Clinical Psychology Review 57 (2017) 141–163

Contents lists available at ScienceDirect

Clinical Psychology Review

journal homepage: www.elsevier.com/locate/clinpsychrev

Review

Emotion regulation as a transdiagnostic treatment construct across anxiety, depression, substance, eating and borderline personality disorders: A systematic review

Elise Sloan[a], Kate Hall[a,b,*], Richard Moulding[a], Shayden Bryce[c,d], Helen Mildred[a], Petra K. Staiger[b]

[a] Faculty of Health, School of Psychology, Deakin University, Geelong, Australia
[b] Centre of Drug, Alcohol and Addiction Research, Deakin University, Australia
[c] School of Psychological Sciences, Monash University, Clayton, VIC, Australia
[d] Monash Alfred Psychiatry Research Centre, The Alfred and Monash University Central Clinical School, Melbourne, VIC, Australia

HIGHLIGHTS

- Deficits in emotion regulation have been implicated across a range of psychological disorders
- This is the first study to examine the transdiagnostic role of emotion regulation in the psychological treatment literature.
- Emotion dysregulation significantly decreased following effective treatment for a broad range of psychopathology
- Results contribute to the growing body of evidence supporting emotion regulation as a transdiagnostic construct

ARTICLE INFO

Keywords:
Emotion regulation
Emotion dysregulation
Transdiagnostic
Psychopathology
Treatment

ABSTRACT

A large body of research has implicated difficulties in emotion regulation as central to the development and maintenance of psychopathology. Emotion regulation has therefore been proposed as a transdiagnostic construct or an underlying mechanism in psychopathology. The transdiagnostic role of emotion regulation has yet to be systematically examined within the psychological treatment outcome literature. It can be proposed that if emotion regulation is indeed a transdiagnostic construct central to the maintenance of psychopathology, then changes in emotion regulation difficulties will occur after effective treatment and this will occur for different disorders. We conducted a systematic review, identifying 67 studies that measured changes in both emotion regulation and symptoms of psychopathology following a psychological intervention for anxiety, depression, substance use, eating pathology or borderline personality disorder. Results demonstrated that regardless of the intervention or disorder, both maladaptive emotion regulation strategy use and overall emotion dysregulation were found to significantly decrease following treatment in all but two studies. Parallel decreases were also found in symptoms of anxiety, depression, substance use, eating pathology and borderline personality disorder. These results contribute to the growing body of evidence supporting the conceptualization of emotion regulation as a transdiagnostic construct. The present study discusses the important implications of these findings for the development of unified treatments that target emotion regulation for individuals who present with multiple disorders.

1. Introduction

In the past decade, converging fields of research have argued that difficulties in emotion regulation (ER) are central to the development and maintenance of psychopathology (Aldao, 2012; Aldao & Dixon-Gordon, 2014; Aldao, Nolen-Hoeksema, & Schweizer, 2010; Berking & Wupperman, 2012; Carpenter & Trull, 2013; Gratz, Weiss, & Tull, 2015; Kring & Sloan, 2010; Lavender et al., 2015; Mennin, Holaway, Fresco, Moore, & Heimberg, 2007). The use of strategies (e.g., rumination, suppression and avoidance) to regulate emotion has been found to relate to a broad range of mental disorders, and has been directly implicated in anxiety, depression, substance use, and

* Corresponding author at: Faculty of Health, School of Psychology, Deakin University, 221 Burwood Highway, Burwood, CIV, 3125 Australia.
E-mail address: kate.hall@deakin.edu.au (K. Hall).

http://dx.doi.org/10.1016/j.cpr.2017.09.002
Received 7 October 2016; Received in revised form 6 September 2017; Accepted 10 September 2017
Available online 11 September 2017
0272-7358/

eating disorders (see Aldao et al., 2010 for a meta-analytic review) and borderline personality disorder (BPD; Carpenter & Trull, 2013). These findings build a compelling argument that ER may be an important transdiagnostic construct, constituting a core underlying dimension common across disorders.

Approaching psychopathology from a transdiagnostic framework aids the conceptual understanding of the complex patterns of comorbidity across mental disorders (Barlow, Allen, & Choate, 2004; Harvey, Watkins, Mansell, & Shafran, 2004; McHugh, Murray, & Barlow, 2009). This framework may therefore inform unified treatment approaches that address comorbid disorders simultaneously, and consequently improve treatment efficiency and implementation fidelity (Hogue & Dauber, 2013; Mills & Marel, 2013). However, while there is considerable support for ER's association with various forms of psychopathology, and initial support for its role as a putative transdiagnostic factor, there are gaps in the literature. The widespread use of cross-sectional designs in these ER studies does not address whether deficits in ER have developed as a consequence of a mental disorders. In the absence of prospective research studies addressing putative causal pathways, this body of literature may lead to premature conclusions regarding the clinical relevance of the construct of ER (Berking & Wupperman, 2012). Alternative methods of understanding the role of ER in psychopathology are needed.

It can be proposed that if ER is indeed a transdiagnostic construct central to the maintenance of psychopathology, then difficulties in ER would decrease after effective treatment and this would be observable across different forms of psychopathology. The systematic review presented here pursues this important line of enquiry in order to contribute to the understanding of ER's transdiagnostic utility and clinical relevance. Given the complexity of ER, this paper will first examine the conceptual limitations of this construct before reviewing two extant frameworks used to examine ER in relation to psychopathology. We then draw upon these two frameworks to systematically examine whether there are changes in ER following treatment in a range of psychological disorders, and whether these changes are related to reductions in symptoms of psychopathology.

1.1. Conceptual challenges in defining emotion regulation

Emotion Regulation is a multidimensional construct that broadly refers to a heterogeneous set of processes involved in modifying emotional experiences. While the definition of ER has been debated and refined in the developmental psychology and BPD literature (Cole, Martin, & Dennis, 2004; Linehan, 1993), definitional and conceptual ambiguity remain a prominent concern in the field of clinical psychology (Berking & Wupperman, 2012). It has been argued that current definitions of ER are too broad, risk subsuming every process or behavior used to modify emotions, and compromise the empirical value of the construct. In spite of these criticisms, it is granted that the concept of ER has a broad heuristic value for research in the treatment of mental disorders (Berking & Wupperman, 2012). As such, we have chosen two prominent conceptualizations of ER to inform our review.

1.2. Framework one: emotion regulation as a set of strategies

One of the most influential conceptual frameworks is Gross' (1998a, 1998b) Process Model of ER. Within this model, ER is broadly defined as the set of strategies that individuals may use to increase, maintain or decrease their affective experience, including the feelings, behaviors or physiological responses that make up a given emotion (Gross, 1999). Empirically, this framework has been utilized to examine the relationship between specific ER strategies and symptoms of clinical disorders (Aldao, 2012; Aldao & Nolen-Hoeksema, 2010; D'Avanzato, Joormann, Siemer, & Gotlib, 2013; Nolen-Hoeksema & Harrell, 2002). For example, Aldao and colleagues examined six key ER strategies (see Table 1 for description), that have been conceptualized as either 'putatively adaptive' or 'putatively maladaptive' (Aldao, 2012; Aldao & Nolen-Hoeksema, 2010, 2012b) based primarily on their relationship with the etiology and maintenance of clinical disorders (see review by Aldao et al., 2010). For simplicity, these strategies will be referred to as 'adaptive' and 'maladaptive' hereafter.

The strength of association between ER strategies and symptoms of psychopathology has also been found to differ within the literature. For example, in a large meta-analysis (Aldao et al., 2010) and a later prospective study (Aldao & Nolen-Hoeksema, 2012b), maladaptive ER strategies were found to be consistently more strongly associated with symptoms of four clinical phenotypes (depression, anxiety, eating disorders, and substance use disorders) than were adaptive ER strategies.

Arguably the strength of Gross' conceptual framework for understanding ER in psychopathology is that it allows for the identification of specific strategies that relate to psychopathology and can be targeted in treatments. However, an over reliance on cross-sectional data from non-clinical samples (i.e., university students; Berking et al., 2012, Levin et al., 2012, Mennin, McLaughlin, & Flanagan, 2009; Turk, Heimberg, Luterek, Mennin, & Fresco, 2005), in studies adopting this framework have limited the generalizability of these findings to clinical populations. Further, the few clinical studies in this literature have limited their investigation to internalizing disorders (i.e., depressive and anxiety related disorders; Ottenbreit, Dobson, & Quigley, 2014; D'Avanzato et al., 2013; Aldao et al., 2010), in spite of the central role that maladaptive ER is theorized to play in the pathogenesis of externalizing disorders such as BPD (Linehan, 1993) and substance use disorders (Kober, 2013; Siegel, 2015). The underrepresentation in research prevents firm conclusions from being drawn about the functionality of ER strategies in the externalizing disorders.

There also are a number of conceptual limitations of adopting the strategy-based framework of ER, resulting in much debate as to which strategies should be included under the heading of ER (see Berking & Wupperman, 2012 for a discussion). This is best highlighted by the construct of rumination, whose function is under-investigated (Smith & Alloy, 2009). While the current review adopts the definition of rumination as a misguided attempt to regulate emotions (Aldao et al., 2010; Lyubomirsky, Layous, Chancellor, & Nelson, 2015; Smith & Alloy, 2009), it has also been argued to function as an attempted problem solving strategy or as an attempt to disengage from unattainable goals (Berking & Wupperman, 2012). While the definitional ambiguity of some ER strategies is acknowledged, the maladaptive strategies (rumination, suppression and avoidance) examined in this review of the treatment literature were included from a pragmatic need to examine a broad range of ER constructs in order to meaningfully contribute to the debate regarding the clinical utility of ER as a transdiagnostic treatment target.

1.3. Framework two: emotion regulation as overall deficits in emotional functioning

An alternate conceptual framework frequently adopted in the examination of ER and psychopathology is represented in models of ER that examine broad deficits in emotional functioning and regulation (Berking, 2010; Bradley et al., 2011; Gratz & Roemer, 2004; Mennin et al., 2007; Mennin, Heimberg, Turk, & Fresco, 2002). One of the most cited as clinically relevant is that proposed by Gratz and Roemer (2004), who define ER as a multidimensional construct involving four aspects: (a) the awareness, understanding and acceptance of emotional experiences, (b) the ability to engage in goal directed behaviors and inhibit impulsive behaviors when experiencing negative emotions; (c) the flexible use of situationally appropriate strategies to modulate the intensity and/or duration of emotional responses; and (d) the willingness to experience negative emotions as part of pursuing meaningful activities in life. Within this model it is proposed that if an individual demonstrates deficits in any of these four domains, they experience emotion dysregulation. The Difficulties in Emotion Regulation Scale

Table 1
Putatively adaptive and maladaptive emotion regulation strategies.

Classification	Strategy	Overview
Maladaptive	Rumination	Passive and repetitive focusing of attention to symptoms of distress or negative mood[a]
	Suppression	Attempts to push away or suppress both thoughts and/or emotional expression[b,c]
	Avoidance	The (behavioral) avoidance of situations, people or events likely to have an emotional impact. The (experiential) avoidance of internal experiences to modulate affect, (thoughts, feelings, memories and physical sensations)[d]
Adaptive	Acceptance	The ability to remain in contact with feelings, thoughts and physical sensations[e]
	Problem solving	The conscious attempts to change a situation or contain its consequences[f,g]
	Reappraisal	Reinterpreting the meaning of an event in order to alter its emotional impact[h,i]

[a] Nolen-Hoeksema, 1991.
[b] Gross & Levenson, 1993.
[c] Wegner & Zanakos, 1994.
[d] Hayes, Wilson, Gifford, Follette, & Strosahl, 1996.
[e] Hayes et al., 1999.
[f] Hofmann & Asmundson, 2008.
[g] Billings & Moos, 1981.
[h] Gross & John, 2003.
[i] Lazarus & Alfert, 1964.

(DERS; Gratz & Roemer, 2004) was developed to operationalize this multidimensional conceptualization of ER.

Similar to the use of maladaptive ER strategies, deficits in emotional functioning have been associated with heightened levels of symptoms across numerous psychological disorders including depression, anxiety, substance use, eating disorders and BPD (Brockmeyer et al., 2012; Buckholdt et al., 2014; Cooper, O'Shea, Atkinson, & Wade, 2014; Mennin et al., 2009; Stepp et al., 2014; Weiss, Tull, Anestis, & Gratz, 2013; Wong et al., 2013). Unlike studies of specific ER strategies that predominantly examine non-clinical samples, overall difficulties in ER are more frequently examined within clinical treatment-seeking populations, including individuals with eating related pathology (Lavender et al., 2015) and BPD (Bornovalova et al., 2008; Stepp et al., 2014). This literature suggests that deficits in the four aspects of ER are common features across depressive, anxiety, substance use, and eating disorders and BPD, in spite of their discrete diagnostic criteria.

Drawing on both the strategy-based and broad emotional functioning frameworks (Gratz & Roemer, 2004; Gross, 1998a) allows for an understanding of both the specific maladaptive ER strategies and their relationship with psychopathology, as well as the broader conceptual core elements of emotion dysregulation which occur within psychopathology. Given that both of these frameworks are purported to measure distinct facets of ER (Bardeen & Fergus, 2014), this review will use both when examining the psychological treatment literature in order to acknowledge the multifaceted nature of ER as a construct (Gratz & Roemer, 2004).

1.4. Emotion regulation as a transdiagnostic treatment target

Individuals with diagnosable psychological disorders commonly present with high rates, and complex patterns, of comorbidity across their life span (Kessler, Chiu, Demler, & Walters, 2005). Transdiagnostic frameworks propose that mental disorders are manifestations of relatively few core underlying dimensions (Barlow, Bullis, Comer, & Ametaj, 2013; Harvey et al., 2004; McEvoy, Nathan, & Norton, 2009; Norton & Paulus, 2015). Conceptually, these frameworks highlight similarities across multiple, apparently distinct, conditions within individuals. Pragmatically, they address comorbidity by providing a target for general intervention that may have an impact across multiple disorders and thus improve treatment efficiency (Hogue & Dauber, 2013; Mills & Marel, 2013). Uniformity in treatment may also reduce clinician burden through minimizing the need for clinicians to learn multiple, disorder-specific protocols. This, in turn, is likely increase treatment fidelity and facilitate treatment dissemination (Barlow et al., 2004; McHugh et al., 2009). The examination of ER as a transdiagnostic treatment target therefore has significant implications for both treatment efficiency and translation to real world settings.

However, the potential utility of ER as a treatment target requires further investigation, in part due to the limitations of this literature, which is largely comprised of studies that employ cross-sectional methodology in samples of healthy individuals. Furthermore, there is comparatively less research examining the role of ER in individuals with BPD and substance use disorder. The systematic review presented here extends the investigation of ER as a potential transdiagnostic treatment target in the following ways: (1) examining clinical samples; (2) assessing whether ER significantly improves following psychological intervention for depressive, anxiety, eating and substance related disorders and BPD; and by (3) examining whether improvements in ER are related to these reductions in psychopathology.

1.5. The present review

The current paper systematically reviews published studies that have examined changes in ER after participants had received psychological treatments for the depressive, anxiety, substance use and eating-related disorders and/or BPD. This group of disorders largely emulates the diagnostic categories reviewed in Aldao et al. (2010) meta-analysis of ER as a transdiagnostic construct in psychopathology, with the exception that it increases the focus on externalizing disorders with the inclusion of BPD. Emotion regulation was operationalized to include both maladaptive ER strategies (specifically, rumination, suppression and avoidance) and overall emotion dysregulation (DERS; Gratz & Roemer, 2004). The inclusion of both specific maladaptive ER strategies (identified by Aldao et al., 2010) and overall emotion dysregulation (as described by Gratz & Roemer, 2004) acknowledges the multifaceted nature of ER (Bardeen & Fergus, 2014). In summary, the primary aim of this review was to determine whether psychological treatments for depressive, anxiety, substance, and eating related disorders and BPD result in significant change(s) in ER. A secondary aim was to evaluate whether changes in ER are associated with changes in the symptoms of these disorders, although very few papers examined this directly.

2. Method

2.1. Protocol

The quality of reporting and conduct of this review was based on the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) statement and AMSTAR (A Measurement Tool to Assess Systematic Reviews; Shea, 2007) checklist where appropriate, and in accordance with the recommendations for improving the quality

of systematic reviews in other fields (Bryce, Sloan, Lee, Ponsford, & Rossell, 2016). This review protocol was developed following the procedures outlined in the Cochrane Handbook for Systematic Reviews (Higgins & Green, 2011).

2.2. Inclusion criteria

Inclusion criteria for the current review included studies that:

a) were published in English in a peer-reviewed journal up to April 2016;
b) evaluated the efficacy of a psychological intervention utilized to treat either an anxiety, depressive, substance use, or eating related disorder, BPD, or a combination of the above in a non-child sample (> 12 years). Psychological treatments were identified based on a literature search of treatments that have cognitive, behavioral or emotional/affective targets, a search of publically available treatment manuals and through expert opinion of key authors.
c) utilized a clinical sample as defined by: participants' symptoms either meeting criteria of the Diagnostic Statistical Manual of Mental Disorders (APA, 2013), or participants being recruited from a clinical treatment setting;
d) reported at least one validated self-report measure of ER before and after treatment;
e) reported an outcome measure designed to identify remission or reduction of the target disorder or symptoms related to that disorder; and
f) analyzed outcome data examining the impact of treatment over time on both ER and clinical symptom measures.

To maximize the breadth of the investigation, intervention studies of all design types were considered for review. Therefore, there were no control/comparison condition specifiers, and studies were included regardless of timeframe to follow-up.

2.3. Exclusion criteria

Exclusion criteria for the current review included studies that:

a) targeted children (defined as mean age of sample < 13 years);
b) described data from case studies, reviews, conference abstracts and letters to the editor; or
c) employed a treatment protocol that only included pharmacological treatment.

2.4. Identification and selection of studies

A comprehensive literature search was conducted using multiple electronic databases including PsychINFO, PubMed/Ovid MEDLINE, the Cochrane Central Register of Controlled Trials and CINAHL. Terms indicative of psychopathology (i.e., anxiety, depression, substance use, disordered eating and BPD), emotion dysregulation (i.e., rumination, avoidance, suppression, emotion regulation, affect regulation), and contemporary psychological treatments (i.e., ACT, MBCT, DBT, CBT) were combined in each database (a full list of search terms is located in Appendix A). Each article was evaluated based on the above pre-defined inclusion criteria through an abstract, title and keyword(s) search. The initial search was conducted on the 28th of July 2015. Two additional searches were undertaken on the 5th of May 2016 and January 27th 2017 to identify any further articles that met criteria but had been published after the original search.

2.5. Study selection

Three authors (ES, SB and KH) independently screened the title and abstract of each article to determine which would proceed to full text review. When the reviewers were uncertain about an article's eligibility, the full report was obtained and discrepancies were discussed. If consensus was not reached, authors PS and RM were consulted.

2.6. Data extraction

Uniform processes were used in the extraction of data from the included studies. General information related to study characteristics including recruitment setting, sample size and treatment condition and duration was extracted from each study. Research design, clinical outcomes and ER outcomes were extracted to address the primary aim of the review. Correlations between changes in ER and changes in clinical outcomes and mediation analysis (if conducted) outcomes were collected to address the secondary aim of the review.

2.7. Evaluation of the methodological quality of studies

The 'Psychotherapy Outcome Study Methodology Rating Form' (POMRF) was used to rate the methodological quality of each of the included studies (Öst, 2008). This scale was considered most appropriate given its suitability for use in reviews considering studies with variable research designs (i.e., from case-series to controlled trials). The POMRF is a comprehensive rating scale which examines 22 methodological elements including sample characteristics, psychometric properties of outcome measures, the nature of any randomization or assessor blinding, statistical analyses, and therapist training/adherence. POMPF items are rated on a 3-point scale from 0 (poor) to 2 (good). Overall scores range from 0 to 44, with higher overall scores indicative of greater methodological rigour. The POMRF has been shown to have good internal consistency (0.86) and inter-rater reliability within the range of 0.50–1.00 (Öst, 2008). Quality assessment data were extracted and rated by the first author. A second assessor (SB) independently rated 20% of articles that were selected at random. An inter-rater agreement rate of at least 0.90 (of the total score) was achieved for each article; that is, at least 20/22 of the POMRF items were rated identically for each article reviewed. This suggested indicating good reliability for the quality scoring system.

3. Results

3.1. Study selection

The electronic search provided a total of 958 papers, with 586 remaining after removal of duplicates. After title and abstract screening, 119 full text articles were assessed. Nine additional articles were identified after scanning the reference list of these 119 articles. Four of these additional reports meet inclusion criteria after abstract screening. Therefore, a total of 123 articles proceeded to full-text review. After full text review, 67 articles were excluded (see Fig. 1). A final total of 56 articles met the inclusion criteria and were subsequently included in the review. The additional searches undertaken on the 5th of May 2016 and 27th of January 2017 identified an additional 99 and 120 articles respectively. After title and abstract screening of the 99 articles identified in the May 2016 search, 5 full text articles were assessed and one article met inclusion criteria. Title and abstract screening of the 120 articles identified in the January search resulted in 18 full text articles being assessed and 10 subsequently meeting inclusion criteria. This brought the total number of articles included in the review to 67. References for these articles are included in Appendix B. Given the heterogeneous nature of the studies included within this review (e.g., participants drawn from different populations and varied interventions delivered in different formats), a systematic qualitative synthesis rather than a meta-analysis was deemed appropriate to examine the research question.

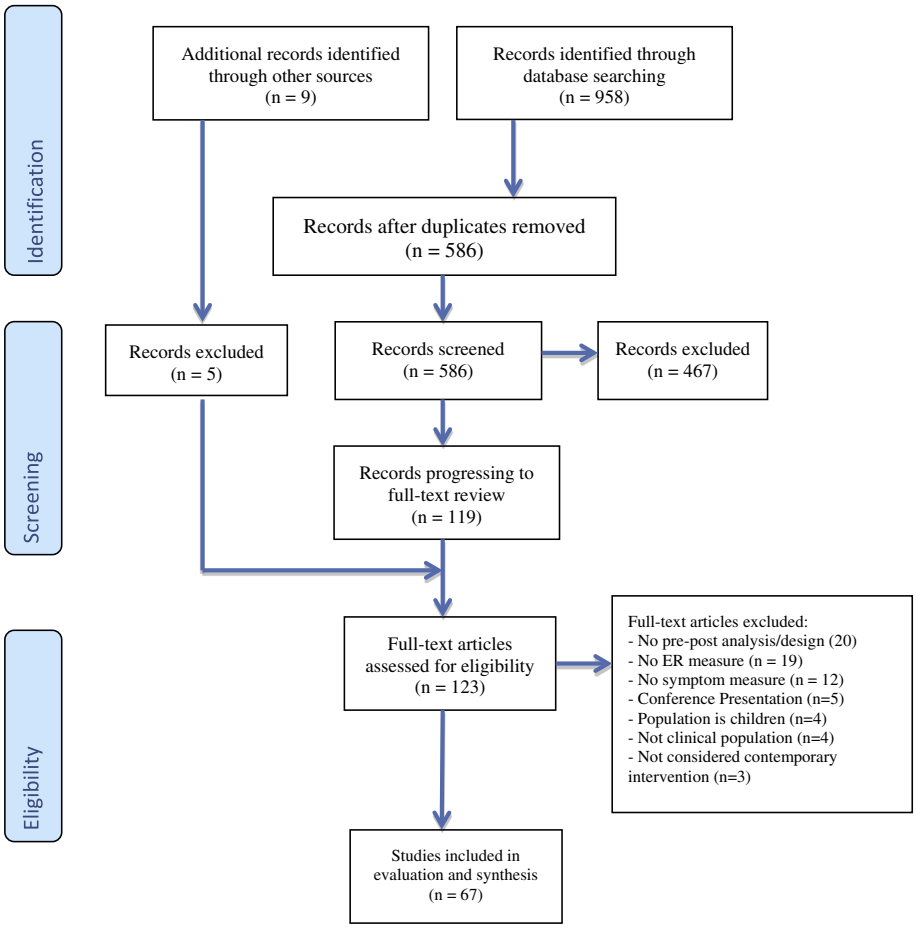

Fig. 1. Flow chart of systematic search and extraction procedure.

3.2. Overview of included studies

Table 2 provides an overview of the 67 studies included within this review, categorized by the ER construct examined within the study. If more than one construct was examined, the study appears twice within the table. All studies were published in the past 16 years. The total number of participants across all studies was 4659. Samples were composed predominately of adults (n = 62 studies), with five studies utilizing an adolescent sample. (See Table 2.)

3.3. Assessment of methodological quality

Significant variability in methodological rigour was evident within the overall POMRF scores, which ranged from 10 to 34 out of a possible total of 44 points, with an average score of 20.8 (SD = 6.0; Table 3). To assist in the comparison of methodological quality between studies, the current review rated studies more than one SD below the mean POMRF score as "well below average" (current investigation range 0–13; n = 7), those which were within one SD of the mean were "below average" (14–19; n = 25), those within one standard deviation above the mean were "above average" (20–26; n = 23), and those more than one SD above the mean "well above average" (27 +; n = 12). This method of comparison is consistent with previous reviews that utilize the POMRF (Swain, Hancock, Hainsworth, & Bowman, 2013).

3.3.1. Study design

Twenty-nine (of 67) studies were open trial designs, and as such, were rated poorly in regards to study design. The remaining studies (38/67) utilized a control condition, with 14 receiving full credit for comparing an active treatment to another previously empirically documented treatment, while 11 received a "fair" rating for comparing the treatment with an active control or well-documented treatment as usual (TAU) condition. Thirteen studies received a poor rating, a result of including a waitlist comparison (11 studies) or a vaguely detailed TAU condition (2 studies).

3.3.2. Therapists

Only two of the 46 studies that used at least two therapists delivering treatment, examined the effect of therapist on treatment outcome. Therapist experience was also considered to be poor, with only 12 studies utilizing experienced and practicing therapists to deliver the treatment.

3.3.3. Adherence and competence

Treatment adherence and therapist competence was poorly conducted within the included studies. Only 18 studies undertook frequent checks of each session using a detailed rating scale. Nine of the 67 studies made checks for therapist competence, through weekly supervision or reviews of therapy tapes to ensure competency.

3.4. Outcomes

A narrative synthesis of outcome data, organized by ER domain examined during treatment, is presented in Table 3. Given the variability in study design and research questions being investigated, the outcome data extracted was dependent on the best available evidence presented within the body of the report (with effect sizes reported when provided by the authors). For example, in single-arm trials, pre-post statistical analyses were presented; however, for randomized controlled trials, group-time interactions (or time-based main effects) were

Table 2
Overview of studies by emotion regulation construct examined.

Study	Country	Sample characteristics				Treatment				Outcome	
		Diagnoses/clinical status	Mean age/range	Gender	Sample size	Design	Conditions	Setting	Sessions	Clinical measure	ER measure
Rumination											
Ames et al., 2014	United Kingdom	Prior MDD with residual depressive sx	12–18 years	91% Female; 9% Male	11	Open Trial	1. MBCT	I	8 × 2 h weekly sessions	MFQ (Depression)	Rumination (CRSQ)
Batink et al., 2013	Netherlands	Prior MDD with residual depressive sx	43.9	75% Female; 25% Male	130	RCT	1. MBCT 2. Waitlist	G	8 × 2.5 h weekly sessions in groups of 10–15	Depression (HDRS)	Rumination (RSS)
Chesin et al., 2016	USA	MDE (90%) Dysthymia (10%)	41.7	80% Female 20% Male	10	Open Trial	1. MBCT-S	G	7 sessions	Depression (LEIDS-R)	Rumination (RRS-B)
Dammen et al., 2015	Norway	MDD	42.3	100% Female	11	Open Trial	1. MCT	I	10 × 90 min weekly sessions of MCT	Anxiety (BAI) Depression (BDI)	Rumination (RSS)
Dimidjian et al., 2014	USA	Prior MDE with residual depression sx	47.4	73% Female; 27% Male	100	Open Trial	1. MBCT	Web	8 sessions	PHQ	Rumination (RSQ)
Ekkers et al., 2011	Netherlands	MDD	72.9	77% Female 23% Male	93	RCT	1. COMET + TAU 2. TAU	G	7 × 90 min sessions	Depression (GDS)	Rumination (RSS)
Forkman et al., 2014b	USA	Prior MDD with residual depressive sx	44.6	79% Female; 21% Male	130	RCT	1. MBCT 2. Waitlist	G	8 × 2 h weekly sessions of 10–15 people	Depression (HDRS)	Rumination (RSS)
Geschwind et al., 2011	Netherlands	Prior MDD with residual depressive sx	44.6	79% Female; 21% Male	130	RCT	1. MBCT 2. Waitlist	G	8 × 2.h hour weekly sessions of 10–15 people	Depression (HDRS)	Rumination (RSS)
Goldin et al., 2016		SAD	32.7	56% Female 44% Male	108	RCT	1. CBGT 2. MBSR 3. Waitlist	G	12 × 2.5 h group sessions	Social Anxiety (LSAS)	Rumination (RRS)
Graser et al., 2016	Germany	Chronic Depression	46.5	36% Female; 64% Male	11	Open Trial	1. MBCT + CFT	G	12 × 100 min weekly group sessions	Depression (BDI-II)	Rumination (RSQ)
Hjemdal et al., 2016		MDD	28.4	80% Female 20% Male	10	Open Trial	MCT	I	10 x sessions	Depression (BDI) Anxiety (BAI)	Rumination (RRS)
Jacobs et al., 2016	USA	Prior MDD with residual depressive sx	15.6	57.6% Female 42.4% Male	33	RCT	1. RFCBT 2. Control	I	8 × 45–60 min weekly individual sessions	Depression (RADS)	Rumination (RRS)
Jermann et al., 2013	Switzerland	Prior MDD with residual depressive sx	46.8	69.4% Female 30.6% Male	36	RCT	1. MBCT + TAU 2. TAU	G	8 x weekly 2 h sessions	Depression (BDI-II)	Rumination (RRQ)
Jones et al., 2008	USA	MDD	44.8	74% Female; 26% Male	81	Open Trial	1. CT	I	16–20 sessions- Sessions 1–8 occurred twice weekly with 8 weekly sessions thereafter	Depression (BDI)	Rumination (RSQ)
Keune et al., 2011	Germany	Prior MDD with residual depressive sx	47.1	73% Female; 27% Male	78	RCT	1. MBCT 2. Waitlist	G	1 x weekly sessions for 8 weeks	Depression (BDI-II)	Rumination (RSQ-D)
Kingston et al.,2007	Ireland	Prior MDD with residual depressive sx	41.8	89% Female; 10% Male	19	Not Randomized	1. MBCT 2. Waitlist	G	8 x weekly 2 h sessions	Depression (BDI)	Rumination (RRS)
Kocovski et al., 2009	USA	SAD	34.2	69%	42	Open Trial	1. MAGT	G	12 × 2 h weekly sessions	Social Anxiety (LSAS)	Rumination

(continued on next page)

Table 2 *(continued)*

Study	Country	Sample characteristics				Treatment				Outcome	
		Diagnoses/clinical status	Mean age/range	Gender	Sample size	Design	Conditions	Setting	Sessions	Clinical measure	ER measure
				Female; 31% Male					and 3 month follow up session	Depression (BDI-II)	(RRQ-R) Experiential Avoidance (AAQ)
Kocovski et al., 2013	USA	SAD	32.7	52% Female; 48% Male	137	RCT	1. MAGT 2. CBGT	G	12 × 2 h weekly sessions and 3 month follow up session for both conditions	Social Anxiety (SPIN) Depression (BDI-II)	Rumination (RRS) Experiential Avoidance (SA-AAQ)
Kumar et al., 2008	USA	MDD	36.8	66% Female; 34% Male	33	Open Trial	1. EBCT	I	20–24 individual sessions	Depression (BDI-II)	Rumination (RSQ) Experiential Avoidance (AAQ)
Manicavasgar et al., 2012	Australia	MDD	46	64% Female; 36% Male	45	RCT	1. MBCT 2. CBT	G	8 × 2–2.5 h weekly sessions for both treatment conditions	Depression (BDI-II)	Rumination (RSS)
Moshier et al., 2017	USA	MDD	35.6	52% Female 48% Male	34	RCT	1. CCT + BATD 2. BATD	I	4 × 60 min sessions	Depression (BDI)	Rumination (RRS)
Newby et al., 2014	Australia	Comorbid MDD and GAD	44	78% Female; 22% Male	109	RCT	1. iCBT 2. Waitlist	Web	6 x clinician assisted online modules delivered over 10 weeks	PHQ-9; Anxiety (GAD- 7)	Rumination (RTQ)
Papageorgiou et al., 2015	United Kingdom	MDD	41.7	80% Female; 20% Male	10	Open Trial	1. MCT	G	12 × 2 h weekly sessions + 2 booster sessions	Depression (BDI) Anxiety (BAI)	Rumination (RSS)
Shahar et al., 2010	USA	Prior MDD with residual depressive sx	46.4	84% Female; 16% Male	45	RCT	1. MBCT 2. Waitlist	G	8 × 3 h weekly sessions + an all day silent retreat at week 6	Depression (BDI)	Rumination (RSS)
Teismann et al., 2014	Germany	Prior MDD with residual depressive sx	47.1	72% Female; 28% Male	60	RCT	1. CBT-DR 2. Waitlist	G	11 × 90 min weekly sessions in groups of 3–9	Depression (BDI-II)	Rumination (RSQ-B)
Van Aalderen et al., 2012	Netherlands	MDD	47.5	73% Female; 27% Male	219	RCT	1. MBCT + TAU 2. TAU	G	8 × 2.5 h weekly sessions and 1 x day of 6 h meditation	Depression (BDI)	Rumination (RSS)
Watkins et al., 2011	United Kingdom	Prior MDD with residual depressive sx	44.2	57% Female; 43% Male	42	RCT	1. CBT 2.TAU	I	12 x weekly sessions	Depression (BDI-II)	Rumination (RSQ)
Watkins et al., 2012	United Kingdom	MDD or subthreshold MDD	46.3	64% Female 36% Male	121	RCT	1. CNT + TAU 2. RT + TAU 3. TAU		1 × 1.5 h face to face, at least 6 weeks of 30 min daily self-practice & up to 3 × 30 min telephone sessions	Depression (BDI-II) Anxiety (GAD-7)	Rumination (RSQ)
Avoidance											
Bullis et al., 2015	USA	SAD; OCD, Agoraphobia, GAD	44.5	64% Female; 36% Male	11	Open Trial	1. UP	G	12 × 2 h weekly sessions	Depression (ODSIS) Anxiety (OASIS)	Avoidance (MEAQ)
Dalrymple et al., 2007		SAD	31	53% Female; 47% Male	19	Open Trial	1. ACT	I	12 × 1 h weekly individual sessions	Social Anxiety (LSAS)	Experiential Avoidance (AAQ)
Erickson 2003	Canada	Panic; Agoraphobia, GAD, PTSD	38	76% Female; 24% Male	116	Open Trial	1.CBT	G	12 × 2 h weekly sessions in groups of 10–12	Anxiety (BAI)	Behavioral Avoidance (FGSQ)
Espejo et al., 2016	USA	Panic, GAD, PTSD, SAD, OCD	45.3	73% Female 27% Male	48	Open Trial	1. TCBT	G	12 × 2 h weekly sessions in groups	Anxiety (MASQ) Depression (MASQ)	Experiential Avoidance (AAQ)
Eustis et al., 2016	USA	GAD	34.4	65.6%	64	RCT	1. ABBT	G	16 x weekly treatment	Anxiety (PSWQ)	Experiential

(continued on next page)

Table 2 *(continued)*

Study	Country	Sample characteristics				Treatment				Outcome	
		Diagnoses/clinical status	Mean age/range	Gender	Sample size	Design	Conditions	Setting	Sessions	Clinical measure	ER measure
				Female 35.5% Male			2. ART		sessions		Avoidance (AAQ)
Forman et al., 2007	USA	Depression & Anxiety Sx	27.9	82% Female; 18% Male	101	RCT	1. MBCT 2. CT	I	Mean of 15.27 sessions of CT and 15.60	Depression (BDI-II) Anxiety (BAI)	Experiential Avoidance (AAQ)
Gratz et al., 2011	USA	Sub threshold BPD (74% met full criteria)	34.3	100% Female	23	Open Trial	1. ERGT	G	14 × 90 min weekly sessions in groups of 4–6	Depression (BDI-II); Borderline Personality (BEST); Anxiety (DASS); Self Harm (DSHI)	Emotion Dysregulation (DERS) Experiential Avoidance (AAQ)
Gratz et al., 2006	USA	BPD	33	100% Female	22	RCT	1. ERGT + TAU 2. TAU	G	14 × 1.5 h weekly sessions	Self Harm (DSHI) Borderline Personality (BEST); Depression & Anxiety (DASS)	Emotion Dysregulation (DERS) Experiential Avoidance (AAQ)
Gonzalez-Mendez et al., 2004	Spain	SUD	33.6	100% Female	27	RCT	1. ACT 2. CBT	G	16 × 90 min weekly sessions	Substance use	Experiential Avoidance (AAQ)
Hellerstein et al., 2015	USA	Dysthymic Disorder (75%) MDD (25%)	44	45% Female; 64% Male	14	Open Trial	1. BA	I	12 × 50 min weekly sessions with booster sessions at week 18 and 24	Depression (BDI; HSRD; Cornell Dysthymia Scale);	Avoidance (CBAS)
Kocovski et al., 2009	USA	SAD	34.2	69% Female; 31% Male	42	Open Trial	1. MAGT	G	12 × 2 h weekly sessions and 3 month follow up session	Social Anxiety (LSAS) Depression (BDI-II);	Rumination (RRQ-R) Experiential Avoidance (AAQ)
Kocovski et al., 2013	USA	SAD	32.7	52% Female; 48% Male	137	RCT	1. MAGT 2. CBFT	G	12 × 2 h weekly sessions and 3 month follow up session for both conditions	Social Anxiety (SPIN); Depression (BDI-II)	Rumination (RRS) Experiential Avoidance (SA-AAQ)
Kumar et al., 2008	USA	MDD	36.8	66% Female; 34% Male	33	Open Trial	1. EBCT	I	20–24 individual sessions	Depression (BDI-II)	Rumination (RSQ) Experiential Avoidance (AAQ)
Morton et al., 2012	Australia	BPD	35.6	91% Female; 8% Male	41	RCT	1. ACT + TAU 2. TAU	G	12 × 2 h weekly sessions	Borderline Personality (BEST)	Emotion Dysregulation (DERS) Experiential Avoidance (AAQ)
Petersen & Zettle, 2009	USA	Comorbid MDD and SUD	37.9	50% Female; 50% Male	24	RCT	1.ACT 2.TAU	I	30 min sessions occurring twice weekly for duration of treatment phase	Depression (BDI-II)	Experiential Avoidance (AAQ)
Roemer et al., 2007	USA	GAD	36.4	56% Female; 44% Male	16	Open Trial	1. ABBT	I	16 sessions	Anxiety (DASS); Depression (BDI-II)	Experiential Avoidance (AAQ)
Roemer et al., 2008	USA	GAD	33.6	71% Female; 31% Male	31	RCT	1. ABBT 2. Waitlist	I	4 × 90 min and 12 × 1 h sessions undertaken weekly-fortnightly	Anxiety (GAD CSR); Depression (BDI-II)	Avoidance (AAQ)
Twohig et al., 2010	USA	OCD	37	61% Female; 39% Male	79	RCT	1. ACT 2. PRT	I	8 × 1 h sessions	OCD (YBOCS)	Experiential Avoidance (AAQ)
Wildes et al., 2014	USA	AN	26.8	96% Female; 4% Male	24	Open Trial	1. EABT	I	33–58 sessions over 33–58 weeks. Frequency of sessions dependant on severity of symptoms	Eating Disorder (EDE); Anxiety (BAI); Depression (BDI-II);	Experiential Avoidance (AAQ)

(continued on next page)

Table 2 *(continued)*

Study	Country	Sample characteristics				Treatment				Outcome	
		Diagnoses/clinical status	Mean age/range	Gender	Sample size	Design	Conditions	Setting	Sessions	Clinical measure	ER measure
Yuen et al., 2013	Netherlands	SAD	35	25% Female; 75% Male	24	Open Trial	1. ABBT	VC	12 × 1 h long weekly sessions	Social Anxiety (LSAS); Depression (BDI-II)	Experiential Avoidance (AAQ)
Suppression											
Forkman et al., 2014	Germany	MDD	26.4	64% Female; 36% Male	44	Open Trial	1. CBT	IG	2 x hours of individual and 4 x hours of group sessions per day	Depression (BDI)	Expressive Suppression (ERQ)
Hepburn et al., 2009	United Kingdom	Prior MDD with residual depressive sx	48.7	84% Female; 26% Male	68	RCT	1. MBCT 2. Waitlist	G	8 × 2 h weekly sessions + 1 all day session	Depression (BDI)	Thought Suppression (WBSI)
Hoyer et al., 2009	Germany	GAD	45.4	71% Female; 39% Male	73	RCT	1. WE 2. AR 3. Waitlist	I	15 x weekly sessions for both WE and AR conditions	Anxiety (HAMA); Depression (BDI)	Thought Suppression (WBSI)
Ito et al., 2016	Japan	MDD (53%) SAD (24%) PD (12%) PTSD (6%) Ax-NOS (6%)	35.2	59% Female 41% Male	17	Open Trial	1. UP	I	Weekly face to face individual sessions of 50–90 min length	Depression (BDI-II) Anxiety (OASIS)	Expressive Suppression (ERQ)
Overall deficits in emotion regulation											
Axelrod et al., 2011	USA	Comorbid SUD and BPD	38	100% Female	27	Open Trial	1. DBT	IG	20 × 1 h weekly individual sessions + weekly 90 min skills groups + phone coaching as needed	Depression (BDI); Substance Use (UA)	Emotion Dysregulation (DERS)
Ben-Porath et al., 2014	USA	AN (33.8%); BN (66.2%)	23.4	100% Female	65	Open Trial	1. CBT + DBT skills	IG	2 h per week of DBT skills training adapted for eating disorders in addition to CBT inpatient treatment	Eating (EDE); Binge, Purge, Restriction and Exercise outcomes	Emotion Dysregulation (DERS)
Ben-Porath et al., 2009b	USA	Comorbid ED and BPD and just ED	26.3	98% Female; 2% Male	40	Open trial	1. DBT	G	2 h per week of DBT skills training adapted for eating disorders	Eating (EDE) Depression (BDI-II)	Emotion Regulation (NMR)
Berking et al., 2013	Germany	MDD	46.4	82% Female; 18% Male	432	RCT	1. CBT 2. CBT + ER Skills	IG	CBT condition: 1 × 45 min individual therapy and 4 × 45 min group CBT. CBT + ER Condition: 4 × 1.5 h sessions and 2 × 45 min sessions of ER training to replace 10 of the 45 sessions of routine CBT	Depression (BDI)	Emotion Regulation (ERSQ)
Berking et al., 2008	Germany	MDD (48%), Adjustment Disorder (22%); Panic (5%); PTSD (3%); Dysthymia (2%)	47	77% Female; 23% Male	289	RCT	1. CBT + ITEC 2. CBT	IG	1 x individual therapy sessions + 6 x group sessions	SCL; Depression (BDI)	Emotion Regulation (ERSQ)
Ford et al., 2012	USA	PTSD; Sub threshold PTSD	14.7	100% Female	59	RCT	1. TARGET 2. ETAU	I	12 × 50 min sessions	PTSD (CAPS); Depression (TSCC-D) Anxiety (TSCC-A)	Emotion Regulation (NMR)
Gratz et al., 2015; Gratz, Tull, & Levy, 2014	USA	Sub threshold BPD (90.3% met full criteria)	33.3	100% Female	61	RCT	1. ERGT 2. TAU	G	14 × 90 min weekly sessions in groups of 6	Self Harm (DSHI); Borderline Personality Disorder Symptoms (ZAN-BPD); Depression (DASS); Anxiety (DASS)	Emotion Dysregulation (DERS)
Gratz et al., 2011	USA	Sub threshold BPD (74%	34.3	100%	23	Open Trial	1. ERGT	G	14 × 90 min weekly	Depression (BDI-II);	Emotion

(continued on next page)

Table 2 *(continued)*

Study	Country	Sample characteristics				Treatment				Outcome	
		Diagnoses/clinical status	Mean age/range	Gender	Sample size	Design	Conditions	Setting	Sessions	Clinical measure	ER measure
		met full criteria)		Female					sessions in groups of 4–6	Borderline Personality (BEST); Anxiety (DASS); Self Harm (DSHI)	Dysregulation (DERS) Experiential Avoidance (AAQ)
Gratz et al., 2006	USA	BPD	33	100% Female	22	RCT	1. ERGT + TAU 2. TAU	G	14 × 1.5 h weekly sessions	Self Harm (DSHI); Borderline Personality (BEST); Depression & Anxiety (DASS)	Emotion Dysregulation (DERS) Experiential Avoidance (AAQ)
Hamidian et al., 2016	Iran	Dysthymia	33	75% Female 25% Male	44	RCT	1. MBCT 2. Control	G	8 × 2 h weekly sessions	Depression (BDI-II)	Emotion Dysregulation (DERS)
Lenz et al., 2016	USA	MDD (35%) Bipolar Disorder (23%) Other mood disorder (27%) Ax NOS (6%) ADHD (6%) OCD (1%)	15.4	63% Female 38% Male	66	Open Trial	1. DBT	G	7 week program including individual (2 h weekly), group and family sessions (2 h weekly.	Depression (SCR-DEP) Anxiety (SCR-ANX)	Emotion Dysregulation (DERS)
McMain et al., 2017	Canada	BPD	29.7	78.6% Female 21.4% Male	84	RCT	1. DBT 2. Waitlist	G	20 × 2 h weekly group sessions	Borderline Personality Disorder (BSL-23) Depression (BDI-II)	Emotion Dysregulation (DERS)
Morton et al., 2012	Australia	BPD	35.6	91% Female; 8% Male	41	RCT	1. ACT + TAU 2. TAU	G	12 × 2 h weekly sessions	Borderline Personality Disorder (BEST)	Emotion Dysregulation (DERS) Experiential Avoidance (AAQ);
Murray et al., 2015	USA	BN	15.7	100% Female	35	Open Trial	1. DBT	IG	Combination of individual, family, multi family and parent only programs delivered up to 6 days a week for 3–10 h per day depending on severity of sx	Eating Disorder (EDE)	Emotion Dysregulation (DERS)
Neacsiu et al., 2014	USA	Primary diagnosis of a depressive or anxiety disorder from DSM-IV	32.4	68% Female; 32% Male	48	RCT	1. DBT 2. Active Control	G	16 × 2 h weekly sessions	Substance Use (ASI); PHQ-9; Anxiety (OASIS)	Emotion Dysregulation (DERS)
Radkovsky et al., 2014	Germany	MDD	45.6	62.5% Female 37.5% Male	152	Open Trial	1. CBT	IG	Average of 3.7 h of individual and 21.1 h of group therapy	Depression (BDI)	Emotion Regulation (ERSQ)
Safer et al., 2010	USA	BED	52.2	85% Female; 15% Male	101	RCT	1. DBT 2. Active Control	I	20 × 50 min weekly sessions	Eating (EDE); Depression (BDI)	Emotion Dysregulation (DERS)
Schuppert et al., 2012	Netherlands	BPD	16	96% Female; 4% Male	109	RCT	1. ERT 2. TAU	G	17 × 105 min weekly + 2 booster sessions at 6 + 12 weeks post treatment	Borderline Personality Disorder (BPDSI);	Life Problems Inventory (Emotion dysregulation subscale)
Telch et al., 2000	USA	BED	45	100% Female	11	Open Trial	1. DBT	G	20 × 2 h weekly sessions	Binge Eating (BES, EDE) Depression (BDI)	Emotion Regulation (NMR)
Wonderlich et al., 2014	USA	Sub threshold BN Sx (73% met full DSM-IV	27.3	90% Female	80	RCT	1. iCAT 2. CBT-E	I	21 × 50 min sessions over 19 weeks with twice	Eating Disorder (EDE); Depression (BDI);	Emotion Dysregulation

(continued on next page)

Table 2 *(continued)*

Study	Country	Sample characteristics				Treatment				Outcome	
		Diagnoses/clinical status	Mean age/range	Gender	Sample size	Design	Conditions	Setting	Sessions	Clinical measure	ER measure
		criteria)		10% Male					weekly sessions for the first 4 weeks	Anxiety (STAI)	(DERS)

Note: MDD = Major Depressive Disorder; MDE = Major Depressive Episode; SAD = Social Anxiety Disorder; GAD = Generalized Anxiety Disorder; OCD = Obsessive Compulsive Disorder; PTSD = Post Traumatic Stress Disorder; PD = Panic Disorder; BPD = Borderline Personality Disorder; SUD = Substance Use Disorder; AN = Anorexia Nervosa; BD = Bulimia Nervosa; ED = Eating Disorder; BED = Binge Eating Disorder; Ax-NOS = Anxiety Disorder Not Otherwise Specified; MMBCT = Mindfulness Based Cognitive Therapy; MCT = Meta Cognitive Therapy; CFT = Compassion Focused Therapy; CT = Cognitive Therapy; MAGT = Mindfulness and Acceptance Based Therapy; CBGT = Cognitive and Behavioral Group Therapy; EBCT = Exposure Based Cognitive Therapy; CBT = Cognitive Behavioral Therapy; iCBT = Internet Cognitive Behavioral Therapy; TAU = Treatment as Usual; UP = Unified Protocol; ACT = Acceptance and Commitment Therapy; ERGT = Emotion Regulation Group Therapy; BA = Behavioral Activation; ABBT = Acceptance Based Behavior Therapy; PRT = Progressive Relaxation Therapy; WE = Worry Exposure; AR = Applied Relaxation; DBT = Dialectical Behavior Therapy; CBT + ER = Cognitive Behavior Therapy with Emotion Regulation Skills; CBT + ITEC = Integrative Training of Emotional Competencies; TARGET = Trauma Affect Regulation Guide for Education and Therapy, ERT = Emotion Regulation Therapy, iCAT = Integrative Cognitive Affective Therapy; CBT-E = Enhanced Cognitive Behavior Therapy; MBCT-S = Mindfulness Based Cognitive Therapy and Safety Planning; COMET = Competitive Memory Training; BATD = Brief Behavioral Activation Therapy for Depression; CCT = Cognitive Control Training; MBSR = Mindfulness Based Stress Reduction; MFQ = Mood and Feelings Questionnaire; HDRS = Hamilton Rating Scale for Depression; BAI = Beck Anxiety Inventory; BDI = Beck Depression Inventory; BDI-II = Beck Depression Inventory Version 2; LSAS = Liebowitz Social Anxiety Scale; SPIN = Social Phobia Inventory; PHQ-9 = Patient Health Questionnaire- 9; GAD-7 = Generalized Anxiety Disorder 7 item Scale; ODSIS = Overall Depression Severity and Impairment Scale; OASIS = Overall Anxiety Severity and Impairment Scale; BEST = Borderline Evaluation of Severity over Time; DASS = Depression Anxiety and Stress Scale; DSHI = Deliberate Self Harm Inventory; GAD CSR = Generalized Anxiety Disorder Clinical Severity Rating; EDE = Eating Disorder Examination; HAMA = Hamilton Anxiety Rating Scale; UA = Urinary Analysis; TSCC-D = Trauma Symptom Checklist for Children-Depression; TSCC-A = Trauma Symptom Checklist for Children- Anxiety, ZAN-BPD = Zanarini Rating Scale for Borderline Personality Disorder; ASI = Addiction Severity Index; BPDSI = Borderline Personality Disorder Severity Index; STAI = State Trait Anxiety Inventory; CRSQ = Child Response Style Questionnaire; RSS = Rumination on Sadness Scale; RSQ = Ruminative Response Scale; AAQ = Acceptance and Action Questionnaire; SA-AAQ = Social Anxiety Acceptance and Action Questionnaire; RTQ = Repetitive Thinking Questionnaire; MEAQ = Multidimensional Experiential Avoidance Questionnaire; FGSQ = Fear and General Symptoms Questionnaire; DERS = Difficulties in Emotion Regulation Questionnaire; CBAS = Cognitive and Behavioral Avoidance Questionnaire; ERQ = Emotion Regulation Questionnaire; WBSI = White Bear Suppression Inventory; NMR = Negative Mood Regulation Scale; ERSQ = Emotion Regulation Skills Questionnaire; QFS = Quantity Frequency Scale; BSL-23 = Borderline Symptom List - 23.

described. Effect sizes were reported by study authors in a number of different formats (e.g., r, η^2 g, *d*), but for ease of interpretation these have been converted to the common metric of *d*. By convention, a *d* of 0.20 is considered small, 0.50 medium and 0.80 large (Cohen, 1992). Associations between ER and symptom changes were reported in 22 studies, however only three of these studies undertook an analysis whereby ER change longitudinally preceded symptom change (Table 3). Results from the remaining cross sectional mediation analyses, which are only able to examine association between variables, rather than true longitudinal change, are not reported in this table to avoid misleading the reader regarding the available evidence.

3.4.1. Rumination

A total of 28 studies examined the impact of treatment on rumination. Within these studies, depression was the most frequently examined disorder, with 24 studies examining the impact of treatment on both rumination and either a current diagnosis of Major Depressive Disorder (MDD; 12/24) or a prior diagnosis of MDD with residual symptoms (12/24). A variety of different treatments were utilized (See Table 2), however, rumination was reported to have significantly decreased following treatment (and at follow-up when examined) in all of these studies, including those that compared treatment with a TAU or waitlist comparison group. Reductions in depressive symptoms following treatment were also reported in each study reviewed, while anxiety symptoms also decreased in four studies that measured this construct. A further four studies examined the impact of treatment on rumination in individuals with Social Anxiety Disorder (SAD; $n = 3$) and comorbid Generalized Anxiety Disorder (GAD) and MDD. Within all four of these studies rumination decreased following treatment. These reductions paralleled the decreases in social and generalized anxiety symptoms, as well as reductions in symptoms of depression. While ten studies examined the association between rumination and treatment outcome, only one of these examined ER symptom changes (pre-mid) longitudinally preceding symptom change (mid-post; Kocovski et al., 2009), but this study failed to find an association between the variables.

3.4.2. Avoidance

The maladaptive ER strategy of avoidance (including both behavioral and experiential forms) was measured within 20 treatment studies. Eleven of these studies targeted anxiety, utilizing a number of different treatment protocols (see Table 2). In all of these studies, both experiential avoidance and symptoms of SAD, GAD, OCD, and anxiety symptoms in general were found to significantly decrease following treatment, and also at follow-up when examined (Table 3). The majority of these studies (8/11) also examined the impact of treatment on depressive symptoms, revealing a significant reduction following treatment and also at follow-up. Experiential avoidance was examined following treatment in individuals with BPD in three of the included studies. Similar to anxiety, these studies demonstrated significant decreases in experiential avoidance and symptoms of BPD following Emotion Regulation Group Therapy (ERGT) and Acceptance and Commitment Therapy (ACT). The ERGT studies also found decreases in depression, anxiety, and deliberate self-harm.

A total of five studies examined the impact of treatment on avoidance in individuals with depression, with two of these studies also including individuals with an anxiety disorder diagnosis or comorbid substance use disorder. One study measured behavioral avoidance following Behavioral Activation Therapy and found significant decreases in this ER strategy following treatment, however parallel decreases in depression were not found. The remaining four studies examined experiential avoidance and found significant decreases in this ER strategy alongside decreases in symptoms of depression following treatment under a number of different protocols. Only one study examined avoidance following treatment for individuals with substance use disorder. Within this study, avoidance was found to decrease following

Table 3
Outcomes and quality of included studies organized by emotion regulation construct examined.

Study	Study groups	Follow Up	Emotion regulation outcomes	Primary symptom outcomes	Secondary symptom outcomes	Association	POSMRF Score
Rumination							
Ames et al., 2014	1. MBCT	1 month	Rumination decreased pre-post treatment (d = 0.22) and pre-1 month follow up (d = 0.47) Note: Statistical significance not reported due to small sample size	Depression decreased pre-post treatment (d = 0.79) and pre-1 month follow up (d = 0.77) Note: Statistical Significance not reported due to small sample size			10 (well below average)
Batink et al., 2013	1. MBCT 2. Waitlist	n/a	Compared to waitlist, MBCT resulted in significantly larger decreases in rumination following treatment***	Compared to waitlist, MBCT resulted in significantly larger decreases in depressive symptoms following treatment***		Only cross-sectional reported	21 (above average)
Chesin et al., 2016	1. MBCT-S	n/a	Rumination decreased pre-post treatment** (d = 3.2)	Depression decreased pre-post treatment* (d = 1.1)		Only cross-sectional reported	12 (well below average)
Dammen et al., 2015	1. MCT	6 months	Rumination decreased pre-post treatment*** and pre- 3 month follow up***	Depression decreased pre-post treatment*** and pre- 3 month follow up***	Anxiety decreased pre-post treatment*** and pre- 3 month follow up***	Not reported	19 (Below Average)
Dimidjian et al., 2014	1. MBCT	2.5 & 6 months	Rumination decreased pre-post treatment** (d = 0.47)	Depression decreased pre-post treatment** (d = 0.56)		Not reported	14 (below average)
Ekkers et al., 2011	1. COMET + TAU 2. TAU	n/a	Compared to TAU, COMET resulted in significantly larger decreases in rumination* (d = 0.52)	Compared to TAU, COMET resulted in significantly larger decreases in depression*(d = 0.57)		Not reported	32 (well above average)
Forkman et al., 2014 B	1. MBCT 2. Waitlist	n/a	Compared to waitlist, MBCT resulted in significantly larger decreases in rumination following treatment*	Compared to waitlist, MBCT resulted in significantly larger decreases in depressive symptoms following treatment***		Not reported	17 (below Average)
Geschwind et al., 2011	1. MBCT 2. Waitlist	n/a	Compared to waitlist, MBCT resulted in significantly larger decreases in rumination following treatment*	Compared to waitlist, MBCT resulted in significantly larger decreases depressive symptoms following treatment*		Not reported	23 (above average)
Graser et al., 2016	1. MBCT + CFT	3 months	Rumination did not significantly decrease pre-post treatment but did decrease pre-3 month follow up* (d = 0.45)	Depression decreased pre-post treatment* (d = 0.47) and pre treatment- 3 month follow up* (d = *0.75*)		Not reported	
Goldin et al., 2016	1. CBGT 2. MBSR 3. Waitlist	1 year	Compared to waitlist control, CBGT and MBSR resulted in significantly larger decreases in rumination following treatment** (d = 0.94 and d = 0.46 respectively). No difference between CBGT and MBSR	Compared to waitlist control, CBGT and MBSR resulted in significantly larger decreases in social anxiety symptoms following treatment** (d = 1.56 and d = 1.43 respectively. No difference between CBGT and MBSR		Only cross-sectional reported	33 (well above average)
Hjemdal et al., 2016	1. MCT	6 months	Rumination decreased pre-post treatment**(d = 2.08) and pre- 6 month follow up**(d = 2.24)	Depression decreased pre-post treatment**(d = 3.02) and pre- 6 month follow up**(d = 2.51)	Anxiety decreased pre-post treatment**(d = 1.90) and pre- 6 month follow up*(d = 1.22)	Not Reported	22 (above average)
Jacobs et al., 2016	1. RFCBT 2. Control		Compared to control, RFCBT resulted in significantly larger decreases in rumination*	Compared to control, RFCBT resulted in significantly larger decreases in depressive symptoms**		Not reported	16 (below average)
Jermann et al., 2013	1. MBCT + TAU 2. TAU	3 & 9 months	Rumination significantly decreased over time across both MBCT + TAU and TAU (d = 0.73) however there was no difference in these decreases between the two conditions	Depression significantly decreased over time across both MBCT + TAU and TAU (d = 0.73) however there was no difference in these decreases between the two conditions		Not reported	23 (above average)
Jones et al., 2008	1. CT	n/a	Rumination decreased pre-post treatment*** (d = 0.75)	Depression decreased pre-post treatment***(d = 1.67)		Only cross-sectional reported	15 (Below Average)
Keune et al., 2011	1. MBCT 2. Waitlist	n/a	Compared to waitlist, MBCT resulted in significantly larger decreases in rumination following treatment **	Compared to waitlist, MBCT resulted in significantly larger decreases in depressive symptoms following		Not reported	16 (Below Average)

(continued on next page)

Table 3 *(continued)*

Study	Study groups	Follow Up	Emotion regulation outcomes	Primary symptom outcomes	Secondary symptom outcomes	Association	POSMRF Score
			(d = 0.47)	treatment* (d = 0.45)			
Kingston et al., 2007	1. MBCT 2. TAU	n/a	Rumination decreased pre-post treatment in MBCT* however this change was not significantly different from TAU.	Compared to TAU, MBCT resulted in larger decreases in depression following treatment*		Not reported	17 (Below Average)
Kocovski et al., 2009	1. MAGT	3 month	Rumination decreased pre-post treatment**(d = 1.11) and pre-3 month follow up* (d = 1.05)	Social anxiety decreased pre-post** (d = 1.00) and pre-3 month follow up* (d = 1.00)	Depression decreased pre-post treatment** (d = 0.98) and pre-3 month follow up* (d = 0.79)	Pre-mid treatment changes in rumination did not predict mid-post treatment change in social anxiety symptoms (β = 0.22, p = 0.25)	22 (above average)
Kocovski et al., 2013	1. MAGT 2. CBGT 3. Waitlist	3 month	Rumination decreased pre-3 month follow up in both MAGT and CBGT***	Social Anxiety decreased pre-3 month follow up** in both MAGT and CBGT		Not reported	34 (well above average)
Kumar et al., 2008	1. EBCT	n/a	Rumination decreased pre-post treatment*** (d = 0.87)	Depression decreased pre-post treatment*		Not reported	15 (Below Average)
Manicavasgar et al., 2012	1. CBT 2. MBCT	n/a	Rumination decreased pre-post treatment in both CBT and MBCT conditions* No difference between the two conditions on rumination post treatment	Depression decreased pre-post treatment in both CBT and MBCT conditions*** No difference between the two conditions on depressive symptoms		Only cross-sectional reported	20 (Below Average)
Moshier et al., 2017	1. BATD + CCT 2. BATD	1 month	Rumination decreased pre-post and pre-1 month follow up in both BATD + CCT and BATD (d > 1.3). No significant differences between groups	Depression decreased pre-post and pre-1 month follow up in both BATD + CCT and BATD(d > 1.3). No significant differences between groups		Not reported	23 (above average)
Newby et al., 2014	1. iCBT 2. Waitlist	3 month	*Note: 3 month follow up only available for iCBT* Compared to waitlist, iCBT resulted in significantly larger decreases in rumination following treatment *** (d = 0.90). Rumination also decreased from post treatment to 3 month follow up in iCBT (d = 0.47)***	*Note: 3 month follow up only available for iCBT* Compared to waitlist, iCBT resulted in significantly larger decreases in depressive symptoms following treatment *** (d = 1.0). There was no further decrease in depressive symptoms at 3 month follow up Compared to waitlist, iCBT resulted in significantly larger decreases in anxiety following treatment *** (d = 0.85). Anxiety also decreased from post treatment to 3 month follow up in iCBT (d = 0.26)*		No true longitudinal association reported (pre-mid predicting pre-post change).	19 (Below Average)
Papageorgiou et al., 2015	1. MCT	6 months	Rumination decreased pre-post*** (d = 2.34) and then pre-6 month follow up*** (d = 2.02)	Depression decreased pre-post*** (d = 2.87) and then pre-6 month follow up*** (d = 2.49)	Anxiety decreased pre-post*** (d = 1.71) and then pre-6 month follow up*** (d = 1.90)	Not reported	16 (Below Average)
Shahar et al., 2010	1. MBCT 2. Waitlist	n/a	Compared to waitlist, MBCT resulted in significantly larger decreases in rumination following treatment *	Compared to waitlist, MBCT resulted in significantly larger decreases in depressive symptoms following treatment*		Only cross-sectional reported	22 (above average)
Teismann et al., 2014	1. CBT-DR 2. Waitlist	1 year	Compared to waitlist, CBT-DR resulted in significantly larger decreases in rumination following treatment* (d = 0.49). No change in rumination from post treatment- follow up	Compared to waitlist, CBT-DR resulted in significantly larger decreases in depressive symptoms following treatment *** (d = 0.98). No change in depressive symptoms from post treatment- follow up		Not reported	26 (above average)
Van Aalderen et al., 2012	1. MBCT + TAU 2. TAU	1 year	Compared to TAU, MBCT resulted in significantly larger decreases in rumination following treatment*** (d = 0.49)	Compared to TAU, MBCT resulted in significantly larger decreases in depressive symptoms following treatment * (d = 0.49)		Only cross-sectional reported	23 (above average)
Watkins et al., 2011	1. RF-CBT 2.TAU	n/a	Compared to TAU, RF-CBT resulted in significantly larger decreases in	Compared to TAU, RF-CBT resulted in significantly larger decreases in			27 (well above

(continued on next page)

Table 3 *(continued)*

Study	Study groups	Follow Up	Emotion regulation outcomes	Primary symptom outcomes	Secondary symptom outcomes	Association	POSMRF Score
			rumination following treatment * (d = 0.56)	depressive symptoms following treatment * *** (d = 1.12)			average)
Watkins et al., 2012	1. CNT + TAU 2. RT + TAU 3. TAU	3 and 6 months	CNT + TAU resulted in significantly larger reductions in rumination than both RT + TAU** and TAU** No difference between CNT + TAU and RT + TAU. Follow up not recorded for rumination	Compared to TAU, CNT + TAU resulted in significantly larger decreases in depressive symptoms post treatment*** (d = 1.07) and at both 3 and 6 month follow up. No difference between CNT + TAU and RT + TAU.	Compared to TAU, CNT + TAU resulted in significantly larger decreases in anxiety symptoms post treatment** and at both 3 and 6 month follow up* No difference between CNT + TAU and RT + TAU	Not reported	32 (well above average)
Avoidance							
Bullis et al., 2015	1. UP	n/a	Avoidance decreased pre-post treatment (d = 1.12) *Note: Small sample size precluded significance testing*	Anxiety decreased pre-post treatment (d = 1.25) *Note: Small sample size precluded significance testing;*	Depression decreased pre-post treatment (d = 0.65)	Not reported	17 (Below Average)
Dalrymple et al., 2007	1. ACT	3 months	Avoidance significantly decreased from pre-post treatment** (d = 0.93) and from pre-3 month follow up** (d = 0.75)	Social anxiety decreased from pre-post treatment* (Avoidance subscale d = 1.25; Fear subscale d = 0.72) and from pre-3 month follow up* (Avoidance subscale d = 1.22; Fear subscale d = 1.54)		Pre-mid changes in avoidance predicted mid-post changes in social anxiety *(β = − 0.59)	23 (above average)
Erickson 2013	1.CBT	6 months	Avoidance decreased pre-post treatment* and pre-6 month follow up*	Anxiety decreased pre-post treatment *** and pre-6 month follow up**	Depression decreased pre-post treatment*** and pre-6 month follow up**	Not reported	15 (Below Average)
Espejo et al., 2016	1. TCBT	n/a	Avoidance decreased pre-post treatment* (d = 0.54)	Treat perception* and fear ratings** (PTSD sx) decreased pre-post treatment (d = 0.35 and d = 1.21 respectively)	Depression decreased pre-post treatment** (d = 0.52)	Only cross-sectional reported	20 (above average)
Eustis et al., 2016	1. ABBT 2. AR	1, 2 & 3 months	Avoidance decreased in both ABBT** and AR* however decreases were significantly larger in ABBT than in AR**	#GAD symptoms decreased across both conditions (d = 1.36)***		Not reported	14 (below average)
Forman et al., 2007	1. ACT 2. CT	n/a	Experiential avoidance decreased pre-post treatment in both ACT and CT (d = 0.77). No significant difference in this decrease between conditions at post treatment	Depression decreased pre-post in both ACT and CT conditions*** (d = 1.35). Anxiety decreased pre-post in both ACT and CT conditions (d = 0.93) Note: There was no significant difference in level of symptom reduction between these two conditions		Only cross-sectional reported	24 (above average)
Gratz et al., 2011	1. ERGT	n/a	Experiential Avoidance decreased pre-post treatment* (d = 2.87)	BPD symptoms decreased pre-post treatment* (d = 1.91)	Anxiety decreased pre-post treatment* (d = 1.28) DSH decreased pre-post treatment* (d = 1.35) Depression decreased pre-post treatment* (d = 2.34)	Not reported	19 (Below Average)
Gratz et al., 2006	1. ERGT + TAU 2. TAU	n/a	Compared to TAU, ERGT resulted in larger decreases in experiential avoidance following treatment** (d = 3.71)**	Compared to TAU, ERGT resulted in larger decreases in BPD symptoms post treatment** (d = 1.42)**	Compared to TAU, ERGT resulted in larger decreases in depressive symptoms post treatment (d = 1.32)** Compared to TAU, ERGT resulted in larger decreases in DSH post treatment* (d = 1.46) Compared to TAU, ERGT resulted in larger decreases in anxiety symptoms post treatment**(d = 1.32)	Not reported	18 (below average)
Gonzalez-Mendez et al., 2004	1. ACT 2. CBT	6, 12 & 18 months	Experiential avoidance decreased pre-post treatment and pre-6, 12 and 18 month follow up in ACT*** and from pre- post treatment in CBT***	Both ACT and CBT resulted in significant improvement in abstinence pre-post*. ACT produced a higher percentage of abstinence (27.8% post treatment; 84.6% 12 month follow up and 85.7% at		Not reported	22 (above average)

(continued on next page)

Table 3 *(continued)*

Study	Study groups	Follow Up	Emotion regulation outcomes	Primary symptom outcomes	Secondary symptom outcomes	Association	POSMRF Score
				18 month follow up) compared to CBT (15.8% post treatment; 54.5% at 12 month follow up and 50% at 18 month follow up) Individuals in the ACT group also decreased on ASI-6 scores in the domains of drugs***, psychological* and family**			
Hellerstein et al., 2015	1. BA	n/a	Behavioral avoidance decreased pre-post treatment** (d = 0.56)	Depression did not significantly decrease pre-post treatment		Not reported	19 (Below Average)
Kocovski et al., 2009	1. MAGT	3 month	Experiential avoidance decreased pre-post treatment **(d = 0.97) and pre-3 month follow up* (d = 1.17)	Social anxiety decreased pre-post** (d = 1.0) and pre-3 month follow up* (d = 1.0)	Depression decreased pre-post treatment** (d = 0.98) and pre-3 month follow up* (d = 0.79)	Pre-mid treatment change in avoidance predicted mid-post treatment change in social anxiety ($\beta = 0.45$, $p < 0.05$).	22 (above average)
Kocovski et al., 2013	1. MAGT 2. CBGT 3. Waitlist	3 month	Experiential avoidance decreased pre-3 month follow up in both MAGT and CBGT***	Social Anxiety decreased pre-3 month follow up** in both MAGT and CBGT		Not reported	34 (well above average)
Kumar et al., 2008	1. EBCT	n/a	Experiential Avoidance decreased pre-post treatment*** (d = 0.61)	Depression decreased pre-post treatment*		Not reported	15 (Below Average)
Morton et al., 2012	1. ACT + TAU 2. TAU	13 weeks	*Note: Follow up only available for ACT condition* Compared to TAU, ACT resulted in larger decreases in experiential Avoidance post treatment** (d = 0.90). ACT also resulted in decreases in avoidance at 3 month follow up*** (d = 1.25)	*Note: Follow up only available for ACT condition* Compared to TAU, ACT resulted in larger decreases in BPD symptoms following treatment treatment*** (d = 0.63). ACT also resulted in decreases in BPD symptoms at 3 month follow up*** (d = 1.12)		Only cross-sectional reported	21 (above average)
Petersen et al., 2009	1.ACT 2.TAU	n/a	Compared with TAU, ACT resulted in larger decreases in experiential avoidance following treatment** (d = 1.32)	Depression decreased significantly pre-post treatment in ACT* (d = 1.30), however these decreases were not significantly different from TAU		Only cross-sectional reported	16 (Below Average)
Roemer et al., 2007	1. ABBT	3 months	Avoidance decreased pre-post treatment***(d = 3.53) and pre-3 month follow up** (d = 2.34).	Anxiety decreased pre-post treatment***(d = 3.10) and pre-3 month follow up*** (d = 2.20).	Depression decreased pre-post treatment***(d = 1.01) and pre-3 month follow up*** (d = 1.81)	Not reported	21 (above average)
Roemer et al., 2008	1. ABBT 2. Waitlist	3 & 9 month	Compared to waitlist, ABBT resulted in significantly larger decreases in avoidance following treatment*** (d = 1.19); Avoidance also decreased at 3 and 9 month follow up (d = 1.62 and d = 1.81) respectively.	Compared to waitlist, ABBT resulted in significantly larger decreases in GAD symptoms following treatment ***(d = 1.32); Symptoms also decreased at 3 and 9 month follow up (d = 1.46 and d = 1.32) respectively.	Compared to waitlist, ABBT resulted in significantly larger decreases in depressive symptoms following treatment ***(d = 1.07); Symptoms also decreased at 3 and 9 month follow up, (d = 1.58 and d = 1.25) respectively	Not reported	23 (above average)
Twohig et al., 2010	1. ACT 2. PRT	3 month	Avoidance decreased pre-post treatment** (d = 1.07) and pre-3 month follow up**(d = 0.87)	OCD symptoms decreased pre-post treatment** (d = 2.87)	Depression decreased pre-post treatment** (d = 1.38) and pre-3 month follow up**(d = 1.54)	Not reported	33 (well above average)
Wildes et al., 2014	1. EABT	3 & 6 month	Experiential avoidance decreased pre-post treatment and pre-3 and 6 month follow up *** (d = 2.58)	Eating Disorder symptoms decreased pre-post treatment and pre-3 and 6 month follow up*** (d = 1.58)	Depression decreased pre-post treatment and pre-3 and 6 month follow up *** (d = 1.19) Anxiety decreased pre-post treatment and pre-3 and 6 month follow up *** (d = 1.50)	Not reported	16 (Below Average)
Yuen et al., 2013	1. ABBT	3 months	Avoidance decreased pre-post treatment* (d = 0.56) and pre-3 month follow up**(d = 0.87)	Social Anxiety symptoms decreased pre-post treatment** and pre-3 month follow up (d = 1.31)	Depression decreased pre-post treatment* (d = 0.87) and pre-3 month follow up** (d = 0.90)	Not reported	20 (above average)
Suppression							
Forkman et al., 2014a	1. CBT	n/a	Suppression did not significantly decrease pre-post treatment	Depression decreased pre-post treatment** (d = 1.07)		Only cross-sectional reported	19 (Below Average)

(continued on next page)

Table 3 *(continued)*

Study	Study groups	Follow Up	Emotion regulation outcomes	Primary symptom outcomes	Secondary symptom outcomes	Association	POSMRF Score
Hepburn et al., 2009	1. MBCT 2. Waitlist	n/a	No significant decrease in thought suppression pre-post treatment	Compared to waitlist, MBCT resulted in significantly larger decreases in depression post treatment ** (d = 1.09)		Not reported	16 (below average)
Hoyer et al., 2009	1. WE 2. AR 3. Waitlist	6 & 12 month	Compared to WL, WE resulted in significantly larger decreases in thought suppression following treatment*; Suppression continued to decrease from post treatment-6 **and 12* months follow up in WE condition	*Note: Data not presented for follow up* Compared to WL, WE resulted in significantly larger decreases in anxiety symptoms following treatment **	*Note: Data not presented for follow up* Compared to WL, WE resulted in significantly larger decreases in depressive symptoms following treatment **	Not reported	29 (well above average)
Ito et al., 2016	1. UP	3 months	Expressive suppression decreased pre-post treatment (d = 0.09) and pre-3 month follow up (d = 0.15) Note: Statistical significance not reported due to small sample size	Depression decreased pre-post treatment (d = 0.79) and pre-3 month follow up (d = 0.95) Anxiety decreased pre-post treatment (d = 1.71) and pre-3 month follow up (d = 1.36) Note: Statistical significance not reported due to small sample size		Not reported	23 (above average)
Overall deficits in emotion regulation							
Axelrod et al., 2011	1. DBT	n/a	Emotion Dysregulation decreased pre-post treatment*** (d = 1.28)	Depression decreased pre-post treatment** Substance Use decreased pre-post treatment*		Not reported	12 (well below average)
Ben-Porath et al., 2009	1. DBT	n/a	Emotion Dysregulation decreased pre-post treatment**	Eating disordered symptoms decreased pre-post treatment** Depression decreased pre-post treatment**		Not reported	15 (below average)
Ben-Porath, et al., 2014	1. CBT + DBT skills	n/a	Emotion dysregulation decreased pre-post treatment* (d = 0.28)	Eating Disorder symptoms measured by EDE-Q improved pre-post treatment*** (d = 0.75). Binge***(d = 0.58), purge** (d = 0.56), excessive exercise** (d = 0.43), and restriction*** (d = 0.35), behaviors all decreased pre-post treatment		Not reported	11 (well below average)
Berking et al., 2008	1. CBT + ITEC 2. CBT	n/a	ER improved pre-post treatment in both CBT*** (d = 1.25) and CBT + ITEC (d = 2.34). However, improvements in ER were significantly larger in CBT + ITEC compared to CBT* (d = 0.41)	Depression decreased pre-post treatment in both CBT*** (d = 1.67) and CBT + ITEC (d = 2.67). However, decreases in depression significantly larger in CBT + ITEC compared to CBT** (d = 0.41) General Psychopathology decreased pre-post treatment in both CBT*** (d = 1.54) and CBT + ITEC (d = 2.58). There were no between group differences in general psychopathology.		Only cross-sectional reported	23 (above average)
Berking et al., 2013	1. CBT 2. CBT + ER Skills	n/a	ER skills increased pre-post treatment in both CBT and CBT + ER***. There were no differences in improvement between these groups	Depression decreased pre-post in both CBT and CBT + ER*** (d = 1.39), however decreases were significantly larger* in CBT + ER compared to CBT (d = 0.14)		Not reported	28 (well above average)
Ford et al., 2012	1. TARGET 2. ETAU	n/a	TARGET had a small effect on ER (d = 0.35), however when compared to ETAU there was no difference following treatment. When TARGET just examined alone, small effect size change was noted	Compared to ETAU, TARGET resulted in significantly larger decreases in PTSD symptoms following treatment* (d = 0.54)	Anxiety decreased pre-post treatment in TARGET ** (d = 0.61), however this change was not significantly different from ETAU Depressive symptoms decreased pre-post	Not reported	24 (above average)

(continued on next page)

Table 3 *(continued)*

Study	Study groups	Follow Up	Emotion regulation outcomes	Primary symptom outcomes	Secondary symptom outcomes	Association	POSMRF Score
			(within group		treatment in TARGET ** (d = 0.65) however this change was not significantly different from ETAU		
Gratz et al., 2006	1. ERGT + TAU 2. TAU	n/a	Compared to TAU, ERGT resulted in significantly larger decreases in overall emotion dysregulation following treatment(d = 2.14)**. Significant differences were also found in found in favour of ERGT on the subscales of non acceptance (d = 1.42)**, impulse dyscontrol (d = 1.54)**, goals (d = 1.58)**, lack of strategies (d = 2.87)** and non awareness (d = 1.58)**.	Compared to TAU, ERGT resulted in larger decreases in BPD symptoms post treatment** (d = 1.42)**	Compared to TAU, ERGT resulted in larger decreases in depressive symptoms post treatment (d = 1.32)** Compared to TAU, ERGT resulted in larger decreases in DSH post treatment* (d = 1.46) Compared to TAU, ERGT resulted in larger decreases in anxiety symptoms post treatment**(d = 1.32)	Not reported	18 (below average)
Gratz et al., 2011	1. ERGT	n/a	Emotion Dysregulation decreased pre-post treatment* (d = 2.87)	BPD symptoms decreased pre-post treatment* (d = 1.91)	Anxiety decreased pre-post treatment* (d = 1.28) DSH decreased pre-post treatment* (d = 2.27) Depression decreased pre-post treatment* (d = 2.34)	Not reported	19 (Below Average)
Gratz et al., 2014	1. ERGT + TAU 2. TAU	n/a	Compared to TAU, ERGT resulted in significantly larger decreases in overall emotion dysregulation (d = 0.56) and the specific domains of strategies (d = 0.70), non acceptance (d = 0.56) and goals (d = 0.75).	Compared to TAU, ERGT resulted in significantly larger decreases in BPD symptoms pre-post treatment *(d = 1.19)	Compared to TAU, ERGT resulted in significantly larger decreases in DSH (d = 0.63) Compared to TAU, ERGT resulted in significantly larger decreases in depression (d = 0.52)	Not reported	25 (above average)
Gratz et al., 2015	1. ERGT + TAU 2. TAU	n/a	Same study as above but with mediation analysis			Only cross-sectional reported	18 (below average)
Hamidian et al., 2016	1. MBCT 2. Control	n/a	Compared to the control condition, MBCT resulted in larger decreases in emotion dysregulation following treatment*	Compared to the control condition, MBCT resulted in larger decreases in depression following treatment ***		Not reported	17 (below average)
Lenz et al., 2016	1. DBT-A	n/a	Emotion dysregulation decreased pre-post treatment* with d ranging from 0.57–0.81 across the 6 subscales.	Depression decreased pre-post treatment* (d = 0.56) Anxiety decreased pre-post treatment*(d = 0.04)		Only cross-sectional reported	
McMain et al., 2017	1. DBT 2. Waitlist	3 months	Compared to waitlist control, DBT resulted in larger decreases in emotion dysregulation and pre-post treatment** and pre-3 month follow up* (d = 0.5)	Compared to waitlist control, DBT resulted in larger decreases in BPD symptoms pre-post treatment* (d = 0.32) No difference between groups for pre-3 month follow up.	Compared to waitlist control, DBT resulted in larger decreases in depression pre-post treatment*(d = 0.32) No difference between groups for pre-3 month follow up.	Not reported	31 (well above average)
Morton et al., 2012	1. ACT + TAU 2. TAU	13 weeks	*Note: Follow up only available for ACT condition* Compared to TAU, ACT resulted in larger decreases in emotion dysregulation following treatment treatment** (d = 0.98). Emotion dysregulation also decreased at 3 month follow up in the ACT condition** (d = 0.95)	*Note: Follow up only available for ACT condition* Compared to TAU, ACT resulted in larger decreases in BPD symptoms following treatment*** (d = 0.60). ACT also resulted in decreases in BPD symptoms at 3 month follow up*** (d = 1.12)		Only cross-sectional reported	21 (above average)
Murray et al., 2015	1. DBT + FBT	n/a	Emotion dysregulation domain of strategies improved pre-post treatment*	Eating disordered symptoms improved pre-post treatment*		Not reported	11 (well below average)
Neacsiu et al., 2014	1. DBT 2. ASG	2 months	Compared to ASG, DBT results in significantly larger decreases in emotion	Compared to ASG, DBT results in significantly larger decreases in anxiety		Not reported	32 (well above

(continued on next page)

Table 3 *(continued)*

Study	Study groups	Follow Up	Emotion regulation outcomes	Primary symptom outcomes	Secondary symptom outcomes	Association	POSMRF Score
			dysregulation following treatment ** (d = 1.85). There was no difference between groups at follow up	symptoms following treatment**(d = 1.39). There was no difference between groups at follow up DBT resulted in significant decreases in depression following treatment*** (d = 2.33) and at 2 month follow up* (d = 0.63), however these decreases were not significantly different from ASG			average)
Radkovsky et al., 2014	1. CBT	1, 2 and 3 weeks into treatment	Total ER skills ** and specific ER skills of awareness **, clarity*and understanding ** all increased over treatment	Depression decreased over time in treatment*		Using cross-lagged assessment at weekly intervals, patients reporting more successful ER skills application were likely to experience a greater reduction on depressive sx. ER skills of modification and tolerance were specifically associated with subsequent changes in depressive sx when controlling for type 1 error	17 (below average)
Safer et al., 2010	1. DBT 2. Active Control	3, 6 & 12 months	Note: only effect sizes used no p values Compared to active control condition, emotion dysregulation showed a small decrease following DBT (d = 0.18)	64% of participants were abstinent from binge eating at post treatment, 51% at 3 month follow up, 52% at 6 month follow up and 64% at 12 month follow up in the DBT condition. Compared to active control condition, DBT resulted in larger decreases in weight concerns, (d = 0.39) shape concerns (d = 0.32), eating concerns (d = 0.54) and restraint (d = 0.54)	Compared to active control, DBT resulted in small change in depression following treatment (d = 0.20)	Not reported	27 (well above average)
Schuppert et al., 2012	1. ERT 2. TAU	12 months	Emotion dysregulation decreased pre-post treatment * (d = 0.65) and pre-12 month follow up* (d = 0.98) in ERT however change was not significantly different from TAU	BPD symptoms decreased pre-post treatment* (d = 0.52) and pre- 12 month follow up* (d = 0.75) in ERT however this decrease was not significantly different from TAU		Not reported	25 (above average)
Telch et al., 2000	1. DBT	n/a	Note: Significance testing not undertaken ER improved pre-post treatment (d = 0.90)	Note: Significance testing not undertaken Binge Eating decreased pre-post treatment (d = 1.71)	Depression decreased pre-post treatment (d = 0.80)	Not reported	17 (Below Average)
Wonderlich et al., 2014	1. ICAT 2. CBT-E	4 month	Emotion dysregulation decreased pre-post treatment and pre- 4 month follow up in both ICAT and CBT-E conditions*. Emotion Dysregulation did not differ significantly at end of treatment and follow up between ICAT and CBT-E.	Eating disorder symptoms, including frequency of binge and purge episodes decreased pre-post treatment and pre-4 month follow up in both ICAT and CBT-E conditions*. These symptoms did not differ significantly at end of treatment and follow up between ICAT and CBT-E.	Symptoms of depression and anxiety also decreased pre-post treatment in both ICAT and CBT-E conditions*	Not reported	30 (well above average)

Note. *p < 0.05; **p < 0.01; ***p < 0.001; #Lenz 2016 – pre-post data taken from original analysis; #Lenz 2016- pre-post data taken from original analysis Del Conte, Lenz, and Hollenbaugh (2016).

both ACT and CBT; however, avoidance remained decreased at six, 12 and 18-month follow-ups relative to baseline in the ACT condition only. With regards to substance use symptoms, both ACT and CBT resulted in significant rates of abstinence following treatment and at the follow-up times, although these rates were higher for individuals in ACT when compared to CBT. Finally, one study examined changes in experiential avoidance following an Emotion Acceptance Based Therapy (EABT) in a sample of individuals with Anorexia Nervosa. This treatment resulted in significant decreases in both experiential avoidance and eating disorder symptoms at post treatment and at three and six-month follow-up. While six studies undertook additional analyses to explore whether changes in avoidance from pre-post treatment were related to treatment outcome, only two of these examined true longitudinal change. Both of these studies found that changes in avoidance (pre-mid) significantly predicted changes in anxiety outcomes (mid-post; Dalrymple et al., 2007; Kocovski et al., 2009).

Taken together, regardless of the disorder targeted within treatment, or treatment protocol delivered, avoidance was found to significantly decrease following treatment and at follow up when applicable, in all 18 studies ($d = 0.54$ to $d = 3.71$). These decreases in avoidance were seen alongside decreases in symptoms targeted in treatment, including anxiety, BPD symptoms, depression, substance use and eating relating pathology, in all but one study.

3.4.3. Suppression

The maladaptive ER strategy of suppression was examined in four studies. Three of these studies examined the impact of treatment on thought suppression or expressive suppression in samples of individuals with MDD or residual depressive symptoms. Depressive symptoms decreased following treatment in all three studies—however parallel decreases in suppression were not evident. An additional study examined the impact of a worry exposure treatment on thought suppression, revealing that both thought suppression and symptoms of anxiety and depression decreased following treatment. Overall, there appears to be limited evidence regarding the capacity for suppression to change following treatment in depression and anxiety, and no evidence that it is a mechanism of treatment.

3.4.4. Overall deficits in emotion regulation

Overall deficits in ER were measured in 19 of the included studies. A large proportion of these studies ($n = 8$) included individuals with BPD or those with a sub-threshold diagnosis. Three of the eight studies that targeted BPD were conducted by the same research group and examined a treatment developed specifically to target emotion dysregulation - ERGT. Within these studies, significant decreases in emotion dysregulation, and symptoms of BPD, depression, anxiety, and the frequency of deliberate self-harm, were found following ERGT. Furthermore, in two of these studies that included a TAU condition, decreases in both ER and associated psychopathology symptoms were found to be larger within the ERGT condition when compared to TAU. A further three studies compared active treatment (either ACT, DBT or ERT) with TAU or a waitlist control in samples of individuals with a diagnosis of BPD. In two of these studies, the active treatment (ACT or DBT) produced larger decreases in overall emotion dysregulation and in BPD symptoms than did TAU or waitlist respectively, both when following treatment and at follow up. In the remaining study, while ERT produced significant reductions in both emotion dysregulation and BPD symptoms following treatment and at 12-month follow-up, this decrease was not significantly different from those seen in TAU. This was the only study that did not find larger reductions in both ER and BPD in the active treatment condition. Two studies examined the efficacy of DBT for individuals with BPD and a comorbid substance use disorder or eating disorder. Within both of these studies, overall emotion dysregulation was found to significantly decrease along with symptoms of BPD, substance use and eating-related pathology.

Five studies examined the impact of treatment on individuals with an eating disorder diagnosis. Three of these studies implemented DBT-based treatments and found significant reductions in overall emotion dysregulation and in symptoms of eating disorders. Another study examined the impact of DBT and Family Based Therapy (DBT + FBT) on overall emotion dysregulation and symptoms of Bulimia Nervosa (BN), finding that following treatment, individuals' access to appropriate ER strategies, a domain measured on the DERS, improved, alongside symptoms BN. A further study compared Integrative Cognitive Affective Therapy (iCAT) with Cognitive Behavior Therapy for Eating Disorders (CBT-E) in a sample of individuals with BN. Significant decreases in overall emotion dysregulation were found following treatment and at four months follow-up for both ICAT and CBT-E, with no significant differences between groups. Similar results were found for eating disorder symptoms, with the frequency of binge and purge episodes decreasing significantly and equally following treatment and at follow-up in both conditions.

A final six studies examined emotion dysregulation in samples of individuals with a primary diagnosis of either a depressive or anxiety disorder. Within all of these studies, regardless of the specific treatment protocol delivered, emotion dysregulation was found to decrease following treatment, alongside decreases in symptoms of depression and anxiety. Of note, three of the six studies examined the effect of treatments that were designed specifically to target affective regulation. One study utilized a sample of adolescents with PTSD and compared a CBT based treatment that included elements designed specifically to target affect regulation (TARGET) with an active TAU. While individuals in the TARGET condition showed a small reduction in ER difficulties following treatment, this decrease was not significantly different from the decrease seen in the active TAU condition. In comparison, symptoms of PTSD, anxiety and depression all decreased significantly more in the TARGET condition than they did in active TAU. Two further studies examined whether the addition of ER skills training to CBT would improve treatment outcome in samples of individuals with mixed mood and anxiety disorders or with MDD. In the sample of individuals with mixed mood and anxiety disorders, ER and symptoms of depression significantly improved following treatment in both conditions; however, these improvements were significantly larger in CBT + ITEC than in CBT. In contrast, in the sample of individuals with MDD, both CBT + ER and CBT produced equal and significant increases in ER, however the CBT + ER condition resulted in significantly larger decreases in symptoms of depression.

While five studies examined the association between changes in ER and treatment outcome, only one study looked at true longitudinal change. This study utilized cross-lagged assessments at weekly intervals, finding that more successful ER skills application was likely related to subsequent reductions in depressive symptoms (Radkovsky, McArdle, Bockting, & Berking, 2014).

Overall, emotion dysregulation and symptoms of depression, anxiety, BPD, eating related pathology and substance use were found to decrease following treatment in all of the included studies (effect sizes raged from $d = 0.18$ to $d = 2.87$ for emotion dysregulation). Furthermore, decreases seen in the active treatment conditions were larger than those seen following TAU or an active control in eight out of the ten studies utilizing these comparison conditions. There is preliminary evidence to suggest that changes in ER are associated with changes in treatment outcome, however with the exception of one study, there is not yet evidence that the changes in avoidance precede the changes in symptoms.

4. Discussion

The present systematic review addressed two key questions relevant to the field of ER and psychopathology. First, it evaluated whether psychological treatments for a range of disorders produced changes in ER, and second, it examined whether these changes were related to positive treatment outcomes. In addressing the first question we found

that in 64 of the 67 included studies, significant decreases in maladaptive ER strategy use or overall emotion dysregulation post-treatment occurred, regardless of: 1) the specific treatment protocol delivered; 2) the construct of ER examined; or 3) the disorder targeted within treatment. Further, these studies showed concomitant (and statistically significant, when included) decreases in symptom severity for symptoms of several classes of psychopathology, including depressive, anxiety, substance use, eating pathology and BPD. These decreases occurred for both the specific disorder targeted within treatment, as well as symptoms of other psychological disorders when measured.

In addressing the second, we found that of the 67 studies reviewed, surprisingly only three conducted true longitudinal mediation where change in ER was analyzed in relation to whether it preceded symptom change. Of these, Kocovski et al. (2009) found that changes in rumination did not predict changes in social anxiety, whereas change in avoidance behavior did; the latter finding was also found by Dalrymple et al. (2007). The most vigorous analysis was by Radkovsky et al. (2014) who found that increases in adaptive ER skills were associated with greater subsequent reduction on depressive symptoms. However, given the limited number of studies, true longitudinal analysis of symptom change remains a pressing priority for this research, particularly using more sophisticated or intensive measurement such as used by Radkovsky et al.—where circumstances allow it given its extra cost and participant burden. Overall, this review is the first to provide a comprehensive evaluation of the impact of psychological treatment on ER across depressive, anxiety, substance use and eating disorders and BPD, and its findings are consistent with the literature that proposes that ER is an important construct in the treatment of psychopathology (Berking et al., 2008; Campbell-Sills & Barlow, 2007; Gratz et al., 2015; Mennin & Fresco, 2009).

4.1. Considering methodological quality

The methodological quality of studies within this review was varied. However, the decreases in emotion dysregulation following treatment were significant for studies rated either above or below average in methodological quality. This may suggest that ER is amenable to change regardless of nonspecific factors, such as therapist competence and treatment adherence.

4.2. Conceptual implications

The findings of the current review indicate that distinct psychological treatments for a number of different disorders, that are not necessarily designed to target ER, can produce meaningful change in this construct. Conceptually, this observation supports the notion of ER as a transdiagnostic construct (Aldao, 2012; Fernandez, Jazaieri, & Gross, 2016; Kring & Sloan, 2009; Norton & Paulus, 2015) Research that has examined ER within non clinical samples using cross-sectional designs (i.e., the strength of association between ER and symptoms of psychopathology) has supported the notion of ER as a transdiagnostic construct across depressive, anxiety, eating, substance use disorders and BPD (Aldao & Nolen-Hoeksema, 2010, 2012a, 2012b; McLaughlin & Nolen-Hoeksema, 2011; Newby, Williams, & Andrews, 2014). The current review was able to extend these findings through an examination of the treatment literature, which lends further support to the notion of ER as an underlying process that may contribute to changes in symptoms of multiple forms of psychopathology following treatment. Hence, these findings are consistent with, and lend further support to, the growing evidence base that suggests that ER difficulties are likely to be intrinsic to multiple forms of psychopathology (Kring & Sloan, 2009) and support suggestions that ER may form a key target for psychological treatments (Gratz et al., 2015).

From a broader perspective, the findings of this review contribute to the debate underpinning a potential paradigm shift in the conceptualization of psychopathology, in which the study of discrete diagnostic categories has been replaced with a transdiagnostic approach, where psychopathology is proposed to comprise several higher order dimensions or factors which are shared across disorders (Barlow et al., 2004; Brown & Barlow, 2009; Dudley, Kuyken, & Padesky, 2011; Harvey et al., 2004; Mansell, Harvey, Watkins, & Shafran, 2009; Norton & Paulus, 2015). Several additional potential transdiagnostic candidates have been proposed within the literature (Mansell, 2011), including attentional biases (Mathews & MacLeod, 2005), anxiety sensitivity (Naragon-Gainey, 2010), perfectionism (Egan, Wade, & Shafran, 2011) and psychological flexibility (Levin et al., 2014). However, despite the range of transdiagnostic processes that have been examined, ER is arguably one of the most widely studied and supported (Norton & Paulus, 2015). The current review provides additional support both for the existence of transdiagnostic processes within psychopathology, and for the role that ER has as one of these processes.

4.3. Clinical implications

A number of important clinical implications require consideration. Firstly, it must be noted, that despite the intuitive appeal of ER, in the absence of strong evidence of ER causal role in the reduction of psychopathology, any conclusions regarding the utility of ER as a crucial treatment target must be treated with caution. Nonetheless, the finding that ER can improve in response to different treatments designed for, and implemented with, individuals with a range of manifestations of psychopathology may suggest that treatments for specific disorders have common paths of action (i.e., through reducing emotion dysregulation as one mechanism of action). This finding supports the well-founded assumption that core processes exist across psychological disorders, and when targeted in treatment, are likely to produce clinical change (Barlow et al., 2013). More broadly, by providing additional evidence that transdiagnostic processes exist within psychopathology, and are amendable to change during treatment, the results from this review provide conceptual support for existing treatments that target transdiagnostic processes, such as the Unified Protocol (Barlow et al., 2010), DBT (Linehan, 1993) and ACT (Hayes, Strosahl, & Wilson, 1999).

The magnitude of change in ER reported in the studies included in this review also highlights the potential for the development of adjunctive transdiagnostic treatments that specifically target ER and that may contribute to reductions in psychopathology. Such treatments could be incorporated into treatment packages that already contain disorder-specific components. For example, one research group have developed The Affect Regulation Training (ART), an ER skills training package which can be added to any form of empirically validated treatment (Berking, 2010; Berking et al., 2008). When empirically evaluated, ART added alongside CBT in a sample of inpatients with MDD was found to produce significantly greater increases in wellbeing and significantly greater decreases in negative affect than did CBT alone (Berking, Ebert, Cuijpers, & Hofmann, 2013). The findings from this review provide support for the continued development of such adjunctive ER treatments, and suggest a broader application of such treatments to disorders such as substance use disorder, eating disorders and BPD. However, further examination is needed to determine if adjunctive ER treatments augment the efficacy of existing evidence based treatments (Berking et al., 2008; Berking et al., 2013).

The findings from this review also have important implications for the application of existing treatments that have been designed specifically to target ER. Such treatments have been developed by a number of independent research groups, however they have generally been designed for specific disorders, including generalized anxiety disorder (Mennin, 2004), depression (Berking et al., 2008) and BPD and deliberate self-harm (Gratz & Gunderson, 2006). The transdiagnostic nature of ER proposed within this review suggests that these treatments may in fact be efficacious for a wider range of psychopathology. The validation of these treatment protocols for a range of psychological conditions

would appear to represent an important area of future research.

4.4. Limitations

The findings of the present review have several limitations. First, only a small number of studies examined mediation directly, with studies more commonly reporting statistical mediation when change was measured in both ER and symptoms at the same time points, rather than examining true mediation models. Given that cross sectional designs prevent any inferences regarding causation, these studies were not included in addressing the second question of this review. To properly establish mediation, longitudinal studies are required with multiple measurement points, for example taking the form of a cross-lagged panel model with at least three (and likely more) measurement points (see Seling & Preacher, 2009, for discussion). While there were a few studies that did examine longitudinal patterns, only Radkovsky et al. (2014) used a full cross-lag and latent growth analysis, yet this study did not utilize a control condition to distinguish time and treatment effects. Generally, it is understandable that the expense and difficulty of such studies may have prevented them from being conducted in assessing the mediation role of ER. Nonetheless, the absence of longitudinal mediation analyses in this review has limited the conclusions that can be drawn regarding the causal role of emotion regulation in the development or reduction of psychopathology. This is a well-recognised gap in the psychotherapy literature, whereby the empirical state of psychotherapeutic change research has shown little progress in the past decade (Hayes, Long, Levin, & Follette, 2013; Lemmens, Muller, Arntz, & Huibers, 2016; Murphy, Cooper, Hollon, & Fairburn, 2009). There is an urgent need for the field to invest in research designs which facilitate the examination of change processes, in order to facilitate the development of empirically supported transdiagnostic treatments that incorporate evidence based treatment targets.

Second, despite the high rates of comorbidity reported within clinical treatment settings, very few studies in the present review examined the efficacy of treatment for individuals experiencing multiple psychological disorders. Furthermore, in studies where a significant proportion of the sample was experiencing an additional psychological disorder, it was rare that an outcome measure for symptoms of this disorder were included within the analysis. This limitation has been cited in previous reviews that have examined the efficacy of single disorder treatments for youth with comorbid disorders (Ollendick, Jarrett, Grills-Taquechel, Hovey, & Wolff, 2008; Riosa, McArthur, & Preyde, 2011). As a result, it is still largely unknown whether treatments that can decrease maladaptive ER can also produce reductions in symptoms of co-occurring forms of psychopathology simultaneously. Given the proposed transdiagnostic nature of ER, examination of symptoms of multiple co-occurring forms of psychopathology following an ER-relevant treatment warrants further investigation.

Lastly the selection of ER strategies examined within this review may also represent a limitation when making conclusions around the transdiagnostic nature and clinical utility of ER. The selection of rumination, avoidance and suppression as ER strategies within this review was informed both by both the existing clinical literature (Aldao et al., 2010) as well as a pragmatic need to examine a broad range of constructs for clinical utility in the psychological treatment literature. Nonetheless, it has been argued that the primary function of these strategies may not be to regulate emotion, and thus their inclusion as a construct of ER has been debated (Berking & Wupperman, 2012). However, without the development of measures that account for the complexity of this construct (including those that address the goal or motives of a given behavior), it is likely that the function of these strategies will continue to remain unclear. This is a clear priority for future research.

4.5. Concluding remarks

This review indicates that psychological treatments are able to produce positive treatment-related improvements in ER; a process that has been implicated in the development and maintenance of various forms of psychopathology. These changes in ER appear to be relatively independent of the treatment protocol used, the specific ER construct examined, or the clinical disorder targeted. Changes in ER appear to co-occur with improvement in clinical symptoms of a number of different psychological disorders, such as depression, anxiety, substance use, eating disorders and BPD. Importantly, the findings of the present review contribute to the growing literature in support of ER as a transdiagnostic process, and lend credence to the notion that targeting this construct in treatment may contribute to reductions across psychopathology, regardless of agreed clinical nosological boundaries. From a clinical perspective, this may be particularly relevant for clinicians seeking to treat clients who present with high rates of diagnostic comorbidity and psychological complexity. It is important now for future studies to directly examine these change processes, in order to provide stronger evidence for emotional regulation as a mechanism of change, as well as for studies of treatments that directly target emotion regulation processes as a central treatment target.

Role of funding sources

There was no funding source for this project.

Contributors

The authors had a key role in the preparation of this manuscript, as briefly described below.

ES was involved in the conceptual development of the research question, drafted the initial manuscript and was the first independent reviewer of the selected articles and was the first reviewer of the methodological quality of the articles.

KH was the research supervisor of ES, was involved in the conceptual development of the research question, contributed to the initial draft of the manuscript, was the second independent reviewer of the selected articles and contributed to subsequent drafts of the manuscript.

RM was involved in the conceptual development of the research question, contributed to the methodology of the systematic review and contributed to subsequent drafts of the manuscript.

SB was the second independent reviewer for methodological quality and contributed to the methodology of the systematic review and contributed to subsequent drafts of the manuscript.

HM was involved in the conceptual development of the research question, and contributed to subsequent drafts of the manuscript.

PS was involved in the conceptual development of the research question, and contributed to subsequent drafts of the manuscript.

Conflict of interest

We declare that none of the authors are in receipt of financial support, or have any relationship that may pose a conflict of interest in relation to the content presented in the submitted manuscript.

Appendix A. Supplementary data

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.cpr.2017.09.002.

References

Aldao, A. (2012). Emotion regulation strategies as transdiagnostic processes: A closer look at the invariance of their form and function. *Revista de Psicopatologia y Psicologia Clinica, 17*(3), 261–278. Retrieved from http://dx.doi.org/10.5944/rppc.vol.17.num.

3.2012.11843.
Aldao, A., & Dixon-Gordon, K. L. (2014). Broadening the scope of research on emotion regulation strategies and psychopathology. *Cognitive Behaviour Therapy, 43*(1), 22–33. http://dx.doi.org/10.1080/16506073.2013.816769.
Aldao, A., & Nolen-Hoeksema, S. (2010). Specificity of cognitive emotion regulation strategies: A transdiagnostic examination. *Behaviour Research and Therapy, 48*(10), 974–983. http://dx.doi.org/10.1016/j.brat.2010.06.002.
Aldao, A., & Nolen-Hoeksema, S. (2012a). The influence of context on the implementation of adaptive emotion regulation strategies. *Behaviour Research and Therapy, 50*(7–8), 493–501. http://dx.doi.org/10.1016/j.brat.2012.04.004.
Aldao, A., & Nolen-Hoeksema, S. (2012b). When are adaptive strategies most predictive of psychopathology? *Journal of Abnormal Psychology, 121*(1), 276–281. http://dx.doi.org/10.1037/a0023598.
Aldao, A., Nolen-Hoeksema, S., & Schweizer, S. (2010). Emotion-regulation strategies across psychopathology: A meta-analytic review. *Clinical Psychological Review, 30*(2), 217–237. http://dx.doi.org/10.1016/j.cpr.2009.11.004.
American Psychiatric Association (2013). *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.). Arlington, VA: American Psychiatric Association.
Bardeen, J. R., & Fergus, T. A. (2014). An examination of the incremental contribution of emotion regulation difficulties to health anxiety beyond specific emotion regulation strategies. *Journal of Anxiety Disorders, 28*(4), 394–401. http://dx.doi.org/10.1016/j.janxdis.2014.03.002.
Barlow, D. H., Allen, L. B., & Choate, M. L. (2004). Toward a unified treatment for emotional disorders. *Behaviour Therapy, 35*, 205–230. http://dx.doi.org/10.1016/S0005-7894(04)80036-4.
Barlow, D. H., Bullis, J. R., Comer, J. S., & Ametaj, A. A. (2013). Evidence-based psychological treatments: An update and a way forward. *Annual Review of Clinical Psychology, 9*, 1–27. http://dx.doi.org/10.1146/annurev-clinpsy-050212-185629.
Barlow, D. H., Farchione, T. J., Fairholme, C. P., Ellard, K. K., Boisseau, C. L., Allen, L. B., & Ehrenreich May, J. T. (2010). *Unified protocol for transdiagnostic treatment of emotional disorders: Therapists guide.* New York: Oxford University Press.
Berking, M. (2010). *The affect regulation training.* New York: Springer.
Berking, M., Ebert, D., Cuijpers, P., & Hofmann, S. G. (2013). Emotion regulation skills training enhances the efficacy of inpatient cognitive behavioral therapy for major depressive disorder: A randomized controlled trial. *Psychotherapy and Psychosomatics, 82*(4), 234–245. http://dx.doi.org/10.1159/000348448.
Berking, M., Poppe, C., Luhmann, M., Wupperman, P., Jaggi, V., & Seifritz, E. (2012). Is the association between various emotion-regulation skills and mental health mediated by the ability to modify emotions? Results from two cross-sectional studies. *Journal of Behavior Therapy and Experimental Psychiatry, 43*(3), 931–937. http://dx.doi.org/10.1016/j.jbtep.2011.09.009.
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. http://dx.doi.org/10.1097/YCO.0b013e3283503669.
Berking, M., Wupperman, P., Reichardt, A., Pejic, T., Dippel, A., & Znoj, H. (2008). Emotion-regulation skills as a treatment target in psychotherapy. *Behaviour Research and Therapy, 46*(11), 1230–1237. http://dx.doi.org/10.1016/j.brat.2008.08.005.
Billings, A. G., & Moos, R. H. (1981). The role of coping responses and social responses in attenuating the stress of life events. *Journal of Behavioral Medicine, 4*, 139–157.
Bornovalova, M. A., Gratz, K. L., Daughters, S. B., Nick, B., Delany-Brumsey, A., Lynch, T. R., ... Lejuez, C. W. (2008). A multimodal assessment of the relationship between emotion dysregulation and borderline personality disorder among inner-city substance users in residential treatment. *Journal of Psychiatric Research, 42*(9), 717–726. http://dx.doi.org/10.1016/j.jpsychires.2007.07.014.
Bradley, B., DeFife, J. A., Guarnaccia, C., Phifer, J., Fani, N., Ressler, K. J., & Westen, D. (2011). Emotion dysregulation and negative affect: Association with psychiatric symptoms. *Journal of Clinical Psychiatry, 72*(5), 685–691. http://dx.doi.org/10.4088/JCP.10m06409blu.
Brockmeyer, T., Bents, H., Holtforth, M. G., Pfeiffer, N., Herzog, W., & Friederich, H. C. (2012). Specific emotion regulation impairments in major depression and anorexia nervosa. *Psychiatry Research, 200*(2–3), 550–553. http://dx.doi.org/10.1016/j.psychres.2012.07.009.
Brown, T. A., & Barlow, D. H. (2009). A proposal for a dimensional classification system based on the shared features of the DSM-IV anxiety and mood disorders: Implications for assessment and treatment. *Psychological Assessment, 21*(3), 256–271. http://dx.doi.org/10.1037/a0016608.
Bryce, S., Sloan, E., Lee, S., Ponsford, J., & Rossell, S. (2016). Cognitive remediation in schizophrenia: A methodological appraisal of systematic reviews and meta-analyses. *Journal of Psychiatric Research, 75*, 91–106. http://dx.doi.org/10.1016/j.jpsychires.2016.01.004.
Buckholdt, K. E., Parra, G. R., Anestis, M. D., Lavender, J., Jobe-Shields, L., Tull, M. T., & Gratz, K. L. (2014). Emotion regulation difficulties and maladaptive behaviors: Examination of deliberate self-harm, disordered eating, and substance misuse in two samples. *Cognitive Therapy and Research, 39*(2), 140–152. http://dx.doi.org/10.1007/s10608-014-9655-3.
Campbell-Sills, L., & Barlow, D. H. (2007). Incorporating emotion regulation into conceptualizations and treatments of anxiety and mood disorders. In J. J. Gross (Ed.). *Handbook of emotion regulation* (pp. 542–559). New York: Guilford.
Carpenter, R. W., & Trull, T. J. (2013). Components of emotion dysregulation in borderline personality disorder: A review. *Current Psychiatry Reports, 15*(1), http://dx.doi.org/10.1007/s11920-012-0335-2.
Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155–159.
Cole, P. M., Martin, S. E., & Dennis, T. A. (2004). Emotion regulation as a scientific construct: Methodological challenges and directions for child development research. *Child Development, 75*, 317–333. http://dx.doi.org/10.1111/j.1467-8624.2004.00673.x.
Cooper, J., O'Shea, A. E., Atkinson, M. J., & Wade, T. D. (2014). Examination of the difficulties in emotion regulation scale and its relation to disordered eating in a young female sample. *International Journal of Eating Disorders, 47*(6), 230–239. http://dx.doi.org/10.1002/eat.22278.
D'Avanzato, C., Joormann, J., Siemer, M., & Gotlib, I. H. (2013). Emotion regulation in depression and anxiety: Examining diagnostic specificity and stability of strategy use. *Cognitive Therapy and Research, 37*(5), 968–980.
Dalrymple, K. L., & Herbert, J. D. (2007). Acceptance and commitment therapy for generalized social anxiety disorder: A pilot study. *Behavior Modification, 31*(5), 543–568. http://dx.doi.org/10.1177/0145445507302037.
Del Conte, G., Lenz, A. S., & Hollenbaugh, K. M. (2016). A pilot evaluation of dialectical behavior therapy for adolescents within a partial hospitalization treatment milieu. *Journal of Child and Adolescent Counseling, 2*(1), 16–32. http://dx.doi.org/10.1080/23727810.2015.1134008.
Dudley, R., Kuyken, W., & Padesky, C. A. (2011). Disorder specific and transdiagnostic case conceptualisation. *Clinical Psychological Review, 31*(2), 213–224. http://dx.doi.org/10.1016/j.cpr.2010.07.005.
Egan, S. J., Wade, T. D., & Shafran, R. (2011). Perfectionism as a transdiagnostic process: A clinical review. *Clinical Psychology Review, 31*(2), 203–212. http://dx.doi.org/10.1016/j.cpr.2010.04.009.
Fernandez, K. C., Jazaieri, H., & Gross, J. J. (2016). Emotion regulation: A transdiagnostic perspective on a new RDoC domain. *Cognitive Therapy and Research, 40*(3), 426–440. http://dx.doi.org/10.1007/s10608-016-9772-2.
Gratz, K. L., & Gunderson, J. G. (2006a). Preliminary data on an acceptance-based emotion regulation group intervention for deliberate self-harm among women with borderline personality disorder. *Behavior Therapy, 37*(1), 25–35. http://dx.doi.org/10.1016/j.beth.2005.03.002.
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*, 41–54. http://dx.doi.org/10.1023/B:JOBA.0000007455.08539.94.
Gratz, K. L., & Tull, M. T. (2011). Extending research on the utility of an adjunctive emotion regulation group therapy for deliberate self-harm among women with borderline personality pathology. *Personality Disorders, 2*(4), 316–326. http://dx.doi.org/10.1037/a0022144.
Gratz, K. L., Tull, M. T., & Levy, R. (2014). Randomized controlled trial and uncontrolled 9-month follow-up of an adjunctive emotion regulation group therapy for deliberate self-harm among women with borderline personality disorder. *Psychological Medicine, 44*(10), 2099–2112. http://dx.doi.org/10.1017/S0033291713002134.
Gratz, K. L., Weiss, N. H., & Tull, M. T. (2015). Examining emotion regulation as an outcome, mechanism, or target of psychological treatments. *Current Opinion in Psychology, 3*(0), 85–90. http://dx.doi.org/10.1016/j.copsyc.2015.02.010.
Gross, J. J., & Levenson, R. W. (1993). Emotional suppression: Physiology, self-report, and expressive behaviour. *Journal of Personality and Social Psychology, 64*, 970–986.
Gross, J. J. (1998a). Antecedent- and response-focused emotion regulation: Divergent consequences for experience, expression, and physiology. *Journal of Personality and Social Psychology, 74*(1), 224–237. http://dx.doi.org/10.1037/0022-3514.74.1.224.
Gross, J. J. (1998b). The emerging field of emotion regulation: An integrative review. *Review of General Psychology, 2*(3), 271–299. http://dx.doi.org/10.1037/1089-2680.2.3.271.
Gross, J. J. (1999). Emotion regulation: Past, present, future. *Cognition & Emotion, 13*(5), 551–573. http://dx.doi.org/10.1080/026999399379186.
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*, 348–362. http://dx.doi.org/10.1037/0022-3514.85.2.348.
Harvey, A. G., Watkins, E., Mansell, W., & Shafran, R. (2004). *Cognitive behavioural processes across psychological disorders: A transdiagnostic approach to research and treatment.* Oxford: Oxford University Press.
Hayes, S., Long, D., Levin, M., & Follette, W. (2013). Treatment development: Can we find a better way? *Clinical Psychology Review, 33*, 870–882. http://dx.doi.org/10.1016/j.cpr.2012.09.009.
Hayes, S., Strosahl, K., & Wilson, K. G. (1999). *Acceptance and commitment therapy: An experiential approach to behaviour change.* New York: Guilford.
Hayes, S., 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), 1152–1168. http://dx.doi.org/10.1037/0022-006X.64.6.1152.
Higgins, J. P. T., & Green, S. (Eds.). (2011). *Cochrane Handbook for Systematic Reviews of Interventions Version 5.1.0 [updated March 2011]*Available from: The Cochrane Collaborationhttp://handbook.cochrane.org.
Hofmann, S. G., & Asmundson, G. J. (2008). Acceptance and mindfulness-based therapy: New wave or hold hat? *Clinical Psychology Review, 28*, 1–16. http://dx.doi.org/10.1016/j.cpr.2007.09.003.
Hogue, A., & Dauber, S. (2013). Diagnostic profiles among urban adolescents with unmet treatment needs: Comorbidity and perceived need for treatment. *Journal of Emotional and Behavioral Disorders, 21*(1), 18–32. http://dx.doi.org/10.1177/1063426611407500.
Kessler, R. C., Chiu, W. T., Demler, O., & Walters, E. E. (2005). Prevalence, severity, and comorbidity of 12-month DSM-IV disorders in the national comorbidity survey replication. *Archives of General Psychiatry, 62*, 617–627. http://dx.doi.org/10.1001/archpsyc.62.6.617.
Kober, H. (2013). Emotion regulation in substance use disorders. In J. J. Gross (Ed.). *Handbook of emotion regulation* (pp. 428–446). (2nd ed.). New York: Guilford Press.
Kocovski, N. L., Fleming, J. E., & Rector, N. A. (2009). Mindfulness and acceptance-based group therapy for social anxiety disorder: An open trial. *Cognitive and Behavioral Practice, 16*(3), 276–289. http://dx.doi.org/10.1016/j.cbpra.2008.12.004.

Kring, A. M., & Sloan, D. S. (2009). *Emotion regulation and psychopathology: A transdiagnostic approach to etiology and treatment.* New York: Guilford Press.
Kring, A. M., & Sloan, D. S. (2010). *Emotion regulation and psychopathology.* New York: Guilford Press.
Lavender, J. M., Wonderlich, S. A., Engel, S. G., Gordon, K. H., Kaye, W. H., & Mitchell, J. E. (2015). Dimensions of emotion dysregulation in anorexia nervosa and bulimia nervosa: A conceptual review of the empirical literature. *Clinical Psychology Review, 40*, 111–122. http://dx.doi.org/10.1016/j.cpr.2015.05.010.
Lazarus, R. S., & Alfert, E. (1964). Short-circuiting of threat by experimentally altering cognitive appraisal. *Journal of Abnormal and Social Psychology, 69*, 195–205. http://dx.doi.org/10.1037/h0044635.
Lemmens, L. H., Muller, V. N., Arntz, A., & Huibers, M. J. (2016). Mechanisms of change in psychotherapy for depression: An empirical update and evaluation of research aimed at identifying psychological mediators. *Clinical Psychology Review, 50*, 95–107. http://dx.doi.org/10.1016/j.cpr.2016.09.004.
Levin, M., Lillis, J., Seeley, J. R., Hayes, S., Pistorello, J., & Biglan, A. (2012). Exploring the relationship between experiential avoidance, alcohol use disorders, and alcohol-related problems among first-year college students. *Journal of American College Health, 60*(6), 443–448. http://dx.doi.org/10.1080/07448481.2012.673522.
Levin, M., MacLane, C., Daflos, S., Seeley, J. R., Hayes, S., Biglan, A., & Pistorello, J. (2014). Examining psychological inflexibility as a transdiagnostic process across psychological disorders. *Journal of Contextual Behavioral Science, 3*(3), 155–163. http://dx.doi.org/10.1016/j.jcbs.2014.06.003.
Linehan, M. M. (1993). *Cognitive behavioural treatment of borderline personality disorder.* New York: Guilford Press.
Lyubomirsky, S., Layous, K., Chancellor, J., & Nelson, S. K. (2015). Thinking about rumination: The scholarly contributions and intellectual legacy of Susan Nolen-Hoeksema. *Annual Review of Clinical Psychology, 11*, 1–22. http://dx.doi.org/10.1146/annurev-clinpsy-032814-112733.
Mansell, W. (2011). Core processes of psychopathology and recovery: "does the Dodo bird effect have wings?". *Clinical Psychological Review, 31*(2), 189–192. http://dx.doi.org/10.1016/j.cpr.2010.06.009.
Mansell, W., Harvey, A., Watkins, E., & Shafran, R. (2009). Conceptual foundations of the transdiagnostic approach to CBT. *Journal of Cognitive Psychotherapy, 23*(1), 6–19. http://dx.doi.org/10.1891/0889-8391.23.1.6.
Mathews, A., & MacLeod, C. (2005). Cognitive vulnerability to emotional disorders. *Annual Review of Clinical Psychology, 1*(1), 167–195. http://dx.doi.org/10.1146/annurev.clinpsy.1.102803.143916.
McEvoy, P. M., Nathan, P., & Norton, P. J. (2009). Efficacy of transdiagnostic treatments: A review of published outcome studies and future research directions. *Journal of Cognitive Psychotherapy, 23*(1), 20–33. http://dx.doi.org/10.1891/0889-8391.23.1.20.
McHugh, R. K., Murray, H. W., & Barlow, D. H. (2009). Balancing fidelity and adaptation in the dissemination of empirically-supported treatments: The promise of transdiagnostic interventions. *Behaviour Research and Therapy, 47*(11), 946–953. http://dx.doi.org/10.1016/j.brat.2009.07.005.
McLaughlin, K. A., & Nolen-Hoeksema, S. (2011). Rumination as a transdiagnostic factor in depression and anxiety. *Behaviour Research and Therapy, 49*(3), 186–193. http://dx.doi.org/10.1016/j.brat.2010.12.006.
Mennin, D. S. (2004). Emotion regulation therapy for generalized anxiety disorder. *Clinical Psychology & Psychotherapy, 11*(1), 17–29. http://dx.doi.org/10.1002/cpp.389.
Mennin, D. S., & Fresco, D. M. (2009). Emotion regulation as an integrative framework for understanding and treating psychopathology. In A. M. Kring, & D. S. Sloan (Eds.). *Emotion regulation and psychopathology: A transdiagnostic approach to etiology and treatment* (pp. 356–379). New York, NY: Guilford Press.
Mennin, D. S., Heimberg, R. G., Turk, C. L., & Fresco, D. M. (2002). Applying an emotion regulation framework to integrative approaches to generalized anxiety disorder. *Clinical Psychology: Science and Practice, 9*(1), 85–90. http://dx.doi.org/10.1093/clipsy/9.1.85.
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. *Behavior Therapy, 38*(3), 284–302. http://dx.doi.org/10.1016/j.beth.2006.09.001.
Mennin, D. S., McLaughlin, K. A., & Flanagan, T. (2009). Emotion regulation deficits in generalized anxiety disorder, social anxiety disorder, and their co-occurence. *Journal of Anxiety Disorders, 23*, 866–871. http://dx.doi.org/10.1016/j.janxdis.2009.04.006.
Mills, K., & Marel, C. (2013). International data on the prevalence and correlates of comorbid substance use and psychiatric disorders. In P. Miller (Vol. Ed.), *Principles of addition: Comprehensive addictive behaviours and disorders. Vol. 1. Principles of addition: Comprehensive addictive behaviours and disorders* (pp. 481–488). Sydney: Academic Press.
Murphy, R., Cooper, Z., Hollon, S. D., & Fairburn, C. G. (2009). How do psychological treatments work? Investigating mediators of change. *Behaviour Research and Therapy, 47*(1), 1–5. http://dx.doi.org/10.1016/j.brat.2008.10.001.
Naragon-Gainey, K. (2010). Meta-analysis of the relations of anxiety sensitivity to the depressive and anxiety disorders. *Psychological Bulletin, 136*(1), 128–150. http://dx.doi.org/10.1037/a0018055.
Newby, J. M., Williams, A. D., & Andrews, G. (2014). Reductions in negative repetitive thinking and metacognitive beliefs during transdiagnostic internet cognitive behavioural therapy (iCBT) for mixed anxiety and depression. *Behaviour Research and Therapy, 59*, 52–60. http://dx.doi.org/10.1016/j.brat.2014.05.009.
Nolen-Hoeksema, S. (1991). Responses to depression and their effects on the duration of depressive episodes. *Journal of Abnormal Psychology, 100*(4), 569–582. http://dx.doi.org/10.1037/0021-843X.100.4.569.
Nolen-Hoeksema, S., & Harrell, Z. A. (2002). Rumination, depression, and alcohol use: Tests of gender differences. *Journal of Cognitive Psychotherapy, 16*(4), 391–403. http://dx.doi.org/10.1891/jcop.16.4.391.52526.
Norton, P. J., & Paulus, D. J. (2015). Toward a unified treatment for emotional disorders: Update on the science and practice. *Behavior Therapy*. http://dx.doi.org/10.1016/j.beth.2015.07.002.
Ollendick, T. H., Jarrett, M. A., Grills-Taquechel, A. E., Hovey, L. D., & Wolff, J. C. (2008). Comorbidity as a predictor and moderator of treatment outcome in youth with anxiety, affective, attention deficit/hyperactivity disorder, and oppositional/conduct disorders. *Clinical Psychology Review, 28*, 1447–1471. http://dx.doi.org/10.1016/j.cpr.2008.09.003.
Ottenbreit, N. D., Dobson, K. S., & Quigley, L. (2014). An examination of avoidance in major depression in comparison to social anxiety disorder. *Behaviour Research and Therapy, 56*(1), 82–90. http://dx.doi.org/10.1016/j.brat.2014.03.005.
Öst, L. G. (2008). Efficacy of the third wave of behavioral therapies: A systematic review and meta-analysis. *Behaviour Research and Therapy, 46*(3), 296–321. http://dx.doi.org/10.1016/j.brat.2007.12.005.
Radkovsky, A., McArdle, J. J., Bockting, C., & Berking, M. (2014). Successful emotion regulation skills application predicts subsequent reduction of symptom severity during treatment of major depressive disorder. *Journal of Consulting and Clinical Psychology, 82*(2), 248–262. http://dx.doi.org/10.1037/a0035828.
Riosa, P. B., McArthur, B. A., & Preyde, M. (2011). Effectiveness of psychosocial intervention for children and adolescents with comorbid problems: A systematic review. *Child and Adolescent Mental Health, 16*(4), 177–185. http://dx.doi.org/10.1111/j.1475-3588.2011.00609.x.
Seling, J., & Preacher, K. J. (2009). Mediation models for longitudinal data in developmental reasearch. *Research in Human Development, 6*(2), 1–32. http://dx.doi.org/10.1080/15427600902911247.
Shea, B. J. (2007). Development of AMSTAR: A measurement tool to assess the methodological quality of systematic reviews. *BMC Medical Research Methodology, 7*(10), 7–10. http://dx.doi.org/10.1186/1471-2288-7-10.
Siegel, J. (2015). Emotion regulation in adolescent substance use disorders: Rethinking risk. *Journal of Child & Adolescent Substance Abuse, 24*, 67–79. http://dx.doi.org/10.1080/1067828X.2012.761169.
Smith, J. M., & Alloy, L. B. (2009). A roadmap to rumination: A review of the definition, assessment, and conceptualization of this multifaceted construct. *Clinical Psychology Review, 29*(2), 116–128. http://dx.doi.org/10.1016/j.cpr.2008.10.003.
Stepp, S., Scott, L., Morse, J., Nolf, K., Hallquist, M., & Pilkonis, P. (2014). Emotion dysregulation as a maintenance factor of borderline personality disorder features. *Comprehensive Psychiatry, 55*(3), 657–666. http://dx.doi.org/10.1016/j.comppsych.2013.11.006.
Swain, J., Hancock, K., Hainsworth, C., & Bowman, J. (2013). Acceptance and commitment therapy in the treatment of anxiety: A systematic review. *Clinical Psychology Review, 33*(8), 965–978. http://dx.doi.org/10.1016/j.cpr.2013.07.002.
Turk, C. L., Heimberg, R. G., Luterek, J. A., Mennin, D. S., & Fresco, D. M. (2005). Emotion dysregulation in generalized anxiety disorder: A comparison with social anxiety disorder. *Cognitive Therapy and Research, 29*(1), 89–106. http://dx.doi.org/10.1007/s10608-005-1651-1.
Wegner, D. M., & Zanakos, S. (1994). Chronic though suppression. *Journal of Personality, 62*, 615–640.
Weiss, N. H., Tull, M. T., Anestis, M. D., & Gratz, K. L. (2013). The relative and unique contributions of emotion dysregulation and impulsivity to posttraumatic stress disorder among substance dependent inpatients. *Drug and Alcohol Dependance, 128*(1–2), 45–51. http://dx.doi.org/10.1016/j.drugalcdep.2012.07.017.
Wong, C. F., Silva, K., Kecojevic, A., Schrager, S. M., Bloom, J. J., Iverson, E., & Lankenau, S. E. (2013). Coping and emotion regulation profiles as predictors of nonmedical prescription drug and illicit drug use among high-risk young adults. *Drug and Alcohol Dependance, 132*(1–2), 165–171. http://dx.doi.org/10.1016/j.drugalcdep.2013.01.024.