants

Participants in this study were 137 youth (52.6% female) aged 7 to 17 years (M = 12.18, SD = 2.59) with a primary diagnosis of OCD, and their parents. Most participants had comorbid conditions, with only 10.2% presenting with a sole diagnosis of OCD. Indeed, 5.1% of children had OCD and only one other secondary diagnosis, and 84.7% had two or more comorbid diagnoses. Table 1 illustrates the frequencies and percentages of diagnoses that presented as secondary and tertiary comorbid conditions only (however, analyses incorporated all clinically significant comorbid diagnoses relevant to the study's second hypothesis). Diagnoses were determined to be primary, secondary and tertiary based on assigned Clinician Severity Ratings following diagnostic interviews. The sample was recruited through an established, ongoing university OCD treatment program. Children and

adolescents deemed eligible for the broader research program satisfied the following inclusionary criteria: a primary diagnosis of OCD, one parent willing to participate, and if taking medication, being on a stable dose for 12 weeks prior to study entry. Participants on a stable dose of prescribed SSRI medication constituted 29.9% of the current sample, with 21.9% taking other prescribed medication. Exclusionary criteria included: psychosis, diagnosed intellectual disability, active suicidal ideation, and concurrent participation in psychotherapy. For youth who had a comorbid diagnosis of autism spectrum disorder, only those categorised as Level 1 were included in the study. In the larger clinical trial 119 children and adolescents that were screened for eligibility were excluded from the trial because they did not meet criteria (n = 71), they declined participation (n = 46) or for other reasons (n = 2). Individuals deemed ineligible were provided with referral options for appropriate treatment services.

Table 1.

Secondary and Tertiary Comorbidity Characteristics of Study Participants

	Secondary Diagnoses		Tertiary Diagnoses	
	n	%	*n*	%
GAD	49	35.8	16	11.7
Social Phobia	20	14.6	10	7.3
Specific Phobia	18	13.1	23	16.8
ADHD	10	7.3	6	4.4
SAD	8	5.8	3	2.2
ODD	5	3.6	6	4.4
Depression/Dysthymia	4	3	3	2.2
Panic Disorder	1	0.7	1	0.7
Agoraphobia	0	0	2	1.5
TOTAL	115	83.9	70	51.2

Note. ADHD = Attention Deficit/Hyperactivity Disorder, GAD = Generalised Anxiety Disorder, ODD = Oppositional Defiant Disorder, SAD = Separation Anxiety Disorder.

Measures

Anxiety Disorders Interview Schedule for DSM-IV, Parent Version (ADIS-IV-P; Silverman & Albano, 1996). The ADIS-IV-P is a semi-structured clinical interview for parents of children aged 7 to 17 years and is specifically designed to assess for DSM diagnoses of childhood anxiety, mood, and behavioural disorders. Parents were administered the interview over the telephone to determine whether the child or adolescent met criteria for an OCD diagnosis, and to confirm secondary and tertiary comorbid diagnoses, including other anxiety disorders, mood disorders (Major Depressive Disorder and dysthymia), externalising disorders (ADHD and Oppositional Defiant Disorder), and to screen for

pervasive developmental disorders (PDD). Participants received a Clinician Severity Rating (CSR) ranging from 0-8 for each diagnosis they obtained, with a score of 4 indicating a clinically significant diagnosis. The ADIS-IV-P has demonstrated good interrater and test-retest reliability (Silverman & Albano, 1996), and has been shown to be as reliable when administered over the phone as face to face (Rapee et al., 1997). It has also demonstrated good sensitivity to treatment effects in both childhood anxiety (Barrett, Dadds, & Rapee, 1996; Ollendick et al., 2009) and childhood OCD research (Barrett, Healy-Farrell, Piacentini, & March, 2004; Waters, Barrett, & March, 2001).

Children's Yale–Brown Obsessive–Compulsive Scale (CY–BOCS; Scahill et al., 1997). The CY–BOCS is a clinician-rated, semi-structured inventory of OCD symptoms and severity over the prior week and was administered to provide an assessment of youth OCD symptom severity. It uses a five-point Likert scale and captures frequency, interference, distress, resistance and control across two subscales for obsessions and compulsions, which combine to create a total score of OCD severity. This clinician administered semi-structured interview is considered the gold standard of OCD assessment in youth aged 4–18 years (Storch et al., 2004). The CY-BOCS has demonstrated high internal consistency, with total score alphas ranging from .87 to .90 (Scahill et al., 1997; Storch et al., 2004). The CY–BOCS has also been shown to be treatment sensitive (Barrett et al., 2004; Pediatric OCD Study Team, 2004). In this study, it was administered to the child or adolescent with a parent present. Overall, the sample used in the current study had pre-treatment scores within the severe range (CY-BOCS: $M = 27.10$, $SD = 4.53$).

The Behaviour Rating Inventory of Executive Function (BRIEF; Gioia et al., 2000). The BRIEF is a measure of executive functioning that asks parents to report on their child's behavioural problems over the past six months. Parents were required to rate each of the 86 items by indicating *Never* (1 - if the behaviour is never a problem), *Sometimes* (2 - if

the behaviour is sometimes a problem) or *Often* (3 - if the behaviour is often a problem). The BRIEF consists of eight subscales, however only the Emotional Control (EC) subscale was used in this study. This subscale contains 10 items and examines the child's ability to modulate emotional responses (e.g., "Reacts more strongly to situations than other children", "Has explosive, angry outbursts"). Items were summed on the emotional control subscale and age and gender-based norms provided by the BRIEF were used to derive *t*-scores for each child. Overall, the BRIEF has good internal consistency ratings. McNamara et al. (2014) reported alphas ranging from .85 to .96 for each BRIEF subscale in a paediatric OCD sample. The BRIEF has been validated for general paediatric populations ages 5 to 18 years (Gioia et al., 2000) and has been used in several clinical research studies (e.g., McAuley, Chen, Goos, Schachar, & Crosbie, 2010; McCandless & O'Laughlin, 2007; McNamara et al., 2014). In the current study, Cronbach's α for the EC subscale was .89.

Child Behaviour Checklist for Ages 6–18 (CBCL/6-18; Achenbach & Rescorla, 2001). The CBCL is a parent report measure of children's behavioural problems and social competencies, during the past six months. Items are rated using a three-point Likert scale (0 - *Not True*, 1 - *Somewhat or Sometimes True*, or 2 - *Very True or Often True*). The CBCL contains two scales: Internalising symptoms and Externalising symptoms. The internalising domain measures emotional problems and contains three subscales: Anxious/Depressed, Withdrawn/Depressed, and Somatic Complaints. The externalising domain measures behavioural problems and contains two subscales: Rule Breaking Behaviour and Aggressive Behaviour. Validity and reliability are excellent for both the Internalising (.94) and Externalising scales (.97) (see Achenbach & Rescorla, 2001). In the current study, Cronbach's α = .76 for the Internalising symptoms scale, and α = .84 for the Externalising symptoms scale.

Family Accommodation Scale, Self-Report (FAS-SR; Pinto, Van Noppen, & Calvocoressi, 2013). The FAS-SR is a 19-item parent self-report measure of family accommodation of a child's OCD-related behaviours over the previous month. Items are anchored with respect to either frequency or magnitude using a five-point Likert scale ranging from 0 *(Never)* to 4 *(Daily).* Scores are summed to produce an overall accommodation score, where higher scores indicate greater parental accommodation. Internal consistency for the FAS has been found to be high, Cronbach's α = .90 (Pinto et al., 2013). In the current study, Cronbach's α was .87.

Procedure

Ethical approval for recruitment and procedures involved in this study were obtained from the institution's human research ethics committee. Participants were recruited either through advertising or referrals by healthcare providers. Participants and their parent were required to provide written informed consent. Following an expression of interest in the program, parents were contacted for a brief telephone screen to determine potential eligibility for the program. If deemed likely eligible, the diagnostic telephone interview (ADIS-IV-P) was conducted to confirm the child's suitability. Following administration of the ADIS-IV-P, the child and parent attended the university clinic to complete the CY-BOCS, to assess the child's OCD symptom severity. Parents also completed the BRIEF in person during this session, and then completed the CBCL and FAS-SR online prior to their child commencing treatment.

Following baseline assessment, participants received Cognitive-Behavioural Therapy with Exposure and Response Prevention (CBT-ERP). Treatment consisted of an initial psychoeducation session (1.5 hours), followed by a series of three intensive individual therapy sessions (three hours duration), along with a one-month booster session (either one session in clinic, or three brief weekly Skype calls to assist with therapy maintenance),

consistent with the overall CBT approach for paediatric OCD described by March and Mulle (1998). The treatment being offered was part of ongoing double-blind RCTs (pilot and larger RCT) examining d-cycloserine (DCS) augmented CBT for paediatric OCD, whereby children received intensive CBT-ERP augmented with placebo or DCS. Clinical supervision was provided by a senior psychologist with extensive experience in the assessment and treatment of OCD (LJF). Pre-treatment and post-treatment assessments were completed by blinded independent evaluators who were post-graduate psychology students trained to reliability on both assessment measures (CY-BOCS, ADIS-P). Assessment of OCD symptoms and severity was carried out one week following the fourth treatment session (post-treatment) and 3-months later. All diagnostic assessments across time points were audio recorded and diagnoses and severity ratings were subject to group clinical consensus by clinicians experienced in the assessment and treatment of OCD.

Overview of Analysis

Analyses were conducted using the Statistical Package for the Social Sciences version 24. Preliminary analysis of the data indicated that although all participants completed treatment, there was missing data for OCD severity at post-treatment (n = 19, 13.9%) and 3-month follow-up (n = 25, 18.2%). A Missing Values Analysis indicated that Little's (1988) test of Missing Completely at Random (MCAR) was not significant, $\chi^2 = 2.65$, df = 2, p = .27. In cases where outcome data was missing for post-treatment and 3-month follow-up, estimation-maximisation was used to derive estimates.

In order to determine higher and lower EC groups, a median split of responses to the emotional control index of the BRIEF resulted in two groups of children – those with relatively greater EC (mean t-score = 53.21, SD = 5.59) and those lower on EC (mean t-score = 73.57, SD = 7.02). There were no significant differences between groups on gender χ^2 (1, 137) = .60, p = .44, φ = -.07, SSRI medication use χ^2 (1, 137) = 1.86, p = .17, φ = -.12 or

other medication use χ^2 (1, 137) = 2.58, p = .11, φ = .14. Independent samples *t*-tests determined a significant difference between groups on total number of comorbid diagnoses *t* (137) = -2.85, p = .01, children with relatively poorer EC had more comorbid diagnoses (M = 3.13, SD = 1.44) relative to children with greater EC (M = 2.50, SD = 1.13). There was no significant difference between groups on age *t* (137) = -.62, p = .54.

In order to examine clinical characteristics (OCD severity, family accommodation, internalising symptoms, externalising symptoms) of children with relatively poorer EC compared to children with greater EC, a series of Independent samples *t*-tests were conducted. χ^2 contingency table analyses were conducted to evaluate specific comorbid diagnoses of children with relatively poorer EC compared to children with greater EC (i.e., Hypothesis 2).

Finally, χ^2 contingency table analyses were conducted in order to examine treatment response of children with relatively poorer EC compared to children with greater EC. For the purposes of evaluating treatment outcome, differences in the frequency of responders versus non-responders, and remitters versus non-remitters across the two groups at both post-treatment and follow-up, were assessed. Treatment responders were defined as those demonstrating at least a 35% reduction in CY-BOCS total scores. Alternatively, treatment remitters were defined as those showing at least a 55% reduction in CY-BOCS total score, as well as a final CY-BOCS score ≤11 in accordance with recently updated signal detection guidelines (Skarphedinsson, De Nadai, Storch, Lewin, & Ivarsson, 2017) which were identified as more stringent and efficient criteria. This approach to assessing treatment response was used to differentiate the degree of treatment response categorically, given that responders are generally noted as still experiencing several OCD symptoms, but below the level of symptoms required for a diagnosis whereas remitters are typically regarded as healthy and discontinuing treatment could be considered (Torp & Skarphedinsson, 2017).

Participants in the sample were participating from two consecutive RCTs examining intensive CBT-ERP, augmented with d-cycloserine (DCS) or placebo (manuscripts in preparation). Although treatment efficacy was not being evaluated in this study, preliminary analyses were conducted to determine any effect of treatment condition on outcomes (DCS versus PBO augmented CBT-ERP). In the current combined sample there were no Time x Condition (DCS, PBO) or Time x Trial (pilot, larger RCT) effects on treatment outcome scores derived from the CY-BOCS. Therefore, the full sample was used in treatment response analyses, without covariates.

Results

Clinical characteristics and associations with emotional control

In relation to the first hypothesis, independent samples *t*-tests revealed a significant difference between those higher and lower in EC with respect to OCD severity (t (137) = -3.03, p = .003), family accommodation (t (137) = -2.50, p = .02), internalising symptoms (t (130) = -3.82, p <.001), and externalising symptoms (t (130) = -8.33, p <.001), with moderate to large effect sizes. Children and adolescents with relatively poorer EC had significantly more severe OCD, greater family accommodation, and experienced more internalising and externalising symptoms compared to children with greater EC. Thus, support was found for Hypothesis 1 (see Table 2).

Table 2.

Results of Independent Samples t-tests for Variables Associated with OCD Symptoms and Impairment

	High Emotional Control (n = 68)		Low Emotional Control (n = 69)			
Variable	Mean	SD	Mean	SD	t *(df)*	d
OCD Severity	25.96	4.04	28.23	4.72	-3.03** (135)	.52
Family Accommodation	20.37	14.71	32.41	20.58	-2.50* (135)	.67
Internalising Symptoms	60.85	8.95	66.63	8.32	-3.82** (128)	.67
Externalising Symptoms	48.45	8.10	60.18	7.98	-8.33** (128)	1.46

Note: d = Cohen's d.

* $p \leq 0.05$, ** $p \leq 0.01$

Comorbid Diagnoses and association with emotional control

In relation to the second hypothesis, there was a significant difference between those higher and lower in EC in terms of having a comorbid diagnosis of ODD (χ^2 (1, 137) = 10.11, p = .001, φ = .27), such that more children in the lower EC group (84.2%, n = 16) compared to the higher EC group (15.8%, n = 3) held a comorbid ODD diagnosis. There was also a significant difference between EC groups on those who had a comorbid diagnosis of Social Phobia (χ^2 (1, 137) = 5.01, p = .03, φ = .19). Specifically, more children in the lower EC group (65.8%, n = 25) than the higher EC group (34.2%, n = 13) held a comorbid diagnosis

of Social Phobia. However, no significant differences between EC groups were found on comorbid Depression/Dysthymia (χ^2 (1, 137) = .00, p = .98, φ = -.00), ADHD (χ^2 (1, 137) = 1.85, p = .17, φ = .15), ASD (χ^2 (1, 137) = 1.71, p = .19, φ = .11), GAD (χ^2 (1, 137) = .06, p = .80, φ = .02), Separation Anxiety Disorder (χ^2 (1, 137) = 1.79, p = .18, φ = .11), Panic Disorder (χ^2 (1, 137) = .36, p = .55, φ = -.05), Agoraphobia (χ^2 (1, 137) = .99, p = .32, φ = .09), and Specific Phobia (χ^2 (1, 137) = .72, p = .40, φ = .07) (see Table 3). Therefore, partial support was provided for the study's second hypothesis.

Table 3.

Comorbidity in Youth with Obsessive-Compulsive Disorder Higher and Lower on Emotional Control

	High Emotional Control (*n* = 68) *n* (%)	Low Emotional Control (*n* = 69) *n* (%)		
Variable			χ^2 *(df)*	φ
ODD	3 (15.8)	16 (84.2)	10.11** (1)	.27
Depression/ Dysthymia	4 (50)	4 (50)	.00 (1)	-.00
ADHD	8 (36.4)	14 (63.6)	1.85 (1)	.15
ASD	9 (37.5)	15 (62.5)	1.17 (1)	.11
GAD	36 (48.6)	38 (51.4)	.06 (1)	.02
SAD	5 (33.3)	10 (66.7)	1.79 (1)	.11
Panic Disorder	2 (66.7)	1 (33.3)	.36 (1)	.11
Agoraphobia	0 (0)	1 (100)	.99 (1)	-.05
Social Phobia	13 (34.2)	25 (65.8)	5.01* (1)	.19
Specific Phobia	20 (44.4)	25 (55.6)	.72 (1)	.07

Note: ODD = Oppositional Defiant Disorder; ADHD = Attention-Deficit/Hyperactivity Disorder; ASD = Autism Spectrum Disorder, GAD = Generalised Anxiety Disorder, SAD = Separation Anxiety Disorder.

* $p \leq 0.05$, ** $p \leq 0.01$

Treatment outcome and association with emotional control

In relation to the third and final hypothesis, there was a significant difference between EC groups on treatment response at post-treatment (χ^2 (1, 137) = 4.89, p = .03, φ = -.18), whereby there were significantly more responders (57.1%) in the higher EC group, relative to the lower EC group (42.9%). There was also a significant difference between EC groups at 3-month follow up (χ^2 (1, 137) = 6.57, p = .01, φ = -.22), with significantly more responders (58.3%) in the higher EC group, relative to the lower EC group (41.7%). Finally, there was a significant difference between EC groups on treatment remission at post-treatment (χ^2 (1, 137) = 5.59, p = .02, φ = -.20), with significantly more treatment remitters (62.7%) in the higher EC group, relative to the lower EC group (37.3%). However, there was no significant difference between EC groups in the number of treatment remitters at 3-month follow up (χ^2 (1, 137) = .88, p = .35, φ = -.08) (see Table 4). Therefore, partial support was provided for Hypothesis 3.

Table 4.

Treatment Outcome in Youth with Obsessive-Compulsive Disorder Higher and Lower on Emotional Control

	High Emotional Control (*n* = 68) *n* (%)	Low Emotional Control (*n* = 69) *n* (%)		
Variable	Post-treatment	Post-treatment	χ^2 *(df)*	φ
Responders	48 (57.1)	36 (42.9)	4.89* (1)	-.18
Remitters	32 (62.7)	19 (37.3)	5.59* (1)	-.20
	3 Months	3 Months		
Responders	49 (58.3)	35 (41.7)	6.57** (1)	-.22
Remitters	31 (54.4)	26 (45.6)	.88 (1)	-.08

Note: 3 months = Follow-up assessment 3 months after treatment.

* $p \leq 0.05$, ** $p \leq 0.01$

Discussion

This study aimed to examine the clinical expression of paediatric OCD for children and adolescents that were classified into two groups, one that was relatively lower on emotional control (EC) and another that was relatively higher on EC. Specifically, the study examined differences between those relatively higher and lower on EC in relation to OCD severity, family accommodation, internalising and externalising symptoms, comorbid diagnoses, and immediate as well as longer-term treatment outcome. It was hypothesised that children with relatively poorer EC would have significantly more severe OCD, greater family accommodation, and experience more internalising and externalising symptoms compared to children with relatively greater EC. The results provided support for this hypothesis. Further,

it was hypothesised that children with relatively poorer EC were more likely to have comorbid diagnoses of ODD and depression compared to those with relatively greater EC. The results partially supported this hypothesis, whereby children in the lower EC group had higher rates of comorbid ODD and Social Phobia relative to those in the higher EC group. Finally, the results provided partial support for the third hypothesis whereby children with relatively greater EC were more likely to experience response and remission of their symptoms immediately following treatment, as well as a response to treatment at 3-month follow up, compared to children defined as having relatively poorer EC. However, there was no significant difference between children higher and lower on EC in terms of remission of symptoms 3 months following treatment. Each of these results will be discussed in turn.

The finding that relatively poorer EC was associated with more severe OCD is consistent with the findings of Storch et al. (2012) who demonstrated a significant association between children's dysregulated behaviour (rage) and OCD severity in a paediatric sample. Additionally, Storch et al. (2011) found that increased rage was associated with more symptoms of OCD. The current study's findings are also consistent with the findings of McGuire et al. (2013) that impaired self-regulation (dysregulation) among youth with OCD was associated with greater OCD severity as well as increased family accommodation. An increased number of symptoms and overall greater severity may be explained by a greater inability to modulate emotional distress which leads to an increase in compulsions (the maladaptive strategy of regulating the intrusive thoughts). The association between ER and OCD severity may further be explained by the role of distress tolerance (Cougle, Timpano, Fitch, & Hawkins, 2011; Robinson & Freeston, 2014) which has been highlighted in previous literature as a key feature of the disorder's presentation. Robinson and Freeston (2014) posited that within OCD, deficits in fundamental components of ER (e.g., identifying and labelling emotions) may result in the individual's belief that they are unable to cope with

even low levels of arousal and moreover, they may have an overall sense of emotions as overwhelming and unmanageable (poor distress tolerance). Additionally, Cougle et al. (2011) found that poor distress tolerance was associated with increased obsessions (after controlling for depression, anxiety, anxiety sensitivity and obsessive beliefs) and was prospectively predictive of residual change in obsessional symptoms over time (1 month). The findings of the current study highlight the need for clinicians to be aware that some children (perhaps those who are more severe in their OCD presentation) may require a more specific focus on the development of ER skills that may in turn improve their ability to tolerate distress and potentially result in a more favourable response to intervention.

The finding that youth with relatively poorer EC had higher levels of family accommodation compared to those with relatively greater EC is consistent with the findings of Storch et al. (2012) and McGuire et al. (2013) who found that dysregulated emotion and behaviour, often employed by children with OCD, resulted in greater family accommodation. The findings highlight the potential role of ER as a skill deficit in the child with OCD that leads parents to engage in the kind of *situation modification* described by Gross and Thompson (2007) and represents parental effort to regulate the child's environment for them. However, it should also be considered that the process of accommodation could potentially lead to decreased ability to regulate emotions, given that children do not have the opportunity to develop their self-regulatory capacity or learn to tolerate distress (Lebowitz, Scharfstein, & Jones, 2014).

The current study also found that, compared to children with relatively greater EC, those with relatively poorer EC experienced more internalising and externalising symptoms, and were more likely to hold a comorbid diagnosis of ODD and Specific Phobia. These findings echo the results of some studies that have assessed fundamental components of ER in relation to internalising symptoms in anxious youth. For example, Penza-Clyve and Zeman

(2002) and Zeman, Shipman, and Suveg (2002) found that dysregulation of anger and sadness, self-reported challenges with emotional awareness, and unwillingness to express negative emotions predicted internalising symptoms of depression and anxiety in youth. This pattern of difficulties with ER being associated with internalising symptoms, appears to hold true for children with OCD. However, the findings suggest a similar pattern in terms of externalising symptoms, with children relatively lower in EC demonstrating higher levels of externalising symptoms. The findings in this regard are consistent with previous studies by Storch et al. (2011; 2012) that found significant levels of rage (27.5% to 50% respectively) in their samples of children with OCD. These findings concerning externalising symptoms and EC are congruent with the additional finding of relatively poorer EC being associated with increased likelihood that a child with OCD may also have a comorbid diagnosis of ODD.

Oppositional defiant disorder is characterised by disruptive behaviour in children (that includes a persistent pattern of resistance, argumentativeness, as well as aggressive behaviour), both inside and outside of the home (American Psychiatric Association [APA], 2013). Understandably, these behaviours are associated with significant levels of impairment in the child's relationship with adults and peers. Furthermore, there has been considerable research highlighting that ER deficits are a core part of the diagnostic formulation of this disorder (Wolff & Ollendick, 2010), specifically highlighting difficulties in the child's ability to communicate using emotion-based messages (Salmon, Dadds, Allen, & Hawes, 2009). Furthermore, Cavanagh, Quinn, Duncan, Graham, and Balbuena (2017) found ODD to be associated with emotional lability and irritability in a community sample of 4,380 children (aged 5 to 17) and concluded that deficits in ER are not only a component of ODD, but rather should be considered a core feature of the disorder. The current study found no significant differences between EC groups on comorbid Depression/Dysthymia. However, the relatively small portion of the current sample (n = 8) which had a comorbid diagnosis of

Depression/Dysthymia may have decreased the likelihood of detecting a statistically significant difference based on higher and lower EC classifications.

It was also interesting that relatively poorer EC was associated with increased likelihood of having a comorbid diagnosis of Social Phobia. The nature of Social Phobia is such that the individual has an intense fear of being evaluated by others, which in turn translates to a fear of social situations where this is likely to occur (APA, 2013). There has been a significant amount of research examining associations between ER and Social Phobia. In fact, contemporary models of the disorder (Morison & Heimberg, 2013) have highlighted the role of emotion dysregulation evidenced by behavioural avoidance of situations (to avoid feelings of anxiety) and suppression of emotions (driven by a belief that expressing their emotions would lead to negative evaluation). Furthermore, studies have highlighted ineffective use of cognitive reappraisal (changing the meaning or interpretation of the event) as a core part of what maintains heightened anxiety symptoms (Goldin, Manber-Ball, Werner, Heimberg, & Gross, 2009; Jazaieri, Morrison, Goldin, & Gross, 2015; Kivity & Huppert, 2018; Morisson & Heimberg, 2013). Taken together, the associations between relatively poorer EC and OCD severity, as well as increased probability of these two comorbid conditions with known deficits in ER, suggest a need for clinicians to be mindful of the increased complexity of presentations (de la Cruz et al., 2013) for children who fit these diagnostic profiles.

Indeed, the heterogeneity that characterises OCD in children and adolescents is known to encapsulate aetiology, symptom expression and comorbidity profiles. The findings of the current study highlights that this heterogeneity may extend to the variability in the capacity for ER. This finding has clinical implications for assessment of paediatric OCD, whereby at pre-treatment clinicians may consider going beyond an assessment of OCD symptoms, severity and family accommodation and additionally incorporate measures of the

child's ER capacity. Given the findings that youth with relatively poorer ER were more severe and moreover, more likely to have specific comorbid diagnoses (ODD or Social Phobia), it may be especially important that clinicians consider incorporating the assessment of ER for youth with greater severity or where these comorbidities appear to be present.

The study's findings that greater EC was associated with improved treatment response and remission immediately following treatment was consistent with the findings of McNamara et al. (2014) that children with poorer EC demonstrated less OCD symptom reduction at post-treatment. The current study built on the findings of McNamara et al. (2014), by exploring associations between baseline EC and longer-term (3 months post-intervention) outcomes of treatment. While greater EC was associated with a more positive treatment response at 3-month follow up, there was no significant difference between EC groups in relation to treatment remission at this time. This finding suggests that although baseline EC may have some association with long-term treatment response, it is not as important for longer-term remission which involves a more drastic reduction in OCD symptomatology and severity (a 55% reduction in CY-BOCS total score, combined with a final CY-BOCS score ≤ 11). McNamara et al. (2014) proposed that with the goal of CBT-ERP being to elicit moderate levels of anxiety, the individual would need to be able to regulate that distress during the treatment. Therefore, an inability to modulate emotions adequately may in turn lead to poorer response to treatment. Children with greater ER difficulties may therefore benefit from additional sessions to address some of these regulatory deficits and improve their chances of a favourable response to treatment. This proposed augmented treatment may involve incorporating a specific Emotion Regulation Therapy component (ERT; see Mennin & Fresco, 2014) into existing CBT-ERP treatments, which has been associated with improved outcomes for other psychopathologies such as PTSD (e.g.,

Cloitre, Koenen, Cohen, & Han, 2002; Cloitre et al., 2010) as well as specific phobia (Kamphuis & Telch, 2000).

The present study has provided findings that extend the knowledge regarding associations between OCD, ER and treatment response. Furthermore, the study has numerous strengths, including its use of a relatively large clinical sample and its longitudinal assessment of treatment response. Determining the relationship between ER and response to treatment is an important contribution to the field, as is exploring associations with longer-term response to treatment. However, the results from this study, should be tempered by a consideration of some limitations. The measurement of ER using the EC index of the BRIEF, represents a rather conservative measure of ER when considering the multifaceted nature of ER as a process (Gross, 2013). Furthermore, Gross highlighted the utility of looking at specific ER strategies, as some strategies are more effective than others in achieving ER and may vary in their outcome relative to different psychopathologies. The limited number of studies that have examined specific ER strategies in paediatric OCD have explored a narrow range of strategies (e.g., Berman et al., 2018) and have not examined these strategies in relation to treatment outcome. Therefore, future research ought to expand the exploration of ER strategies in order to improve our understanding of how regulatory strategies impact on the course and treatment of the disorder. Future studies examining ER as a predictor of treatment response should consider controlling for the clinical correlates examined in the current study given their known association with poorer treatment response as well as greater levels of these clinical features among youth with relatively poorer EC in the current study. Additionally, future studies may consider measuring changes in ER across time (e.g., pre to post-treatment) as a function of treatment and whether providing treatment in an intensive format may facilitate accelerated learning and a more efficacious style of regulating symptoms and distress relative to standard treatment.

In conclusion, the current study has added to the existing literature on OCD and ER by highlighting that there is variability in the capacity of children with OCD to modulate their emotions. Taken together, the findings may also suggest that youth with relatively poorer ER may represent a more severe sub-type of patients with OCD. Therefore, identifying whether a child has poorer emotional control may assist clinicians in: 1) arriving at a transdiagnostic formulation based on the child's unique presentation of symptoms and associated ER deficits and 2) intensifying or augmenting treatment to provide greater support to these youth who appear to experience greater impairments and poorer response to treatment. Accounting for the role of ER in OCD may provide a basis for considering ways in which treatment can be augmented to target such regulatory difficulties and potentially improve treatment outcomes.

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