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Application of third-wave cognitive-behavioral interventions in the treatment of obsessive-compulsive disorder

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APPLICATION OF THIRD-WAVE COGNITIVE-BEHAVIORAL INTERVENTIONS IN THE TREATMENT OF OBSESSIVE-COMPULSIVE DISORDER: A SYSTEMATIC REVIEW

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by

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This dissertation, written by

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ABSTRACT

Obsessive-compulsive disorder (OCD) has a high comorbidity rate, with substantial risks for anxiety, mood, and substance use disorders. Exposure and response prevention (ERP) is considered the first-line psychotherapy treatment for OCD. While highly efficacious, not all patients achieve full remission with ERP, and given the chronicity of OCD and its sensitivity to stress-related events, many patients struggle with ongoing symptoms. A growing area of research has been the use of third-wave behavioral and cognitive therapies that potentially enhance patients' willingness to engage with exposure-based treatment and provide strategies to cope with residual symptoms. This integrative systematic review summarizes and synthesizes results from 21 research studies that examine efficacy of standalone uses of Acceptance and Commitment Therapy (ACT), Mindfulness-Based Cognitive Therapy (MBCT) and Mindfulness-Based Stress Reduction (MBSR), as well as the efficacy of ERP augmented with these interventions in the treatment of OCD. Results suggest that adaptations of ACT and MBCT are efficacious treatments for OCD with and without ERP. However, treatment comparisons yielded commensurate, but not superior results, especially for the few studies that included long-term follow-up assessment. Recommendations for future research include investigating the shared processes of change *across treatments* to hone in on *treatment-specific* processes that drive symptom change, tracking the stability of treatment results over time, and utilizing multiple OCD symptom severity outcomes measures that specifically account for avoidance behavior. Given the complex and heterogeneous nature of OCD, this study elucidates patient and therapist factors that should be considered when navigating treatment decisions.

Chapter 1: Introduction

Data from the 2010 National Comorbidity Survey Replication (NCS-R) indicate that roughly between 2 and 3 million adults in the United States will experience symptoms of OCD at some point in their lives, with a lifetime prevalence of 2.3%—twice that of schizophrenia and bipolar disorder. Moreover, roughly half of adults who meet clinical criteria experience serious impairment in either social, occupational, academic, or other important areas of functioning (Ruscio et al., 2010). The functional impairment associated with OCD contributes to more years of disability than that of neurodegenerative diseases, such as multiple sclerosis and Parkinson's disease combined, and can cause functional impairment comparable to that associated with schizophrenia (Bystritsky et al. 2001; World Health Organization [WHO], 2008). Prior to the 2010 NCS-R study, Hollander et al. (1997) referred to OCD as a "hidden epidemic," citing the economic cost and serious impact of OCD on quality of life (QoL).

Results from a recent meta-analysis by Sharma et al. (2021) found OCD to have a significantly high lifetime psychiatric comorbidity rate of up to 71%. The most common comorbid conditions included mood, anxiety, and substance use disorders, with mood and substance abuse disorders particularly correlated with increased mortality rates (Meier et al., 2016) Even as the fourth most common psychiatric disorder, OCD is often not detected or misdiagnosed (Senter et al., 2021), contributing to an 8.9-year gap in screening and care (Hollander, 2007). Moreover, certain symptom presentations (e.g., sexual and or aggressive obsessions and compulsions) are often under detected, given the taboo and ego-dystonic nature of the symptoms that contribute to patient embarrassment and non-disclosure (Fineberg et al., 2019).

Significance

The World Health Organization has ranked OCD as one of the 10 most debilitating medical conditions worldwide (Veale & Roberts, 2014). With the addition of comprehensive and high-quality data from national registries in Denmark (Meier et al., 2016) and Sweden (Fernández de la Cruz et al., 2022) there a growing consensus on the long-term public health consequences of OCD. These include higher risks for premature death, suicide, and cardiovascular and metabolic disorders. These findings are derived from comprehensive, well-designed studies, some of which attempt to control for the most known confounds such as comorbidity and medication use.

In a clear example of the public health sequelae associated with OCD, Meier et al. (2016) provided alarming statistics of heightened risk of mortality associated with OCD. Using the Danish longitudinal register, the researchers found that in a sample of 10,155 Danes with OCD, the risk of death was double that of the general population. Comorbid conditions increased the risk considerably; however, even controlling for comorbidity, the risk of death was still significantly higher than the general population. Moreover, in the population-based study of patients in the Swedish national registers, Fernandez de la Cruz et al. (2017) estimated the risk of death by suicide as well as risk of suicide attempts. Compared to matched controls, patients with OCD had a ten times higher risk of completed and attempted suicides, even when adjusting for the two most predictive comorbidities, substance abuse and affective disorders. A second study from the Swedish national registers by Isomura et al. (2018) documented the sizable risk of metabolic and cardiovascular disease for patients with OCD. They reported an increased risk of obesity, type-2 diabetes, and circulatory system diseases compared to the general population. The Swedish population-wide studies are also documenting other non-medical consequences of

OCD such as lesser education attainment (Pérez-Vigil et al., 2018) and lower participation in the labor force with higher rates of disability and long-term unemployment (Pérez-Vigil et al., 2019).

The COVID-19 pandemic has had a dramatic impact on overall mental health and well-being worldwide (WHO, 2022) including an estimated increase of 25.1% increase in cases of major depressive disorder (MDD) and a 25.6% increase in cases of anxiety disorders worldwide (Santomauro et al., 2021). The nature of, and stress related to the pandemic increased OCD symptoms in both clinical and non-clinical populations with a particularly worsened course for those with contamination-based symptoms. In a systematic review of the studies assessing OCD during the early stages of the pandemic (Guzick et al., 2021), it was found that that 32% of patients with OCD in specialty clinics reported worsening symptoms during the early stages of the pandemic across studies as well as an increase of 16% of new patient cases with OCD. Rates were significantly higher—up to 77%—in samples of those with self-reported OCD symptom from online surveys, support lines, and college student samples. These results stress the potential protective benefits of evidence-based treatment and advocate for the refinement and dissemination of evidence-based interventions for OCD.

Obsessive-Compulsive Disorder

OCD symptoms are highly varied and specific to the individual yet can be captured by the defining clinical criteria for a diagnosis of OCD in the *Diagnostic and Statistical Manual of Mental Disorders*, 5th Edition (DSM-5). Criteria include the presence of obsessions or compulsions, or more commonly both, that meet clinical thresholds in one of the following: "take more than an hour per day" *or* "clinically significant distress" *or* "impairment in social, occupational, *or* other important areas of functioning" (American Psychiatric Association [APA], 2013, p. 237). Obsessions are defined as thoughts, images or ideas that are "recurrent and

persistent" that are not associated with everyday worries, are not pleasurable, and for most individuals cause intense distress. Compulsions are defined as "repetitive behaviors that a person feels driven to perform in response to an obsession or according to rules that must be applied rigidly" (APA, 2013, p. 237). Compulsions may be observable such as hand washing, or more covert such as mental rituals, that also are not pleasurable, but may reduce distress in the short-term (APA, 2013). It is important to note that it is very common for people to engage in avoidance behavior of obsession-inducing stimuli to lessen distress and associated compulsions (Abramowitz et al., 2010).

Per a 2018 study by Emerson et al., obsessive intrusive thoughts (OITs) like many other aspects of OCD exist on a continuum (Emerson et al., 2018). It is posited that what often differentiates a person who meets criteria for OCD and one who does not is the frequency and associated distress of the intrusive thoughts. These factors are influenced by how a person appraises and responds to OITs (Berry & Laskey, 2012). The process of ERP not only behaviorally changes how a person responds to OITs but helps to disconfirm overestimates of threat or importance associated with the thoughts (Emerson et al., 2018).

While the most common treatment for OCD is pharmacological (Blanco et al., 2006), primarily with selective serotonin reuptake inhibitors (SSRIs), ERP is found to lead to better outcomes than antidepressant medication. Moreover, ERP in combination with antidepressant medication tends to yield greater benefits than use of antidepressant medication alone (Öst et al., 2015).

Exposure and Response Prevention

ERP is considered the "first line" psychotherapy treatment for OCD (Koran et al., 2007). Exposure in ERP involves the clinician helping the patient to intentionally and systematically

confront feared situational or mental triggers while purposely refraining from acting on compulsive rituals (Abramowitz & Jacoby, 2015). The clinician and patient collaboratively create a fear hierarchy, a ranking of least to most distressing situations specific to the patient's OCD symptoms. Through repeated in-session and between-session *in-vivo* and imaginal exposures, a patient confronts increasingly challenging items on their fear hierarchy. Even when habituation is not reached, ERP facilitates new learning that the feared outcome(s) are unlikely to occur and increase one's confidence that he or she can tolerate distress and/or lack of certainty without engaging in compulsions (Hezel & Simpson, 2019).

Average improvement rates vary from 50% to 76% across meta-analyses of ERP for OCD (Abramowitz, 2006; Fisher & Wells, 2005), and research suggests completion of between-session exposure tasks and *early* patient treatment adherence is correlated with symptom reduction (Simpson et al., 2011). A meta-analysis of cognitive behavioral therapies for OCD (Guzick et al., 2018) addressed whether adding medications, motivational interviewing, or family involvement to ERP improves patient treatment adherence and outcomes. Their findings suggested that adding SSRIs had minimum additional benefit, and that motivational interviewing and family involvement were most effective in studies when they are delivered separately, rather than combined. In a 2016 systematic review by Ong et al., it is reported that the overall dropout rate for ERP at 14.7% is comparable to that of other emotional disorders (e.g., post-traumatic stress disorder, MDD, etc.). However, the approximate attrition rate (combination of refusal and dropout rates) of ERP at 18.7% still leaves room for improvement (Ong et al., 2016).

Willingness to experience distressing thoughts, emotions, and bodily sensations appears to be a marker of effective exposure in adults with OCD (Reid et al., 2017). As mindfulness helps one to cultivate a less reactive relationship to one's thoughts, emotions, and physical

sensations, a growing area of interest is the potential benefits of mindfulness in the treatment of OCD. Mindfulness originates from Buddhism as part of a spiritual tradition to ease mental suffering (Thera, 1992) and has been utilized in a secularized manner in many modern therapeutic approaches. Various types of mindfulness interventions have been studied for the treatment of OCD, as a skill in addition to ERP, or as a component of third-wave behavioral and ACT. Each of these treatments incorporate mindfulness and are making inroads in improving outcomes for a rapidly expanding list of psychological as well as physical health disorders (e.g., A-tjak et al., 2015; Khoury et al., 2013).

Mindfulness-Based Stress Reduction

MBSR was originally developed by Dr. Jon Kabat-Zinn to gradually train participants in meditative techniques as a self-regulative approach to stress reduction. The 8-week group program consists of 2.5-hour sessions, a half-day retreat, and daily meditative home practice. In-session and between-session meditative practice aids participants in learning to focus their attention on sensations, thoughts, and emotions in the present moment in an open, nonjudgmental way, thus helping to change participants' reactivity patterns. This is meant to serve as a self-regulatory strategy to be used in everyday life to avoid rumination and not amplify distress (Kabat-Zinn, 2013). Although the focus of MBSR is not symptom reduction, it has been studied as a treatment of anxiety disorders (Baer, 2003; Hoge et al., 2013; Kabat-Zinn et al., 1992; Miller et al., 1995) and is increasingly used in medical centers as an adjunctive treatment for many chronic conditions such as asthma (E. T. Higgins et al., 2022) and fibromyalgia (Cash et al., 2015). Given MBSR aims to facilitate a less reactive, decentered relationship to one's thoughts, feelings, and bodily sensations, it is considered to be a promising standalone or adjunctive treatment (with ERP) for OCD (Patel et al. 2007).

Mindfulness-Based Cognitive Therapy

Cognitive therapy researchers, Drs. Zindel Segal, Mark Williams, and John Teasdale created the eight-week MBCT protocol to specifically address relapse of clinical depression by incorporating cognitive therapy and psychoeducation components to the MBSR curriculum (Segal et al., 2018). The cornerstone of MBCT theory is for individuals to "approach" versus "avoid" their internal experience, which is cultivated by aiding participants in developing metacognitive awareness in the first half of the curriculum *to then* purposely approach internal difficulty in the second half, with mindfulness (Selchen et al., 2018). Several randomized controlled trials have established the efficacy of this intervention for the reduction of clinical depression and anxiety symptoms (Segal et al., 2018). Given the emphasis on metacognitive awareness and gradual exposure to difficult internal stimuli, novel adaptations of the protocol have been made to test the utility of MBCT for the treatment of OCD (Didonna et al., 2019).

Acceptance and Commitment Therapy

ACT, developed by Dr. Steven C. Hayes, is based on the premise that psychological suffering is primarily caused by experiential avoidance (EA) and cognitive entanglement, resulting in psychological inflexibility. It is posed that this pattern of avoidance and attempts to control one's internal experience leads to impediments in living in accordance with one's core values (Cookson et al., 2020). Thus, ACT aims to increase psychological flexibility (PF), "the ability to remain present, even when in contact with aversive stimuli, in order to engage in deliberate behavior towards meaningful life directions" (Thompson et al., 2021, p. 286). ACT promotes PF through six core processes: acceptance, cognitive defusion, present moment awareness, self-as-context, values, and committed action (Hayes et al., 2006). As such, ACT teaches one to notice and accept, rather than control, one's internal experience.

Studies comparing ACT to ERP often attempt to separate out exposure as the "active ingredient" of ERP—however, ACT is widely considered an exposure-based treatment by virtue of having patients reverse the pattern of avoidance behavior through values-based, committed action (Tolin, 2009). Although operationally different procedures, both ACT and ERP are behavior-focused interventions that include goal setting, behavioral activation, and discourage the use of thought control strategies such as thought suppression (Bluett et al., 2014). ACT techniques have been used experimentally to increase distress tolerance for pain (Masedo & Rosa Esteve, 2007; Páez-Blarrina et al., 2008), and increase the willingness of patients diagnosed with panic disorder to undergo an interoceptive exposure. ACT techniques have also been shown to decrease the distress associated with intrusive thoughts even if the frequency of the intrusive thoughts *does not* decrease (Levitt et al., 2004). There is increasing evidence that ACT is effective in treating OCD (e.g., Twohig et al., 2015). Meta-analyses for anxiety disorders and OCD spectrum disorders (e.g., Bluett et al., 2014; Landy et al., 2015) have found comparable results in treating these disorders with ACT with or without exposure exercises. Accordingly, ACT on its own or incorporated with ERP shows promise as a treatment for OCD.

Summary and Purpose

Despite the efficacy of ERP, a sizeable percentage of patients do not respond to treatment and nearly 50% of those who do respond experience at least partial relapse at follow-up assessments (Öst et al., 2015; Simpson et al., 2004, 2008). Thus, it is important to investigate alternative treatments and adaptations of ERP for the treatment of OCD. The purpose of this study is to analyze the research base of specific third-wave interventions (ACT, MBCT, and MBSR) in treating OCD. The broader aim of this systematic review is to decipher the various ways in which ACT, MBCT and MBSR have been adapted to the treatment of OCD, as well as

how they have been utilized to augment ERP. Preliminary evidence supports the use of these interventions as standalone or adjunctive treatments for OCD (Key et al., 2017; Patel et al., 2007; Sguazzin et al., 2017; Twohig et al., 2010a).

In this systematic review, we examine the available evidence for the efficacy of standalone uses of ACT, MBCT and MBSR, as well as the efficacy of ERP augmented with these interventions in the treatment of OCD. Specifically, we address four questions: 1) How are ACT, MBCT and MBSR being adapted and applied to the treatment of OCD? 2) What is the efficacy of these group and individual treatment approaches? 3) In what ways is ERP being augmented with ACT, MBSR, and/or MBCT? And 4) What is the efficacy of these augmentations?

This systematic review offers a broad view of the current state of the literature involving third-wave behavioral and cognitive therapies applied to the treatment of OCD, as well as the ways in which ERP is augmented with these interventions. However, in an effort to operationalize and control for "dose" of mindfulness through the inclusion of only these manualized treatments, other novel approaches (e.g., modified Dialectical Behavioral Therapy with problem-solving) are not accounted in this review. Moreover, this review does not focus on the mechanisms of change unique to each treatment intervention, but rather what they have in common. The findings of this review may be used to further investigate the mechanisms of change in OCD symptoms related to these, and other third-wave interventions not included in this review.

Chapter 2: Methodology

Systematic Review of the Literature

The objective of this dissertation was to improve the understanding of how third-wave behavioral and cognitive approaches are being utilized in the treatment of OCD through a systematic review of the literature. An integrative review approach was employed to evaluate the research on treatment of OCD utilizing ACT, MBCT, MBSR, and augmentation of ERP with the aforementioned treatments. Despite exponential growth in research on mindfulness-based interventions (MBIs), mindfulness research has been criticized for its lack of quality and rigor (Goldberg et al., 2017). Because ACT, MBCT, and MBSR are manualized in contrast to more vaguely defined mindfulness-based treatments, it is possible in this systematic review to report how these treatments were modified and adapted to the treatment of OCD. As the findings in this systematic review are synthesized from both quantitative and qualitative data, an integrative review was deemed most appropriate. The design and methods of this protocol are in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols (PRISMA-P; Moher et al., 2015). The sections that follow describe the specific research methods and steps that were utilized in this analysis of the literature.

Search, Screening and Selection Process

The search was carried out by using the following electronic databases: PsycINFO, PubMed, SCOPUS, PsychArticles, and Sage Journals Online. Keywords and terms (see Appendix A) were generated and adjusted as appropriate for each database. Manual searches of reference lists were also conducted to case a wider net to locate additional potential studies for inclusion.

The screening and selection process was divided into three phases. The phases hold a set of criteria that must be met to move on to the next. The first phase was the screening of the title/keywords of each study, the second phase was a screening of the abstract, and the third phase was a full text review for eligibility. The third phase also included the final decision on study inclusion for data extraction. Discrepancies in the reviewer's selection of eligible articles was resolved in a consensus discussion with a research assistant (BR). It is important to note that this phase involved evaluating/excluding studies for poor research design with major threats to internal validity.

A PRISMA Flow Diagram (see Appendix D) illustrates the stream of sources as they proceeded through the review process. Initially, 1065 articles were retrieved through the search process. Using EndNote to remove duplicates, 388 articles remained. 231 articles were excluded by title, and 90 by abstract. 67 articles were assessed for eligibility, and 21 articles met the inclusion and exclusion criteria for this systematic review, which are in the Table of Included Studies (see Appendix B).

Eligibility Criteria

All studies included a) are in English or have an English translation, b) are from published, peer-reviewed journals, c) were published between 1982 to 2022, d) involved adults (ages 18+) with clinically significant OCD symptoms, measured by an assessment instrument with demonstrated validity and reliability, e) diagnosis of OCD given by a trained clinician rather than by self-report, f) treatment of individuals with OCD utilizing ACT, MBCT, MBSR, or ERP augmented with elements from aforementioned treatments by a trained clinician (before, after, or in concurrence with ERP treatment), g) treatment delivered in individual or group setting, h) details of specific augmentations to ACT, MBCT, MBSR for OCD, and i) clearly

stated elements of MBCT, MBSR and/or ACT before, during, or after ERP treatment (e.g., MBCT after ERP for residual symptoms of OCD). Only studies from inpatient and outpatient settings were considered. The reason for the criteria is that the study is meant to focus on clinical samples, and it was important for quality control that treatment be administered by trained clinicians.

This systematic review includes clinical case studies, longitudinal studies, follow-up studies, clinical trials, treatment outcomes, meta-analyses, and randomized control trials. Qualitative data was used to provide a deeper understanding into aspects of the interventions that make them effective, including the ways in which these approaches help those with OCD to relate to their obsessive intrusive thoughts differently, thereby affecting their behavior. Moreover, the qualitative data provides insight into the aspects of treatment that may help increase OCD treatment acceptability and efficacy.

Studies that included comorbidities such as anxiety and depression were included, as it this can enrich the generalizability of the study. However, the review excluded studies that had participants with co-occurring substance use disorder, psychosis, mania, severe MDD, autism spectrum disorder (ASD), intellectual disability, dementia, or untreated attention-deficit/hyperactivity disorder.

Data Collection and Extraction

The data extraction tool was adapted from the Cochrane data extraction form (J. P. Higgins, 2011), then pilot-tested and refined by one author (EH). Each data collection and extraction form contain an ID #, authors and year, full document title, and the research variables for each study reviewed. General information was extracted pertaining to type of article and

method of extraction, including the date the form was completed, ID of person extracting data, source/publication type, source name, and publication status.

For quantitative studies, those same design characteristics were extracted, plus data on the duration of treatment, type of study conducted, type of intervention and/or augmentation/adaptation used, and comparisons made. Documentation of the research variables were extracted which includes mindfulness (duration, frequency, skills taught), homework (amount, frequency, compliance), and any relevant information about the adaptations of ACT, MBCT, or MBSR to OCD and training of the practitioners. Information regarding the measures that were used to assess specifically for OCD (e.g., Yale-Brown Obsessive-Compulsive Scale) and trait mindfulness (e.g., Toronto Mindfulness Scale) were extracted as well as information regarding the delivery method (group, individual) of treatment. More information regarding the study participant characteristics and recruitment were extracted as well as data relevant to the population of interest, recruitment methods, sample size, age, gender, race/ethnicity, and setting characteristics including the study location and data collection setting(s). A description of the analysis used for qualitative studies was also recorded. For quantitative studies, power and sample size were extracted in addition to intervention and co-intervention results, and attrition rates. Any additional findings were also recorded. Lastly, the author's conclusions and stated limitations of the paper were extracted.

Quality Appraisal

The Psychotherapy Outcome Study Methodology Rating Form (POMRF) created by Öst (2008) was utilized to conduct a comprehensive analysis of the quality of each source (see Appendix C). The scale consists of 22 items that rate the following domains: (a) clarity of sample description, (b) severity/chronicity of the disorder, (c) representativeness of the sample,

(d) reliability of the diagnosis in question, (e) specificity of outcome measures, (f) reliability and validity of outcome measures, (g) use of blind evaluators, (h) assessor training, (i) assignment to treatment, (j) design, (k) power analysis, (l) assessment points, (m) manualized, replicable specific treatment programs, (n) number of therapists, (o) therapist training experience, (p) checks for therapist adherence, (q) checks for therapist competence, (r) control of concomitant treatments (e.g., medications) control of concomitant treatments (e.g., medications), (s) handing of attrition, (t) statistical analyses and presentation of results, (u) clinical significance, and (v) equality of therapist hours (for non-waitlist control designs only). Each of the 22 items received a rating of good (2), fair (1), poor (0), or not applicable. The overall POMRF rating, 0-44, serves as a quality appraisal of the source, with higher overall scores indicative of greater methodological rigor. Two independent reviewers (EH and BR) extracted quality assessment data; any discrepancies were discussed by the two reviewers to gain consensus.

Data Management, Data Analysis and Synthesis

Through the screening and selection process, only ACT and MBCT studies were included in this systematic review, analyzing the available evidence for the efficacy of ACT and MBCT as standalone, hybrid (with ERP) and adjunctive treatments for OCD. The data were extracted and coded into the Table of Included Studies (Appendix B). The Table of Included Studies reports the following from each study reviewed: 1) Author(s) and Publication Year, 2) Study Aim, 3) Design, 4) Sample Characteristics, 5) Mode (Individual or Group), and 6) Intervention/Control Group(s). Study design characteristics are shown in Table 2, MBCT Study Design Characteristics, and Table 6, ACT Study Design Characteristics.

Table 1 and Table 5 address the author's research question about the ways in which MBCT and ACT are applied for the treatment of OCD, respectively. These tables reflect how

each study specifically adapted standard treatment protocols with and without ERP elements to target OCD symptomatology. Table 3 and Table 7 address the author's research question regarding the efficacy of MBCT and ACT for OCD, respectively. Additionally, Table 4 and Table 8, reflect the various *secondary* outcomes of ACT and MBCT for OCD, respectively.

Chapter 3: Results

Twenty-one articles of various research designs, including case studies and randomized control trials (RCTs) met full inclusion criteria for this review. An overview of the screening process is illustrated in Appendix D, and Appendix B provides a Table of Included. Of the twenty-one articles, nine examined ACT, ten examined MBCT and two were meta-analysis (one ACT, one MBCT).

How MBCT-Informed Treatments are Adapted for OCD

Table 1 provides an overview of how each included study adapted MBCT, with and without ERP, for the treatment of OCD. The table only includes primary studies and excludes studies which are secondary analyses of the same study and treatment protocol. For example, of the ten studies implementing MBCT-informed interventions for OCD, two (Cludius et al., 2020; Hertenstein et al., 2012) are secondary analyses of a randomized control trial by Külz et al. (2019) and are therefore excluded in Table 1. Moreover, two studies (Leeuwerik et al., 2020; Sguazzin et al., 2017) present qualitative data that was collected as part of a broader quantitative study conducted by Strauss et al. (2018) and Key et al. (2017), respectively, and are therefore excluded from Table 1.

The six studies included in Table 1 describe the ways in which MBCT has been utilized in the treatment of OCD. Three of these six studies (Key et al., 2017; Külz et al., 2019; Selchen et al., 2018) tested the efficacy of MBCT adapted for OCD as an augmentation strategy with participants who had residual OCD symptoms after Cognitive Behavioral Therapy (CBT). Selchen et al. (2018) also included a second treatment group using MBCT as a standalone treatment for participants who had not previously received treatment for OCD. Two studies (Mathur et al., 2021; Zhang et al., 2021) utilized MBCT adapted for OCD as a standalone

treatment compared to active control groups. Lastly, one study (Strauss et al., 2018) piloted an MBCT-informed mindfulness/ERP hybrid treatment to compare directly to ERP.

As seen in Table 1, there is considerable heterogeneity in how MBCT has been adapted to OCD in the various protocols. There is also considerable variability in how much detail is reported and what must be inferred when the researchers report adhering to the MBCT protocol. All studies had a minimum duration of 8 sessions and were conducted in a group format delivered by a therapist with mindfulness training. Session length spanned 40-150 minutes, and number of sessions ranged 8-12. Common components across all six protocols included cognitive defusion and/or decentering, direct sensing, formal and/or informal mindfulness practice, acceptance, non-avoidance, homework involving formal and/or informal mindfulness practice, and relapse prevention.

Inclusions Specific to OCD

All protocols, save one (Key et al., 2017), explicitly included delivering a treatment rationale (e.g., MBCT Model of OCD), which tended to be included in the pre-group participant interview or addressed in sessions 1-2. Psychoeducation about OCD was explicitly reported to be an augmentation of MBCT treatment in all but one protocol (Zhang et al., 2021), though all protocols included discussion of factors that maintain OCD symptoms.

Three protocols (Key et al., 2017; Külz et al., 2019; Selchen et al., 2018) adhered most closely to the original eight-week MBCT curriculum, with depression-specific content adapted to OCD symptomatology. All three of these protocols included psychoeducation about OCD, discussion of OCD symptoms, and cognitive distortions commonly associated with intrusive thoughts and images. For example, Selchen et al. (2018) outline the most noteworthy modifications to the MBCT protocol to occur in sessions 4 and 6. Session 4 content was adapted

to discuss OCD (rather than depression) symptomatology and thought processes, as well as beliefs participants may have about obsessive thoughts and images. Session 6 content was adapted to discuss how obsession and compulsion inducing situations are associated with specific OCD symptoms, emotions, physical sensations and how these experiences contribute to and maintain the OCD cycle. All three protocols shortened sessions from 2.5 hours to 2 hours, and Key et al. (2017) lessened the 45–60-minute guided meditation between sessions to 20-25 minutes.

One study (Strauss et al., 2018) drew from MBCT and ERP to create an explicit mindfulness/ERP hybrid treatment. Strauss et al. (2018) created Mindfulness-Based ERP (MB-ERP), which specifically drew from ERP inhibitory learning theory (Abramowitz & Arch, 2014; Arch & Abramowitz, 2015) and MBCT (Segal et al., 2013). Treatment included 10, 2-hour sessions, beginning with one session in which the rationale of ERP alongside the rationale for including mindfulness was given. Each 2-hour session thereafter began with a 10-minute version of a primary formal meditation from MBCT with the language specifically adapted to invite participants to notice and accept OCD-related internal stimuli. The final 90 minutes of these sessions included in-vivo exposure in which participants were encouraged to utilize mindfulness. Homework included daily planned ERP tasks and monitoring of engagement in these tasks, though participants were encouraged to also conduct unplanned ERP tasks when facing obsessional cues. One study (Mathur et al., 2021) informally embedded exposure in their treatment by placing emphasis on having participants purposely approach obsession-inducing stimuli. Their protocol included 12, 35–40-minute sessions with nine sessions including formal mindfulness practice and six sessions emphasizing in-session and between-session exposures.

During these exposures, participants were not asked to prevent compulsions, but rather to apply their mindfulness skills (e.g., present moment awareness).

Overview of MBCT Study Design Characteristics

Table 2 provides an overview of the design characteristics of 10 studies of MBCT integrated into the treatment of OCD. Three of the studies (Cludius et al., 2020; Hertenstein et al., 2012; Külz et al., 2019) are linked. Külz and collaborators adapted the Segal et al. (2002) MBCT protocol for patients with OCD. Hertenstein et al. (2012) reported on its acceptability and feasibility, and Cludius et al. (2020) reported on the 12-month follow-up. Sguazzin et al. (2017) and Leeuwerik et al. (2020) collected qualitative data as part of broader quantitative studies by Key et al. (2017), and Strauss et al. (2018) respectively. Chien et al. (2022) is not included in Table 2 as it is a meta-analysis of MBIs for OCD. Thus, the following is based on the six *independent* studies that are not linked or meta-analyses (Key et al., 2017; Külz et al., 2019; Mathur et al., 2021; Selchen et al., 2018; Strauss et al., 2018; Zhang et al., 2021).

Treatment Participants

Of the six RCTs of MBCT in the treatment of OCD, all utilized clinical outpatient samples; three recruited from specialized anxiety disorder clinics (Mathur et al., 2021; Selchen et al., 2018; Key et al., 2017), one from a National Health Service Mental Health Trust in England (Strauss et al., 2018), and two from university-affiliated outpatient mental health centers (Külz et al., 2019; Zhang et al., 2021).

Treatment Conditions

Three of the studies (Külz et al., 2019; Key et al., 2017; Selchen et al., 2018) tested the efficacy of MBCT as a follow-up treatment for patients with residual OCD symptoms following CBT/ERP treatment. Two studies investigated the efficacy of MBCT as a standalone treatment

(Mathur et al., 2021; Zhang et al., 2021). One study compared mindfulness-based ERP to traditional ERP (Strauss et al., 2018).

Dose

Treatment ranged from 120 minutes/week over eight weeks (Key et al., 2017; Külz et al., 2019; Selchen et al., 2018) to 150 minutes/week over 10 weeks (Zhang et al., 2021). Mathur et al. (2021) modified treatment to be 35-40-minute weekly sessions over the course of 12 weeks. Therefore, the "dose" ranges from 480 minutes (Mathur et al., 2021) to 1500 minutes (Zhang et al., 2021). All treatment studies assigned between-session practice that was meant to increase the dose. While some studies did not explicitly report the number of minutes participants were expected to engage in mindfulness practice between sessions, an approximate range was 140 minutes (Key et al., 2017) to 600 minutes (Zhang et al., 2021).

Sample Size

Overall sample sizes of the studies vary between 36 (Key et al., 2017) and 125 (Külz et al., 2019).

Group Size

All studies involved the delivery of group treatment. Four of the studies (Key et al., 2017; Külz et al., 2019; Selchen et al., 2018; Zhang et al., 2021) reported 6-10 participants on average per group. Group size was not reported in two studies (Mathur et al., 2021; Strauss et al., 2018).

Exclusion Criteria

Frequently used exclusion criteria are those conditions that would need to be addressed before treatment of OCD such as suicidal behavior (Külz et al., 2019; Selchen et al., 2018; Zhang et al., 2021), severe depression (Külz et al., 2019; Zhang et al., 2021), current manic

episode/bipolar disorder (Mathur et al., 2021; Selchen et al., 2018; Zhang et al., 2021) psychosis (Külz et al., 2019; Mathur et al., 2021; Selchen et al., 2018; Zhang et al., 2021); and substance abuse (Külz et al., 2019; Mathur et al., 2021; Selchen et al., 2018; Strauss et al., 2018; Zhang et al., 2021). In addition, some studies required participants to not receive other psychotherapy during the study (Mathur et al, 2021; Selchen et al., 2018; Zhang et al., 2021).

Inclusion Criteria

Primary diagnosis of OCD as assessed by the Structured Clinical Interview for DSM Disorders (SCID; First et al., 2002) for Mathur et al., 2021 and Selchen et al., 2018; The Mini International Neuropsychiatric Interview 5.0 (MINI; Sheehan et al, 1998) for Mathur et al., 2021, Strauss et al., 2018, and Zhang et al., 2021. Külz et al., 2019 used the Yale-Brown Obsessive Obsessive-Compulsive Scale (Y-BOCS; Goodman et al., 1989). Previous diagnosis by the study-specific outpatient clinic was used by (Key et al., 2017). One study included participants with a Y-BOCS score equal to or greater than 14 (Key et al., 2017), one greater than 16 (Selchen et al., 2018), and one greater than 20 (Mathur et al., 2021). Zhang et al. (2021) included participants with a Y-BOCS score greater than 12 and less than 24. Külz et al. (2019) included participants with a Y-BOCS global score greater than 12 or a subscore (obsessions or compulsions) equal to or greater than 8. One study (Strauss et al., 2018) did not report specific Y-BOCS cutoff inclusion criteria. In terms of medication, one study required participants to be medication free for eight weeks prior to treatment (Zhang et al., 2021); two studies required participants to be on a stable medication dose for 3 months (Key et al., 2017; Strauss et al., 2018), one for 4 months (Külz et al., 2019), and one for 2 months (Mathur et al., 2021). All required there to be no changes in medication dose during treatment.

Comorbidity

Only two studies specified comorbidities (Mathur et al., 2021; Key et al., 2017). Mathur et al. (2021) reported that MDD and personality disorders were overrepresented in the study control group as compared to the MBCT group. Key et al. (2017) reported the majority mean number of comorbid diagnoses to be 2.3 (SD = 1.2). They also reported the most common comorbid diagnoses in order of prevalence in their sample to be social anxiety disorder (50%), MDD (19.2%) generalized anxiety disorder (11.5%), panic disorder (11.5%), alcohol abuse (3.9%), and eating disorder (3.9%). A very large percent of their sample (89%) were concurrently taking psychoactive medication.

Attrition

There was minimal variation in the number of participants dropping out from the studies with attrition below average and ranging from 5-33%. The range for the MBCT intervention groups was 5-27.7%. Previous studies have reported a drop-out rate of 14.7% and approximate attrition rate (refusal plus drop-out) to be 18.7% for ERP (Ong et al., 2016). Most cases did not report significant differences in drop-out rates by condition but did confirm that there were no significant differences in demographic characteristics and baseline data between participants who did and did not complete treatment.

Follow-up

Of the six RCTs, three studies did not include a follow-up (Key et al., 2017; Mathur et al., 2021; Selchen et al., 2018), and three included a 6-month follow-up (Külz et al., 2019; Strauss et al., 2018; Zhang et al., 2021). In addition to the six studies, Cludius et al. (2020) completed a 12-month follow-up of the participants in the Külz et al. (2019) study.

Homework Assigned/Compliance

Of the six studies, all explicitly reported assigned homework and only one (Mathur et al., 2021) formally measured compliance. There was no uniformity to the amount of homework assigned and whether both control and intervention groups received comparable assignments. Four of the six studies did not *explicitly* report amount of homework. Of the two studies that did, Key et al. (2017) assigned 20-25 minutes/day and Zhang et al. (2021) encouraged 1-hour of mindfulness practice/day. Külz et al. (2019) and Selchen et al. (2018) *inferred* that the between-session practice followed the MBCT treatment manual (45-60 minutes/day).

Methodological Quality

The overall POMRF rating, 0-44, serves as a quality appraisal of the source with higher overall scores indicative of greater methodological rigor. The scores for the six independent studies range from 28-40. Mean POMRF score for the MBCT studies was 29.77, with a standard deviation of 4.39.

Efficacy of MBCT for OCD: Primary Outcome Measures

Table 3 provides an overview of the primary outcome measures of the included MBCT for OCD studies, with the exception of the meta-analysis by Chien et al. (2022).

Quantitative Studies

Meta-Analysis. Chien et al. (2022) conducted a systematic review and meta-analysis with 10 studies that included RCTs or quasi-experimental designs with both active or inactive control groups. The researchers included studies with patients from inpatient or outpatient settings with a primary diagnosis of OCD, and that examined treatment outcomes using MBIs for OCD. The treatment effects of the MBIs were pooled with respect to the primary outcome of severity of OCD symptoms, and the secondary outcomes of depression, obsessive beliefs, and

mindfulness skills. The researchers attempted to separate meta-analyses for follow-up immediately, medium term (1-6 months) and long term (7-12 months) post-intervention. However, due to there being less than 3 eligible studies that reported the medium- or long-term effects, individual study outcomes were reported. The pooled analysis found a significant reduction in OCD symptom severity at post-treatment for both active and inactive controls. In the subgroup analysis, the investigators reported this advantage only held for the self-report outcome measures such as the Obsessive-Compulsive Inventory-Revised (OCI-R; Foa et al., 2002) and not for clinician-rated outcomes measures such as the Y-BOCS. Regarding secondary outcomes, when compared to controls, MBIs had a significant effect on depression symptoms and mindfulness skills but did not differ from controls on obsessive beliefs. As mentioned above, there were too few studies to report differences at follow-ups.

MBCT for Residual OCD Symptoms. Three studies (Külz et al., 2019; Key et al., 2017; Selchen et al., 2018) tested the efficacy of MBCT for patients with residual symptoms after engaging in CBT treatment for OCD. Külz et al. (2019) conducted a RCT of 125 participants with OCD that compared an eight-week, 120-minute/week MBCT program for OCD with a psychoeducational group program designed by the authors as an active control condition. Although significantly greater benefit was found for the MBCT group in secondary outcomes (described in next section) the groups did not differ with respect to a reduction of clinician rated symptoms of OCD (Y-BOCS). At post-treatment, MBCT participants reported significantly lower OCD symptom severity than psychoeducation patients on the OCI-R, but clinician reports of OCD symptom severity (Y-BOCS) did not differ across groups. Moreover, differences between groups in patient self-report were no longer significant at 6-month follow-up.

In a 12-month follow-up of Külz et al. (2019), Cludius et al. (2020) examined the longer-term efficacy of MBCT for OCD. On the Y-BOCS, a significant reduction of OCD symptoms was found with a large effect size for both conditions. However no significant differences were found between the two groups.

Key et al. (2017) examined an eight-week, 120-minute/session MBCT intervention adapted for OCD utilizing a randomized waitlist control (WLC) design with 36 total participants. The investigators sought to evaluate MBCT as a supplement for patients who have significant OCD symptoms following CBT/ERP treatment. Compared with the WLC, participants at post-treatment in the MBCT condition showed statistically significant improvements in OCD symptom severity on the Yale-Brown Obsessive-Compulsive Scale, Self-report (Y-BOCS-SR; Baer et al., 2006) as well as significant improvements on all secondary outcomes (described in next section). It should also be noted that in the MBCT condition, participants reported a reduction in Y-BOCS-SR scores, while the WLC condition participants reported an increase in their Y-BOCS-SR scores.

Selchen et al. (2018) conducted a pilot experimental design to compare the relative efficacy of MBCT as a treatment for two participant streams: 1) participants who had not previously received CBT for OCD, and 2) participants with residual symptoms following previous group CBT treatment for OCD. Their study tests the potential efficacy of an eight-week course of MBCT adapted for the treatment of OCD, both as an adjunctive treatment and as a standalone treatment. The sample size was 37 participants and MBCT for OCD consisted of 120-minute group sessions for eight weeks. Both MBCT alone and MBCT following CBT resulted in significant OCD symptom improvement pre-to-post follow-up (Y-BOCS-SR) as well as improvements in secondary outcomes (as described below).

MBCT as Standalone Treatment for OCD. In addition to Selchen et al. (2018), two other studies investigated the efficacy of MBCT for OCD as a standalone treatment (Mathur et al., 2021; Zhang et al., 2021). Mathur et al. (2021) conducted a two-arm parallel design RCT comparing MBCT to an active control condition of Stress Management Training (SMT) based on the workbook by Davis et al. (2008). The sample size was 60 and MBCT was delivered in a structured 12-session program once a week for 35-40 minutes. The participants in the MBCT condition showed a significant reduction in OCD symptom severity (Y-BOCS-SR) compared to those in the SMT condition. The superiority of MBCT held up even when controlling for the larger drop-out rate in SMT.

Zhang et al. (2021) conducted a randomized, actively controlled clinical trial with three study arms: SSRI, MBCT and Psychoeducation (PE). The sample was 123 unmedicated participants with mild to moderate symptoms of OCD. Similar to Külz et al. (2019), at post-treatment, the MBCT and SSRI treatment groups had a more positive treatment response on the Y-BOCS, while at 6-month follow-up there were no significant treatment response differences among the three groups.

Hybrid Mindfulness-Based ERP. Strauss et al. (2018) conducted an internal pilot RCT with two parallel-groups. The researchers compared ERP and mindfulness-based ERP (MB-ERP), a combination of group ERP with MBCT-informed components. This was meant to test whether any additional gains could be attained by integrating mindfulness with traditional ERP. The sample was 37 participants recruited from two sites within the National Health Service Mental Health Trust. Both groups consisted of 10, 120-minute sessions. Both MB-ERP and ERP and traditional ERP patients showed improvements in OCD symptoms and there were no statistically significant group differences post-treatment and at 6-month follow-up.

In sum, evidence from these quantitative studies suggest that MBCT, either as a standalone or hybrid treatment, or adjunctive treatment for residual symptoms is associated with statistically significant change in OCD symptom severity. However, in comparison to active control conditions such as standard ERP, PE, and SMT, MBCT may have comparable effects but no superiority. The only studies that showed superior results with MBCT were Key et al. (2017), which used a passive WLC condition, and Mathur et al. (2021) which only included pre- and post-treatment measurement without follow-up. This summary underscores the importance of including a follow-up that allows for tracking gains over time and the stability of improvements. Some of the studies that showed significant improvements in symptom severity at post-treatment were not significantly different than controls at follow-up. This may reflect the chronic nature of OCD and the need for "booster sessions" and/or continued practice.

Qualitative Studies

Sguazzin et al. (2017) presented the qualitative data that was collected as part of the quantitative 2017 study by Key et al. described above in the MBCT for Residual OCD Symptoms section. Sguazzin et al. (2017) enrolled seven of the 36 participants into a pilot phase. These participants bypassed randomization and were placed directly in the eight-week MBCT group for OCD. Within two weeks post-treatment, these participants completed a 21-item satisfaction questionnaire developed by the lead author and based on the Client Satisfaction Questionnaire (CSQ; Attkisson & Zwick, 1982). The results are based on 32 participants that included the seven pilot subjects and 25 of the randomized subjects from Key et al. (2017). Using an inductive thematic approach, key themes were identified. Overall findings supported the efficacy and acceptability of MBCT for OCD as an augmentative strategy for residual symptoms post-CBT treatment. 63% of the interviewees reported a perceived decrease of OCD

symptom severity and 72% of the participants reported significant gains from the social support, both from group members and the group leaders.

A workgroup headed by Elizabeth Külz, Nina Rose and Thomas Heidenreich co-designed the MBCT for OCD manual that was piloted with 12 subjects, and the findings were reported by Hertenstein et al. (2012). The aim of the 2012 study was to obtain firsthand feedback from study participants about what they did and did not find useful so as to modify and improve the MBCT for OCD manual. They assessed the subjective experiences of the participants through a semi-structured interview developed by their workgroup. Five overarching themes emerged from the qualitative content analysis, including 1) Being in a group, 2) Mindfulness Exercises, 3) Effects, 4) Struggle, and 5) Modification, with subthemes. Overall, two-thirds of participants reported a decline in OCD symptoms. Some of the main benefits reported included developing a more mindful relationship to one's symptoms of OCD and increased willingness to experience unpleasant states. The findings also suggested that mindfulness training may lead to benefits beyond symptom reduction and manifest in how patients relate to their experience and overall well-being.

Leeuwerik et al. (2020) examined participants' subjective experiences of change over the 10-week MB-ERP intervention in the Strauss et al. (2018) study. They designed an eight-section semi-structured Change Interview adapted from Elliot et al. (2001). The interview was designed to survey the participants' experience of the intervention, and accounts for any changes they perceived pre-to-post treatment. 74% of the 19 participants randomly assigned to MB-ERP in Strauss et al., (2018) completed the semi-structure interview. The most frequently reported changes included OCD symptom reduction (71%), increased ability to manage OCD (64%) and reduced anxiety (50%).

Taken together, these qualitative studies do suggest participants found the mindfulness-informed treatments for OCD beneficial and acceptable. However, existing studies are limited by utilizing retrospective post-treatment interviews, focusing solely on MBCT interventions, and not comparing the subjective accounts with participants' quantitative data. The qualitative data is a valuable source for assessing utility and refining the protocols.

Efficacy of MBCT for OCD: Secondary Outcome Measures

Table 4 provides an overview of secondary outcome measures of the included MBCT for OCD studies, including depression, anxiety, QoL, mindfulness, and obsessive beliefs. It should be noted that Table 4 reports on *seven* studies, as the Cludius et al. (2020) 12-month follow-up study on Külz et al. (2019) is also included. All the MBCT studies in this systematic review included the measurement of depression and mindfulness, and all but one (Zhang et al., 2021) included a measure of obsessive beliefs. Other outcomes such as QoL and anxiety were less common. Overall, only one study (Key et al., 2017) found broader benefits of MBCT when compared to control groups on secondary measures, and one study (Strauss et al., 2018) documented one significant benefit on the mindfulness measure. Details of the secondary measures are provided below.

Depression

The measures of depression include the Beck Depression Inventory-II (BDI-II; Beck et al., 1996), the Montgomery Asberg Depression Rating Scale (MADRS; Montgomery et al., 1979), the Hamilton Depression Scale-24 (HAM-D24; Zimmerman et al., 2013; Zimmerman et al., 2017). Comparing PE with MBCT, Külz et al. (2019) reported greater improvement in depression symptoms on the BDI-II for MBCT at post-treatment, but no differences at 6-month follow-up. In the 12-month follow-up study by Cludius et al. (2020), a significant within-subject

reduction of depression for both MBCT and PE was reported, but no significant differences between the two groups. Contrary to predictions, Mathur et al. (2021) found that SMT was as effective as MBCT in reducing severity of depression on the MADRS. Selchen et al. (2018) reported significant improvement in reported depression on the BDI-II at post-treatment for both pre- and post-CBT groups. Strauss et al. (2018) reported only between-group comparisons, with negligible group effect sizes between MB-ERP and ERP. Zhang et al. (2021) reported significant interaction of time point and intervention on the HAM-D24, but this was not clearly stated and complicated by differences between comparison groups at baseline.

Anxiety

Three included studies measured the effectiveness of MBCT for reducing the severity of anxiety symptoms (Key et al, 2017; Mathur et al., 2021; Zhang et al., 2021) using the Beck Anxiety Inventory (BAI; Beck & Steer, 1990) or the Hamilton Anxiety Rating Scale (HARS; Hamilton, 1959). Key et al. (2017) detected significant differences between WLC and MBCT groups in self-reported anxiety on the BAI. The WLC group reported increases in anxiety over the eight weeks while participants who received MBCT reported significant decreases in anxiety. Similarly, Mathur et al. (2021) found significant between-group difference pre-to-post-test. Participants in the MBCT group reported significantly less anxiety on the HARS than the SMT group. Also measured by the HARS, Zhang et al. (2021) reported all treatment groups showed a significant reduction in anxiety, but no significant differences at post-treatment and at 6-month follow-up.

QoL

QoL, a target of MBCT, was measured pre-and post-treatment in four of the included studies. Using the Abbreviated World Health Organization Quality of Life (WHOQL-BREF;

Power et al., 1999). Külz et al. (2019) and Cludius et al. (2020) in the 12-month follow-up, reported that the QoL ratings were significantly higher in the MBCT group as compared to PE at post-treatment, but at 6- and 12-month follow-up the group difference was no longer significant. However, both groups continued to show improvement. Both Mathur et al. (2021), and Zhang et al. (2021) found negligible differences in WHOQL-BREF scores between MBCT and active control groups (SMT and PE, respectively).

Obsessive Beliefs

Obsessive beliefs was the most uniformly measured secondary outcome with all five studies using a variant of the Obsessive-Beliefs Questionnaire (OBQ; Obsessive Compulsive Cognitions Working Group, 2003, 2005). Key et al. (2017) was the only included study that reported significant decreases in OBQ scores in comparison to its control group. All other studies (Cludius et al., 2020; Külz et al., 2019; Selchen et al., 2018; Strauss et al., 2018) found significant improvements within groups, but no between-group differences at follow-up.

Mindfulness

Mindfulness, a key target outcome of MBCT, was measured in all studies using either the Five Facet Mindfulness Questionnaire (FFMQ; Bohlmeijer et al., 2011), the Kentucky Inventory of Mindfulness Skills (KIMS; Höfling et al., 2011), or the Freiberg Mindfulness Inventory (FMI; Walach et al., 2006). Comparing PE versus MBCT interventions, Külz et al. (2019) found significantly more improvements in mindfulness (KIMS) at post-treatment but no differences at follow-up. Mathur et al. (2021) found no significant differences post-treatment in mindfulness (FMI) when comparing MBCT to an active control (SMT), and Selchen et al. (2018) found no differences at post-treatment between the post-CBT, MBCT group or the MBCT-only group. Strauss et al. (2018) reported when compared to ERP, the addition of a mindfulness component

resulted in significant improvements in mindfulness (FFMQ) at post-treatment and at 6-month follow-up.

In sum, MBCT, either as a standalone, hybrid, or adjunctive treatment is associated with improvements in depression and anxiety and improvements in QoL, mindfulness, and reduction in obsessive beliefs. However, in comparison to active control conditions such as standard ERP, PE, SMT and Cognitive Therapy (CT), MBCT may have comparable effects but no superiority.

How ACT-Informed Treatments are Adapted for OCD

Table 5 provides an overview of the ways in which the included studies adapted ACT, with and without ERP, for the treatment of OCD. Four studies included in Table 5 describe the ways in which ACT and ERP have been utilized in the treatment of OCD, with three describing hybrid treatments (Capel et al., 2022; Twohig et al., 2018; Wheeler, 2017) and one describing a sequential treatment (Thompson et al., 2021). The 2020 study by Ong et al. is a secondary analysis of Twohig et al. (2018), and therefore omitted from Table 5. Moreover, Twohig et al. (2010b) utilized the same treatment protocol as that from Twohig et al. (2010a) and is not included in the table.

As seen in Table 5, despite the many ACT concepts alongside ERP, there is variability in terms of how they are introduced and integrated. All studies had a minimum duration of 13 sessions and session length spanned 45-180 minutes. Common ACT concepts across all four protocols included defusion, expansion/acceptance, and values, as well as the ERP components of in-session exposure and creation of a version of a fear hierarchy.

ACT / ERP Hybrid Studies

ACT-Specific Inclusions. The following describe the ACT-specific inclusions from the three ACT/ERP hybrid treatment studies included in Table 5 (Capel et al., 2022; Twohig et al., 2018; Wheeler, 2017).

Assessment. Wheeler (2017) and Capel et al. (2022) both incorporated the ACT concept of creative hopelessness to their protocols, which assesses what participants have done in the past to address their symptoms. Creative hopelessness is a process to help participant(s) evaluate how their attempts to control or avoid their symptoms have not worked and what it has cost them, so they can let go of what is not working and feel hopeful about a more workable approach (Harris, 2017). Capel et al. (2022) also included an assessment of PF, a core target of ACT.

ACT Concepts. All three studies incorporated the ACT concepts of defusion, willingness and/or acceptance, and values. Wheeler (2017) and Capel et al. (2022) explicitly included the concepts of present moment awareness, urge surfing, committed action, and self-as-context.

Relapse Prevention/Termination. Twohig et al. (2018) utilized an ACT model of relapse prevention. Wheeler (2017) summarized treatment with the patient and reviewed values.

ERP-Specific Inclusions. The following describe the ERP-specific inclusions from the three ACT/ERP hybrid treatment studies included in Table 5 (Capel et al., 2022; Twohig et al., 2018; Wheeler, 2017).

Fear Hierarchy. Wheeler (2017) and Capel et al. (2022) included the creation of a fear hierarchy with activities in accordance with the participant(s') values. Twohig et al. (2018) created a more traditional ERP fear hierarchy but emphasized that the hierarchy would be carried out with flexible responding in the presence of obsessions, anxiety, and compulsive urges.

Exposure. All 3 studies incorporated in-session exposures.

Hybrid-Specific Inclusions. The following describe the non-ERP or ACT-specific inclusions from the three ACT/ERP hybrid treatment studies included in Table 5 (Capel et al., 2022; Twohig et al., 2018; Wheeler, 2017).

Monitoring. As opposed to monitoring Subjective Units of Distress (SUDs) as traditional to ERP, two studies (Capel et al., 2022; Twohig et al., 2018) had participants monitor *willingness* to experience anxiety/discomfort and between-session exposures emphasized values-based choices and flexible responding.

Homework. Between-session exposure was explicitly reported in two studies (Capel et al., 2022; Twohig et al., 2018) and were based on participants' values and flexible responding. Between-session exposure was also inferred by Wheeler (2017), who indicated that the participant re-engaged with valued activities as part of her "hierarchy of goals" she had previously avoided as a result of her OCD symptoms.

ACT / ERP Sequential Study

Rather than a hybrid between ERP and ACT, Thompson et al. (2021) utilized a sequential approach of ERP and ACT in the treatment of OCD. Treatment included weekly, 45-minute sessions, consisting of either four initial ERP sessions, four ACT sessions, and eight ERP sessions *or* eight initial ERP sessions, four ACT sessions, and four ERP sessions. The researchers adapted ERP from treatment protocols by Foa et al. (2012) and Yadin et al. (2012) with sessions shortened to 45 minutes. In-session and between-session exposures were conducted during the ERP phases in accordance with the fear hierarchy created during the assessment phase. In both conditions, the ACT phase of treatment consisted of four sessions, adapted from Eifert and Forsyth (2005) and included experiential exercises to introduce the following:

mindfulness, creative hopelessness, defusion (with obsessive thoughts), acceptance (of OCD-related thoughts and feelings), values, and self-as-context.

Standalone ACT for OCD Studies

Four studies included in Table 5 describe the ways in which ACT has been adapted as a standalone treatment of OCD (Twohig et al., 2010a; Twohig et al., 2010b, Vakili et al., 2015; Zemestani et al., 2022). Two studies adapted ACT for OCD as a standalone treatment compared to active controls. Twohig et al. (2010a) utilized Progressive Relaxation Training (PRT) adapted from Bernstein et al. (2000), and Twohig et al. (2010a) utilized CT and ERP. One study compared ACT for OCD plus SSRI treatment to ERP plus SSRI treatment (Zemestani et al., 2022), and one study compared ACT for OCD with and without SSRI treatment to SSRI treatment alone.

There is considerable homogeneity between the protocols for these studies as seen in Table 5, as they are all based on the same ACT for OCD manual utilized in the 2010a study by Twohig et al. All four studies addressed PF, creative hopelessness, defusion, willingness and/or acceptance, present moment awareness, committed action, self-as-context, values, and relapse prevention in the context of OCD symptomatology. Traditional components of ERP, including creation of a fear hierarchy, in-session exposure, and monitoring (e.g., SUDs) were not applicable to these studies. Behavioral commitments were utilized as ways for participants to engage in values-based activities regardless of nature or intensity of the participant's symptoms. Aligned with the theoretical model of ACT, the focus was on willingness to experience obsessions and anxiety rather than habituation. Notable cultural adaptations in Zemestani et al. (2022) study include an increase in sessions from eight to twelve to avoid non-attendance, two

sessions dedicated to discussing general attitude toward mental health problems, OCD, and psychotherapy, and use of culturally appropriate metaphors.

Overview of ACT Study Design Characteristics

Table 6 provides an overview of the design characteristics of the nine included studies adapting ACT for the treatment of OCD. Studies varied in terms of methodological rigor, treatment components and sample characteristics. Ong et al. (2020) data was drawn from Twohig et al. (2018) as a secondary analysis. Therefore, study characteristics are based on eight independent studies.

Treatment Setting

Of the eight studies examining ACT in the treatment of OCD, six were clinical outpatient samples, one an intensive outpatient treatment sample (Capel et al., 2022), and one sample was recruited from a private practice (Thompson et al., 2021). All studies utilized individual treatment.

Implementation

Three studies utilized ACT and ERP hybrid treatments (Capel et al., 2022; Twohig et al., 2018; Wheeler, 2017). Four studies utilized ACT only (Twohig et al., 2010a; Twohig 2010b; Vakili et al., 2015; Zemestani et al., 2022). Thompson et al. (2021) utilized a novel approach with sequential ACT and ERP.

Treatment Manuals

Six of the included studies used manuals developed by Twohig et al. (2010a, 2015) modified by the individual investigators. One study (Thompson et al., 2021) used the method developed by Eifert & Forsyth (2005), and one study (Wheeler, 2017) adopted various ACT exercises from Harris (2008, 2013) and Luoma (2013). Common components across treatments

included concepts such as cognitive defusion, self-as-context, mindfulness, clarification of values, and engagement with value-based activities. However, there is considerable variability in the way ACT was implemented across the studies which affects interpretations of the results.

Dose

Overall number of treatment hours ranged from 8 hours over eight weeks (Twohig et al., 2010a) to 45 hours over a three-week period in an IOP setting (Capel et al., 2022). The average dose was 18.6 hours.

Sample Size

Sample size of the studies vary between four (Thompson et al., 2021) and 79 (Twohig et. al., 2010a), save one case study (Wheeler, 2017) with one participant.

Exclusion Criteria

Frequently used exclusion criteria include suicidal behavior (Twohig et al, 2018; Vakili et al., 2015; Zemestani et al., 2022), severe depression (Twohig et al., 2018; Vakili et al., 2015; Zemestanti et al., 2022), current manic episode/bipolar disorder (Twohig et al, 2018; Zemestani et al, 2022), psychosis (Twohig et al., 2010a; Twohig et al., 2018; Vakili et al., 2015; Zemestani et al., 2022) and substance-abuse (Zemestani et al., 2022). Other studies also excluded various personality disorders (Twohig et al, 2018; Vakili et al., 2015; Zemestani et al., 2022), and disabilities that would preclude participation such as thought disorder and ASD (Thompson et al., 2021).

Inclusion Criteria

Primary diagnosis of OCD was determined by the SCID (Capel et al, 2022; Thompson et al., 2021; Twohig et al., 2010a; Twohig et al., 2010b; Vakili et al., 2015; Zemestani et al., 2022), MINI (Twohig et al., 2018), or Y-BOCS + OCI-R (Wheeler, 2017); Medication free or stable

and no changes during the study (Twohig et al., 2010a; Twohig et al., 2018; Vakili et al., 2015; Zemestani et al., 2022), no previous trial of ACT or ERP (Thompson et al, 2021; Twohig et al., 2018), Y-BOCS score > 16 (Zemestanti et al., 2022), and OCD symptoms present > 1 year (Vakili et al., 2015).

Comorbidity

All studies except for Capel et al. (2022) reported comorbid conditions. Of the studies that reported comorbid conditions, no significant differences between intervention and comparison groups were found at baseline. A tabulation of the reported comorbid conditions across studies included MDD and other mood disorders (N=63) and anxiety disorders (N=55). Three studies reported the frequency of co-occurring diagnoses per individual per condition (Twohig et al., 2010a; Twohig et al., 2010b; Twohig et al., 2018).

Attrition

There was variation in attrition rate from the included studies (1-17%) with no significant differences in drop-out rate by intervention.

Follow-up

Of the eight studies (Ong et al., 2020; data drawn from Twohig et al., 2018) examined, one included a 1-month follow-up (Capel et al., 2022), one included a 3-month follow-up (Twohig et al., 2010a), and two included 6-month follow-up (Twohig et al., 2018; Zemestani et al., 2022). The remaining four did not include any follow-up (Thompson et al., 2021; Twohig et al., 2010b; Vakili et al., 2015; Wheeler, 2017).

Homework Assigned/Compliance

Of the eight studies, all but Vakili et al. (2015) explicitly assigned or encouraged practice between sessions. Two studies reported on time commitments. Thompson et al. (2017) assigned

45 minutes and Zemestani et al. (2022) assigned 30 minutes of home practice. Twohig et al. (2018) was the only study to include a formal measure of client compliance.

Methodological Quality

The overall POMRF rating, 0-44, serves as a quality appraisal of the source with higher overall scores indicative of greater methodological rigor. The scores for the 8 studies range from 16-36. Mean POMRF for the included ACT studies was 26.87 with a standard deviation of 7.19, with one study below and two studies above the standard deviation.

Efficacy of ACT for OCD: Primary Outcome Measures

Table 7 provides an overview of primary outcome measures of the included ACT for OCD studies with the exception of the meta-analysis by Soondrum et al. (2022).

Meta-Analysis

Soondrum et al. (2022) conducted a systematic review and meta-analysis with 14 included studies to examine the efficacy of ACT for OCD as a standalone therapy against well-defined treatments such as medication (SSRIs) and ERP. All the included studies used ACT with some using medication, placebo, WLC, PRT and other therapies (i.e., narrative therapy, ERP) as comparison groups. The intervention duration ranged from 3-20 weeks. The authors pooled the treatment effects for both primary outcomes of OCD symptoms, and secondary outcomes of depression, obsessive beliefs, and mindfulness skills. The overall effects of ACT in reducing OCD symptom severity on the Y-BOCS were statistically significant with a large effect size. However, the authors speculated that the type of control conditions may play a significant role in the results. Soondrum et al. (2022) found that ACT was superior in reducing symptom severity when compared to inactive control groups such as WLC and placebo, but equivalent when

compared with active controls, such as narrative therapy and ERP. ACT was, however, more effective at reducing symptoms of obsessions when compared to using SSRIs alone.

Standalone ACT for OCD Studies

Two studies tested the efficacy of ACT as a standalone treatment for OCD. ACT was examined in a randomized clinical trial of ACT versus PRT for 79 adults with chronic (M = 20.5 years) OCD (Twohig et al., 2010a). The intervention consisted of eight, 60-minute weekly sessions of ACT or PRT. Using an intent to treat analysis, results found a significant difference in clinician administered Y-BOCS scores between the ACT and PRT conditions at post-treatment ($p = .002$, effect size = .77) and 3-month follow-up ($p < .009$, effect size = .62). Using Jacobson methodology (Jacobson & Traux, 1991) the ACT group produced clinically significant change at both post-treatment and 3-month follow-up.

Twohig et al. (2010b) conducted a study with a small sample of six participants comparing ACT to CT and ERP with two participants in each condition. Participants received twelve 1-hour sessions over a 12-week period. While the initial aim of the study was to examine shared and distinct processes of change, OCD severity scores on the clinician administered Y-BOCS were gathered at pre-and post-treatment. In addition, weekly changes were measured with two questions: time occupied by obsessive thoughts (question 1 on the Y-BOCS) and time spent performing compulsions (question 2 on the Y-BOCS). Twohig et al. (2010b) used visual inspection of obsession and compulsion scores to assess impact of the interventions. The results showed four of six participants who reported *obsessions* to be problematic and four of five participants who reported *compulsions* to be problematic experienced a significant decrease in symptoms both on the Y-BOCS pre- and post-treatment measures and the weekly reports.

ACT and SSRI Treatment Studies for OCD

Vakili et al. (2015) compared the effectiveness of ACT, SSRI treatment, and combination of ACT+SSRI treatment in 32 adults also with chronic OCD (inclusion for study was symptom duration of at least a year). The intervention consisted of eight, 90-minute weekly sessions for the ACT and ACT+SSRI groups. While all three treatments reduced total scores on the clinician-administered Y-BOCS, both the ACT and ACT+SSRI treatments resulted in significantly greater improvements in OCD symptom severity. Clinically significant change was defined as a Y-BOCS score reduction of eight points or more, and final Y-BOCS score of less than or equal to 14. Using these cutoffs, 44% of ACT, 40% of ACT+SSRI and only 23.5% of SSRI-alone participants attained clinically significant change. No significant differences were found between the ACT and ACT+SSRI group on any measure.

Zemestani et al. (2022) compared ACT or ERP as adjunctive therapies to medication (SSRIs) among 38 participants formally diagnosed with OCD. The ACT+SSRI and ERP+SSRI treatments were both highly effective with significantly larger symptom reduction than SSRI-only treatment. While no statistical test was reported, Zemestani et al. (2022) reported lower OCD symptom severity in the ACT+SSRI treatment participants than the ERP+SSRI treatment participants at follow-up.

ACT / ERP Hybrid Studies

Four studies tested the efficacy of a hybrid of ACT and ERP. Capel et al. (2022) examined the effectiveness of a combined ACT and ERP treatment for OCD in an Intensive Outpatient Program (IOP) setting with eight adults. The intervention consisted of 3-hour sessions, 5 days a week for three weeks. All participants showed statistically significant improvement in OCD symptom severity (Y-BOCS) from baseline to post-treatment that were

maintained at the 1-month follow-up yielding a 58% decrease from “severe” to “below clinical levels.”

In a single case study (Wheeler, 2017), a hybrid of ACT and ERP was used to treat a woman in her mid-20’s who was referred for anxiety and mood changes related to her OCD. The patient’s onset of symptoms was gradual over the past three years. She had previous courses of CBT which she described to be “unhelpful.” The ACT/ERP intervention included 15 scheduled 1-hour psychotherapy sessions over the course of 3.5 months. Assessment of changes in OCD symptom severity were measured throughout the course of treatment with the Y-BOCS-SR (baseline and weeks 6, 10, and 13) and the OCI-R (baseline and weeks 7, 10, and 13). OCD symptoms on the OCI showed reliable and clinical change with post-intervention scores below clinical cutoff for OCD. The Y-BOCS-SR changed from 29 (“severe”) to 15 (“mild”). Although the clinical change was not indicated across all the measures, the severity of symptoms decreased significantly.

Twohig et al. (2018) compared an ACT/ERP hybrid treatment to ERP alone to test whether any additional gains could be attained by integrating ACT. They modified ERP by framing exposure as opportunities to practice and foster PF as well as act in accordance with one’s values. 58 participants were randomized to the two interventions. Both therapies were delivered in 16 individual bi-weekly, 120-minute sessions. The primary outcome measure was a decrease in OCD symptom severity which was assessed using the clinician administered Y-BOCS and the Dimensional Obsessive-Compulsive Scale-Self Report (DOCS-SR; Abramowitz et al., 2010). Both interventions showed significant reduction in symptom severity pre- to post-treatment with gains maintained at follow-up. Contrary to prediction, there were no significant differences between the interventions on any symptom outcome.

ACT / ERP Sequential Study

Thompson et al. (2021) examined a sequential ERP and ACT treatment in four individuals with OCD. The participants were randomized to start with four or eight ERP sessions followed by four ACT sessions, and finish with the opposite number of ERP sessions they had initially. Overall ACT was four sessions and ERP was 12 sessions across groups. Measures were taken pre-treatment, mid-treatment, and post-treatment to allow for a time series analysis. This study was conducted within a private practice, with 45-minute sessions per week for 12 weeks. Clinician administered Y-BOCS for three of the four participants had > 35% reduction reflective of treatment response. OCI-R scores of the four participants were below the cutoff for clinically significant OCD symptoms at post-treatment.

In sum, evidence from these eight studies indicate that ACT, either as a standalone, hybrid, or adjunctive treatment, is associated with both statistical and clinically significant change in OCD symptom severity. However, in comparison to active treatment control conditions such as standard ERP and CT, ACT may have comparable effects but no superiority. Both ACT alone and in combination with SSRI treatment, however, were superior to SSRI treatment alone.

Efficacy of ACT for OCD: Secondary Outcome Measures

Table 8 provides an overview of secondary outcome measures for the ACT for OCD studies, including depression, anxiety, QoL and psychological inflexibility.

Psychological Inflexibility

Psychological inflexibility as measured by the Acceptance and Action Questionnaire-II (AAQ-II; Hayes et al., 2004; Bond et al., 2011), was the most consistently included/studied measure, consistent with the general aim of ACT to increase PF. Looking at the AAQ-II, all

studies reported an increase in PF pre-to-post treatment with ACT interventions. Contrary to their predictions, various researchers noted comparable improvements in PF across other interventions such as CT (Twohig et al., 2010b) and ERP groups (Thompson et al., 2010; Twohig et al., 2010b). Only one study (Zemestani et al., 2022) found a significantly greater improvement in PF in ACT+SSRI treatment subjects in comparison to ERP+SSRI treatment subjects.

Depression

Three studies examined a measure of depression (see Table 8). Twohig et al. (2010a, 2018) included the BDI-II, and Capel et al. (2022) included the Depression-Anxiety Stress Scale-21 (DASS-21; Henry & Crawford, 2005), a self-report inventory measuring depression, anxiety, and stress symptoms in adults. Analogous to the outcomes for psychological inflexibility, the three studies reported marked improvement in reported depression pre- to post-treatment with ACT interventions. Twohig et al. (2010a) found that ACT led to a reduction in depressive symptoms when compared to an active control (PRT) but only among participants who reported depressive symptoms in the mild range (BDI-II = 13) or greater at pretreatment. In Twohig et al. (2018) participants in both ACT/ERP, and ERP-alone, reported significantly less symptoms of depression at post-treatment. In the 2022 by Capel et al., participants received an ACT/ERP hybrid treatment in an IOP. Results of the study indicate a significant reduction in depressive symptoms, anxiety, and stress with participants ending treatment in subclinical ranges on the DASS-II.

Anxiety

Only one study (Capel et al., 2022) included a measure of anxiety included in the above mentioned DASS-21. The authors found significant reduction in both anxiety and stress on this measure for the hybrid ACT/ERP intervention.

Cognitive Fusion

Two studies (Thompson et al., 2021; Twohig et al., 2010a) included a measure of the cognitive fusion, considered to be the degree to which people have some degree of objectivity from their thoughts. Thompson et al., 2021 measured cognitive flexibility with the Cognitive Fusion Questionnaire – 7 (CFQ; Gillanders et al., 2014) and found more distance and objectivity pre-to post-treatment but the change was unrelated to whether the participants were in the ACT or ERP phase. Twohig et al. (2010a) used the Thought Action Fusion Scale (TAFS; Shafran et al., 1996). Cognitive fusion decreased in both ACT and PRT conditions, with a trend in favor of the ACT condition.

QoL/Well-Being

QoL, a primary aim of ACT, was measured pre-and post-treatment in two studies. Twohig et al. (2010a) used the Quality of Life Scale (QOLS; Burckhart et al., 1989), a self-report measure of how satisfied people are with the quality of their lives. QoL improved in both the ACT for OCD and active control (PRT) and was marginally in favor of ACT at post-treatment. Wheeler (2017) tracked changes in well-being weekly using the Clinical Outcomes in Routine Evaluation Outcome Measure (CORE-OM; Miller, 2015) and the Outcome Rating Scale (ORS; Miller, 2015). The participant in this ACT/ERP hybrid treatment case study showed overall reliable change on the CORE-OM but not clinical change. However, the participant's change score on the ORS showed both reliable and clinical change.

In sum, while seven of the eight studies examined utilized measures of psychological inflexibility (AAQ-II) there is a paucity of measures of depression, anxiety, and QoL. Also, notably absent (apart from the 2018 by Twohig et al.) are measures of acceptability and engagement (patient treatment adherence). Either as a standalone, hybrid, or adjunctive treatment, ACT is associated with both statistically significant reduction in depression, and improvements in PF and QoL. However, in comparison to active control conditions such as standard ERP, PRT and CT, ACT may have comparable effects but no superiority.

Chapter 4: Discussion

Aim

The aim of this systematic review was to synthesize the current state of research on three third-wave interventions: ACT, MBCT, and MBSR, and how they are applied to the treatment of OCD. Through the screening and selection process, only ACT and MBCT met the inclusion criteria in this systematic review, which analyzed the available evidence for the efficacy of ACT and MBCT as standalone, hybrid, and adjunctive treatments for OCD. As there is empirical support for second and third-wave interventions for OCD, it is crucial to continue to examine ways to optimize the use of these treatments alone and in concert with one another.

Adaptations of MBCT for OCD

While there is some consistency in the modifications of MBCT for OCD across studies—particularly for the studies that adapted Segal et al.'s 2002 or 2013 manuals (Key et al., 2017; Külz et al., 2019; Selchen et al., 2018; Zhang et al., 2021)—there is a lack of reporting of "dose" of in-session mindfulness, and a lack of uniformity of between-session mindfulness practice across protocols (140-540 minutes). In accordance with Cludius et al. (2020), it is suggested future studies assess home mindfulness practice as a possible moderator of treatment outcomes and more consistently track home practice compliance. Strauss et al. (2018) made the point that the weaker effects of the hybrid MB-ERP intervention may be the result of less time devoted to mindfulness practice than traditional MBCT. In this vein, it is recommended that future studies assess "minimum effective dose" of mindfulness practice for patients with OCD and how many sessions should be attended for a participant to be considered a treatment completer.

The lack of comparison groups, follow-ups (Selchen et al., 2018), and consistent description of session-by-session adaptation of MBCT (Key et al., 2017; Zhang et al., 2021; Külz

et al., 2019) makes it challenging to draw comparisons across protocols. The transparency of deviations from MBCT is important in terms of research and clinical work, as MCBT follows a very purposeful sequential framework (refer to Selchen et al., 2018). It is recommended that future research studies include a narrative and/or table column (e.g., Selchen et al., 2018) of modified content to make it clear how adaptations of MBCT for OCD do or do not adhere to the original model. Moreover, it is recommended that future research consistently include active comparison groups and include sufficient follow-up assessment to track the stability of treatment results over time.

Efficacy of MBCT With Primary Measures

Findings from the six independent studies included in this review investigating the efficacy of MBCT are not clearcut and varied considerably. The three studies that used patients with residual symptoms after completing CBT/ERP (Key et al., 2017; Külz et al., 2019; Selchen et al., 2018) are too few to draw any conclusions, and only one (Külz et al., 2019) included an active comparison group. Moreover, only one study (Strauss et al., 2018) tested a hybrid MB-ERP treatment. The 2019 by Külz et al. also raised the issue of clinician-administered versus self-report outcome measures as their study found significantly lower OCD symptom severity at post-treatment on the OCI-R self-report among the treatment group as compared to the psychoeducation group. However, this group difference was not found on the clinician-administered Y-BOCS from pre-to-post treatment. In addition, Zhang et al. (2021) and Külz et al. (2019) found that MBCT superiority on measures of OCD severity at post-treatment dissipated at follow-up. In sum, the superiority of MBCT depended on the assessment period (post-treatment or follow-up) and the measure used (clinician administered vs. self-report).

Efficacy of MBCT With Secondary Measures

There was some uniformity in the use of secondary measures, particularly the measure for obsessive beliefs (OBQ) and the measure of mindfulness (FFMQ) in the MBCT studies included in this review. The findings from the included studies suggest that MBCT as a standalone, hybrid, or adjunctive treatment was associated with improvements in depression, anxiety, QoL and mindfulness, and reduction in obsessive beliefs. However, as discussed above, any initial advantage of MBCT compared to other groups dissipated by 6-month follow-up. MBCT may have comparable effects but no superiority to other treatments. In addition, for those studies that included follow-up assessment, the gains in depression, anxiety, and QoL continued to increase for both treatment and control conditions.

Adaptations of ACT for OCD

While there is some consistency in the modifications of ACT for OCD across studies—particularly for the ACT standalone studies (Twohig et al., 2010a; Twohig et al., 2010b; Vakili et al., 2015; Zemestani et al., 2022)—there is minimal uniformity in implementation. In ACT/ERP hybrid studies (Capel et al., 2022; Twohig et al., 2018; Wheeler, 2017), there is consistency in exposures being adapted to reflect participants' values and adaptation of monitoring during exposures to be of *willingness* to experience discomfort versus habituation. In the one ACT/ERP sequential study (Thompson et al., 2021), traditional exposure is emphasized in the ERP sessions, and acceptance of thoughts and feelings, as well as defusion, is emphasized throughout the ACT sessions. However, the number, length, and duration of treatment sessions of an adequate trial (standalone ACT, hybrid, and sequential ACT/ERP) varied considerably, underscoring the need to establish these parameters in future studies. In addition, studies utilize different outcome assessment tools, making comparisons challenging.

Efficacy of ACT With Primary Measures

For both the ACT standalone and ACT/ERP sequential treatment studies, the relative effectiveness of ACT in reducing OCD symptoms depended strongly on the choice of the control group. When compared to SSRI treatment, ACT and ACT/ERP outperformed SSRIs in reducing OCD symptom severity (Vakili et al., 2015; Zemestani et al., 2022). ACT was also superior in reducing symptom severity when compared to passive control groups but more attenuated when compared to active psychotherapeutic approaches (Soondrum et al., 2022). It should be noted that three of the ACT/ERP studies (Capel et al., 2022; Thompson et al. 2021; Wheeler, 2017) did *not* include a comparison group, and the findings were based on small sample sizes.

Three of the studies (Thompson et al., 2021; Twohig et al., 2010b; Wheeler, 2017) did *not* include a follow-up, and of those that did (Capel et al., 2022; Twohig et al., 2010a; Twohig et al., 2018; Zemestani et al., 2022) only one (Twohig et al., 2018) included a 6-month follow-up sufficient to track stability over time. In sum, while these findings represent important empirical evidence for the utility of ACT as a comparable treatment modality for OCD, results are tentative and limited by the small number of studies, small sample sizes, and insufficient follow-up to track stability over time.

Efficacy of ACT With Secondary Measures

For included studies that used ACT as a standalone treatment or ACT as part of a hybrid ACT/ERP treatment, ACT was associated with statistically significant reductions in measures of depression, and improvements in measures of QoL and PF. However, in comparison to active control conditions such as standard ERP, PRT, and CT, ACT interventions resulted in demonstrable improvements but no consistent advantage. It is important to note that these findings are based on a relatively small sample of studies. While most of the reviewed studies

included measures of psychological inflexibility (e.g., AAQ-II), there is a scarcity of measures of depression, anxiety, and QoL. Also notably absent (apart from the 2018 study by Twohig et al.) are measures of acceptability and patient treatment adherence, which are central to addressing the rationale of using ACT for OCD. Analogous to the primary outcomes, while these findings provide empirical support for the use of ACT as an alternative treatment modality for OCD, results are tentative and limited by the small number of studies, small sample sizes, and limited inclusion of follow-up assessments.

Overall Consideration of Outcomes

It is important to compare these findings with results of other psychotherapy outcome studies, especially when analyzed by type of control group. Similar to both the ACT and MBCT studies in this review, when ERP was compared with other therapy groups, a recent meta-analysis (Song et al., 2022) found that ERP outperformed SSRIs and placebo, but was equivalent to CBT in reducing symptom severity of OCD. These findings also align with a recent study by Spinhoven et al. (2022), examining the relative effectiveness of MBCT as compared to Relapse Prevention-Cognitive Behavioral Therapy (CBT-RP) for patients with refractory anxiety disorders. Spinhoven et al. (2022) reported significant decreases in self-reported anxiety pre- to post-treatment, but a drop off at the 6-month follow-up. Thus, the time-limited nature of treatment gains from ACT and MBCT for OCD may be similar to ERP and more indicative of the chronic nature of OCD and the need for follow-up treatment or booster sessions.

Dichotomizing treatments may limit the field from better understanding the complex processes of change that exist across treatments. For example, Twohig et al. (2018) found that while processes proposed by ACT, ERP, and CT are distinguishable (PF, exposure, and cognitive restructuring, respectively), each treatment also affects other processes than the ones

they were predicted to. Similarly, Ong et al. (2020) found that PF functions as both a process of change and consequence of symptom improvement in both ACT + ERP and ERP. These findings reflect a small piece of a larger puzzle about how treatments for OCD may work through a broader and more complex range of processes than the ones they are purported to affect (Thompson et al., 2021; Twohig et al., 2018). To identify the driving elements of therapies to move the field forward, it is necessary to first identify their similarities. This will help to distill which aspects of treatment are truly efficacious (Arch & Craske, 2008; Tolin, 2009).

Limitations

This systematic review was subject to some limitations regarding measures used in the studies reviewed and generalizability of results. There is an over-reliance on one primary outcome measure of OCD in the included studies (e.g., Y-BOCS or Y-BOCS-SR). As most measures of OCD symptom severity have limitations and drawbacks (Abramowitz et al., 2010) it is important to include multiple measures to capture the complexity of OCD symptom presentation. Moreover, there are possible differences between the clinician rated Y-BOCS and the self-rated Y-BOCS-SR, with the latter utilized in 50% of the MBCT and 25% of the ACT studies included in this systematic review. Although the Y-BOCS and Y-BOCS-SR have been used interchangeably, Hauschildt et al. (2019) describe a "correction over time" effect in the self-rating form, especially for the "resistance against obsessions" item. The self-rated form tended to reflect lower symptom severity compared to the clinician administered interview at baseline, but agreement strongly increased by post-treatment and follow-up. It is hypothesized that this is possibly due to the psychoeducational elements in the interventions providing patients more clarification of the self-rated measure over time. As the Y-BOCS-SR may yield an underestimate

of baseline OCD symptom severity, it may underestimate treatment effects across treatment and comparison conditions.

Although most included studies attempted to control for medication effects by restricting changes, not all participants were on medication, adding a variable that potentially could impact study outcomes. For example, if more participants in the control group were on medication compared to the treatment group, effects of the intervention may be underestimated. Other limitations outlined by the authors of the included studies reflect methodological quality, such as suboptimal measurement of treatment compliance and therapist adherence, over-reliance on self-report measures, and absence of follow-ups (especially of a year or more).

In an attempt to include comparable and replicable studies, the inclusion and exclusion criteria of this systematic review limits the generalizability of results. Studies involving non-patient populations (e.g., college students), technology-assisted treatments, and self-help interventions were excluded in an effort to mitigate confounding variables. Thus, this systematic review does not address novel approaches developed to improve dissemination of OCD treatments, a growing area in the field. The inclusion and exclusion criteria also excluded studies of patient populations with disorders often comorbid with OCD, including substance use disorder, ASD, and psychotic disorders. Moreover, the inclusion criteria limited the initial record search to empirical studies that were published in peer-reviewed journals, thus increasing the possibility of publication bias.

The inclusion and exclusion criteria of this systematic review also limited the inclusion of MBSR studies. When conducting the initial search, 37 MBSR studies were screened. Thirty of these studies were excluded by title, five by reading of the abstract, and the remaining two were excluded after a full-text screen. The two MBSR articles reviewed included: Aardema et al.

(2022) and Patel et al. (2007). The 2022 study be Aardema et al. was excluded because MBSR served as a *non-specific active control condition* with adaptations to the protocol not made explicit. The 2007 study by Patel et al. was excluded because the protocol was adapted with elements from both MBCT and ACT, making it difficult to distill the MBSR aspects of the treatment.

Future Research Directions

ACT and MBCT for OCD specifically train participants to approach versus avoid their OCD symptoms, aligned with the growing understanding of the role of avoidance behaviors in OCD symptomatology. Despite the many strengths of the Y-BOCS and other well-established measures of OCD symptoms (e.g., OCI-R), a limitation to their widespread use is that they do not adequately account for avoidance behaviors in symptom severity. It is recommended that future OCD treatment studies utilize measures that account for avoidance behavior in their severity ratings, such as the Yale-Brown Obsessive Compulsive Scale-Second Edition (Y-BOCS-II; Storch et al., 2010) and the DOCS.

The Y-BOCS-II is an updated version of the original Y-BOCS to reflect active avoidance in patient scores as well as treatment effect on the upper end of symptom severity. Moreover, the Y-BOCS-II does not include item 4 from the Y-BOCS which accounts for resistance against obsessions. Both ACT and MBCT train patients not to resist obsessions but rather acknowledge them as transitory mental experiences without needing to suppress them. Therefore, use of the Y-BOCS-II may help limit false score inflation in participants that may have successfully applied a mindset of acceptance versus resistance of their obsessions.

The DOCS is a self-report instrument developed in part to help capture less common OCD symptoms and account for avoidance behavior in symptom severity. Its structure leaves

room to capture the heterogeneous ways in which symptoms may manifest within the four empirically supported symptom dimensions of OCD (contamination, responsibility, unacceptable thoughts, and symmetry/incompleteness; Abramowitz et al., 2010). Its capacity to detect less common OCD symptoms is complementary to the Y-BOCS-II which offers a comprehensive symptom checklist. Moreover, the DOCS is found to detect ERP treatment progress via the subscale scores (Abramowitz et al., 2010), and the Y-BOCS-II is designed to detect changes in the upper limits of symptom severity (Storch et al., 2010). It is recommended future OCD treatment studies utilize these validated, complementary clinician-administered and self-report measures to capture the vast range of OCD symptoms, avoidance behavior, and response to treatment across the spectrum of symptom severity.

Several studies included in this systematic review examined the efficacy of MBCT for OCD for participants with residual symptoms after completing ERP, likely because MBCT was originally created to help prevent depressive relapse. However, qualitative data suggests MBCT for OCD may have benefits as a *prelude* to exposure-based treatment. Research indicates that willingness to experience unpleasant internal states during exposure enhances ERP outcomes and is associated with faster treatment response (Reid et al., 2017). In post-MBCT for OCD participant interviews by Hertenstein et al. (2012) and Leeuwerik et al. (2020), participants reported an increased willingness to experience unpleasant internal states. This shows promise that MBCT for OCD may reduce EA, the unwillingness of a person to remain in contact with unwanted, negatively perceived internal experience. It is suggested that future studies examine the sequencing effects of treatments (e.g., 8-week MBCT for OCD prior to ERP) to determine if MBCT for OCD could have the potential to increase acceptability, adherence, and outcomes of exposure-based treatment for OCD.

Clinical Implications

Given the number of interventions with demonstrated efficacy for OCD, clinicians must make several decisions to choose the best approach to maximize treatment response. According to evidence-based behavioral practice (EBBP), it is recommended that clinicians base treatment choice on available evidence, their own expertise, and the characteristics of the patient (Gambrill, 2016). As mentioned prior, a patient willing to experience internal states perceived to be difficult may be a good candidate for and adhere to ERP. However, a patient relatively high in EA may be more receptive to engaging in ACT or MBCT for OCD. While ACT does facilitate patients engaging in actions that may elicit distress (i.e., behavioral commitments), as a non-linear model, it allows for flexibility for the clinician to return to other components (e.g., defusion, acceptance, present moment awareness) to help facilitate these client actions. It is important to note that the behavioral commitments mostly occur outside of session, as they are meant to be ways in which the patient can engage with his or her value-oriented actions. Thus, the clinician is not present for the behavioral intervention. Research suggests that *clinicians'* EA in response to patient distress during in-session exposure (Scherr et al., 2014) is associated with suboptimal treatment adherence and, therefore, attenuated treatment outcomes (Deacon et al., 2013). As such, clinicians who are particularly uncomfortable with patient related distress during ERP should consider utilizing an ACT or MBCT approach with patients with OCD and/or consider increasing their own willingness toward or acceptance of patient distress.

In addition to choosing treatment orientation based on evidence, patient characteristics and clinician expertise, it is suggested that specific treatment protocols be chosen based on the specific needs of the patient. One study of MBCT for OCD (Zhang et al., 2021) from China includes a session dedicated to teaching participants' family members how to help and support

them effectively. This may be helpful for patients whose families could benefit from psychoeducation about OCD, and particularly if a patient's OCD symptoms involve family members who may inadvertently perpetuate their OCD symptoms (e.g., accommodation of avoidance). A second MBCT for OCD study (Mathur et al., 2021) from India includes two sessions dedicated to participants building their support system by sharing their challenges with trusted friends and family. These may be a helpful approach for patients who struggle with perceived stigma surrounding their diagnosis or lack social support of their challenges. Both studies highlight how friend- or family-assisted therapy may help a patient continue to live the "exposure lifestyle" of approaching versus avoiding obsession-inducing stimuli after treatment ends, possibly contributing to a lesser need for ongoing treatment and/or booster sessions.

One study of ACT for OCD (Zemestani et al., 2022) includes cultural adaptations based on empirical evidence (Rohani et al., 2018) and practice experience of clinicians treating Iranian patients with OCD. These adaptations included the addition of two sessions dedicated to discussing ambivalence surrounding mental health issues, OCD, and psychotherapy. Moreover, the number of sessions were increased to twelve to account for non-attendance. This highlights the necessity of matching the treatment protocol to where a patient is in terms of the Stages of Change (Prochaska & Norcross, 2011) whether it be influenced by individual or cultural factors. Zemestani et al. (2022) also adapted metaphors used in ACT to Iranian culture, highlighting the need for clinicians to adapt these central components of ACT for them to meaningfully land with the patient for treatment potency.

Systemic and patient-specific barriers to treatment are important considerations to assess when choosing the best treatment option for a patient with OCD. These include but are not limited to, length and number of sessions covered by insurance and time the patient can commit

to treatment. Thompson et al. (2021) supports the feasibility of completing ERP and ACT within 45-minute sessions, which are more likely to be reimbursed by insurance in the United States than 90–120-minute sessions common to ERP clinical trials (e.g., Abramowitz et al., 2003). In terms of time and financial barriers, the relatively low in-session time commitment required in MBCT (16-20 hours) in a condensed, eight-week period makes it an intensive but time-limited, option that can offer significant therapeutic change. Selchen et al. (2018) posits that MBCT for OCD is also an economical option given the relatively low cost of an eight-week group compared to individual weekly therapy.

Lastly, patient preference in terms of treatment and mode (group vs. individual) is of utmost importance when selecting an intervention. MBCT may also be considered when a patient could benefit from aspects inherent to group therapy, including connecting with others experiencing OCD. Hertenstein et al. (2012) reported that the majority of participants at post-MBCT for OCD named connecting with the other participants affected by OCD to be a validating experience.

In Wheeler's 2017 case study, the clinician accommodated the preferences of the patient (within her scope of expertise) who felt prior CBT treatment had not been helpful and wanted to address her OCD symptoms in the broader context of her life. The clinician practiced flexibility within fidelity when she adapted ERP with ACT by first introducing exposure as a way for the patient to move towards her values to then segue into a more ERP-specific approach. Honoring the patient's choice of therapy helped to maintain a high therapeutic alliance, an essential factor to treatment success across theoretical orientations (Norcross & Lambert, 2018).

Conclusion

This systematic review summarizes and synthesizes quantitative and qualitative research evidence from 21 studies on the effectiveness of ACT and MBCT adapted for OCD. The results suggest that standalone ACT for OCD + SSRI treatment outperforms SSRI treatment alone, and hybrid ACT/ERP is comparable to ERP. Results also suggest that while MBCT is as efficacious in treating OCD as SSRI treatment and active control groups (e.g., psychoeducation), for those studies that included follow-ups, the advantages dissipated by 6 months. However, the findings should be interpreted cautiously due to the small number of studies and sample sizes. Despite the diversity of countries represented in the included studies (Canada, China, Germany, Great Britain, India, Iran, and the United States), there is homogeneity within samples, and heterogeneity across studies and sample characteristics. Future research is needed to examine whether short-term treatment effects can be maintained or extended with booster sessions on a regular basis. It is recommended that future studies consider an active control group, standardized treatment protocols, multiple, comparable primary and secondary outcome measures, varying sequencing of treatments, large and diverse samples to ensure generalizability, and primary outcome measures that account for avoidance (e.g., Y-BOCS-II and DOCS) to examine the treatment effectiveness of ACT and MBCT for patients with OCD. Moreover, it is recommended that studies include sufficient follow-up to track the stability of treatment results over time.

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TABLES

Table 1

MBCT-Informed Treatments for OCD

Study	Source(s) Adapted	Dose	Rationale	Psychoeducation about OCD	Monitoring	Cognitive Distortions/Reality as Perspective	Concept of autopilot	Obstacles
Key et al. (2017)	Segal et al. (2002)	8, 2-hour sessions/week	Not reported	OCD and factors that maintain it addressed	Focus on *awareness* of obsessions and compulsions; formal monitoring not reported	Addressed in session 2/ inferred*	Addressed session 1 inferred*	Inferred*
Külz et al. (2019)	Segal et al. (2002)	8, 2-hour sessions/week	Not reported	Discussion of neurobiological correlates of OCD	Identification of individual OCD triggers	"The spectacles of OCD" impact of subjective appraisal of thoughts	Addressed	Inferred*
Mathur et al. (2021)	Not reported	12, 35-40 minutes sessions/week	Addressed in session 1	Addressed in sessions 1-2	Via monitoring cognitive distortions and recognizing them session 1	Via drawing conclusions from direct sensing session 6	Not reported	Not reported
Selchen et al. (2018)	Segal et al. (2013)	8, 2-hour sessions/week	MBCT Model of OCD in pre-class participant interview	Via pre-class participant interview and session 1	Via OCD Experiences Diary in session 3	Addressed in session 2, adapted to OCD symptomatology	Addressed session 1	Addressed session 2
Strauss et al. (2018)	Mindfulness practice developed by expert in MBI's and OCD	10, 2-hour session/week	Inclusion of rationale alongside mindfulness	Not reported	Guidance described to specifically invite participants to notice internal OCD-related stimuli	Not reported	Not reported	Not reported
Zhang et al. (2021)	Segal et al. (2013)	10, 150-minute sessions/week	Addressed sessions 1-2	Maintaining factors addressed session 5	Not reported	Framed as "mistrust" as part of OCD	Not reported	Via tendency of "minds to wander" sessions 1-2

Study	Cognition Defusion/ Decentering	Direct Sensing	Self-Compassion	Formal and/or Informal Mindfulness Practice & Inquiry	In-Session/ Between-Session Exposure	Acceptance & Non-Avoidance	Relapse Prevention /Support	Homework
Key et al. (2017)	Addressed	Via formal and informal practices	Inferred* part of relapse prevention	Inferred*	Via exposure to *difficult emotions* in formal practices	Accepting internal experience; non-avoidance of difficult emotions	Inferred* addressed in session 8	Guided meditation for 20-25 minutes/day; complete meditation logs
Külz et al. (2019)	Via positive/negative events diary; discussion of neurobiology to encourage disidentification	Via guided mindfulness practice	Via objective "being kind with oneself"	Inferred*	Via Exposure to *difficult emotions* in formal practices	Inferred*	Inferred*	Between-session mindfulness practice reported, details inferred*
Mathur et al. (2021)	Via having participants write down and observe obsessive thoughts session 6	Via teaching reliance on direct sensing session 6	Not included	Via mindful breathing; attentional training; Perceptive Experience Validation; Inquiry not reported	Sessions 4-10	Sessions 3 and 7; non-avoidance via exposures and homework	Via building support system sessions 7 and 12	Mindful daily activities; respond to obsessions differently; “Five aspects of mindfulness"; monitor results of acceptance versus non-acceptance of obsessions
Selchen et al. (2018)	Implicit in formal practices throughout; defusion explicitly in session 6	Via formal & informal practices	part of relapse prevention	All addressed	*Via exposure to difficult emotions* in formal practices	Via concept of "befriending" OCD; discussion of ways to respond more adaptively	Via “Home Practice Plan" to relate differently to OCD	"Unpleasant Events Calendar" changed to OCD Experiences Diary; "relapse signature" worksheet adapted to OCD
Strauss et al. (2018)	Via guided mindfulness practice sessions 2-9	Via guided mindfulness practice sessions 2-9	Not reported	Via guided meditation; 20 minutes Socratic inquiry; 3-minute breathing space	Both included sessions 2-9	Via acceptance to internal experience; non-avoidance through ERP tasks	Consolidation of learning session 10	Daily planned ERP tasks: ERP diaries to monitor engagement; encourage unplanned daily ERP tasks by facing obsessional cues
Zhang et al. (2021)	Via decentering addressed in session 6	Addressed session 5	Addressed Session 9	Practice via homework; in-session mindfulness; No inquiry reported	Via "Mindful exposure" session 8	Via “taking constructive risks in a mindful way" session 10	Support addressed sessions 9-10	Encouraged to practice mindfulness for at least 1 hour per day

Note. MBCT = Mindfulness Behavioral Cognitive Therapy; OCD = Obsessive-Compulsive Disorder; * = inferred by stated adherence to use of treatment manual.

Table 2

MBCT for OCD Study Design Characteristics

Study	*N*	Inclusion	Exclusion	Session duration	Total Sessions	Comparison group	Time points measured	Primary Measures	Secondary measures	Attrition	Quality appraisal
Cludius et al. (2020)	125	Completed at least 20 sessions of CBT/ERP within 3 years prior with residual symptoms	Psychosis; severe depression; suicidality; BPD; Asperger; IQ<70; beginning or modifying medication or therapy within 12 weeks; neurological disorder	120 minutes/1 x per week	8	OCD-EP by authors	12-month follow-up	Y-BOCS	OCI-R; BDI-II; BSI; KMS; DTS; OBQ-44; MCQ-30; WHOQOL-BREF; SCS	Not applicable	41
Hertenstein et al. (2012)	12	Completed a behavioral therapy with ERP within 2 years prior with residual symptoms	Psychosis; severe depression; substance abuse; BPD; severe brain injury; current psychotherapy treatment	120 minutes/1 x per week	8	None	Post-treatment	Qualitative data from participant interviews	questionnaire assessing frequency of mindfulness and satisfaction	None	28
Key et al. (2017)	36	Y-BOCS>14; Group CBT/ERP within 10 years; no mindfulness practice for at least 1 year	no changes in medication or dose 3 months prior and during study	120 minutes/1 x per week	8	WLC	Pre-and Post-treatment	Y-BOCS-SR	FFMQ; SCS; BAI; OBQ-44; BDI-II	27.7% MBCT; 16.7% WLC	26
Külz et al. (2019)	125	Completed at least 20 CBT/ERP sessions within 3 years prior with residual symptoms	Psychosis; severe depression; suicidality; BPD; Asperger; IQ<70; beginning or modifying medication or therapy within 12 weeks; neurological disorder	120 minutes/1 x per week	8	OCD-EP by authors	Pre- and Post-treatment; 6-month follow-up	Y-BOCS	OCI-R; BDI-II; BSI; KMS; DTS; OBQ-44; MCQ-30; WHOQOL-BREF; SCS	18% MBCT; 17% PE	41
Leeuwerik et al. (2020)	14	Stable on medication and no therapy at least 3 months prior and no plans to start therapy during study	Organic cause for OCD; LD; psychosis; PTSD; anorexia; alcohol or substance abuse; hoarding-only compulsions	120 minutes/1 x per week	10	ERP	6-month follow-up	Qualitative data on effectiveness and acceptability of MB-ERP	Change interview	Not applicable	28
Mathur et al. (2021)	60	Y-BOCS >20; educated at least to 10th standard	Psychosis; Bipolar; Substance/Alcohol abuse; neurological illness; treatment for OCD in the last year; not being on stable dose of SSRIs for 2 months	35-40 minutes/1 x per week	12	SMT	Pre- and Post-treatment	Y-BOCS-SR; CGI	OBQ-44; HARS; WSAS; WHQOL-BREF; Homework Compliance Scale; MADRS; AAQ-II; FMI	10/% MBCT; 33% SMT	30

Study	*N*	Inclusion	Exclusion	Session duration	Total Sessions	Comparison group	Time points measured	Primary measures	Secondary measures	Attrition	Quality appraisal
Selchen et al. (2018)	37	Y-BOCS >16	Suicidality; PTSD; Bipolar Disorder; psychosis; substance abuse within 3 months of study	120 minutes /1x per week	8	MBCT post-CBT augmentation	Pre- and Post-treatment	Y-BOCS-SR	BDI-II; OBQ-44; FFMQ	5% MBCT; 5% MBCT post CBT	28
Sguazzin et al. (2017)	32	Y-BOCS>14; Group CBT/ERP at ATRC within 10 years; no mindfulness practice for at least 1 year	no changes in medication or dose 3 months prior and during study	120 minutes/ 1x per week	8	WLC	2 weeks post-intervention	Satisfaction interview based on CSQ	None	None stated	26
Strauss et al. (2018)	37	Stable on medication and no therapy at least 3 months prior and no plans to start therapy during study	Organic cause for OCD; LD; psychotic disorder; PTSD; anorexia; alcohol or substance abuse; hoarding-only compulsions	120 minutes /1 x per week	10	ERP	Pre-and Post-treatment;6-month follow-up	Y-BOCS	BDI-II; OBQ-44; FFMQ-SF; WEMWBS	21% MB-ERP; 5% ERP	28
Zhang et al. (2021)	87	Y-BOCS>12 and < 25; at least middle school education; no medication or discontinued for 8 weeks prior to study start	Other psychiatric disorder by DSM-V; severe physical or CNS disease; pregnant or lactating; concurrent treatment; history of mindfulness intervention without benefit	150 minutes 1x per week	11	SSRI and PE	Baseline; 4 weeks; post-treatment; 3 and 6- month follow-up	Y-BOCS	HAMD-24; HAMA; FFMQ; SDS	15% MBCT; 14% PE	33

Notes. MBCT = Mindfulness-based Cognitive Therapy; CBT/ERP = cognitive behavioral therapy and exposure and response prevention; BPT= Borderline Personality Disorder; OCD-EP = Psychoedication group; Y-BOCS =Yale-Brown Obsessive-Compulsive Scale; OCI-R = Obsessive-Compulsive Inventory Revised; BDI II = Beck Depression Inventory-II; BSI = Brief Symptom Inventory; KMS =Kentucky Inventory of Mindfulness Skills; DTS = Distress Tolerance Scale; OBQ-44 = Obsessive Beliefs Questionnaire; MCQ-30 = short form of the Metacognitions Questionnaire; WHOQOL-BREF = World Health Organization Quality of Life-abbreviated; SCS = Self-Compassion Scale; ERP = Exposure and Response Prevention; WLC = Wait list control; Y-BOCS-SR = Yale-Brown Obsessive-Compulsive Scale-Self Report; FFMQ = Five-Facet Mindfulness Questionnaire; BAI = Beck Anxiety Inventory; OCD = Obsessive-Compulsive Disorder; LD = Learning disability; PTSD = Post-traumatic Stress Disorder; MB-ERP = Mindfulness based Exposure and Response Prevention; SSRI = selective serotonin reuptake inhibitor; SMT = Stress Management Training; CGI =Clinical Global Impression- Severity Scale; HARS = Hamilton Anxiety Rating Scale; WSAS = Work and Social Adjustment Scale; MADRS=Montgomery-Asberg Depression Rating Scale; AAQ-II =Acceptance and Action Questionnaire II; FMI = Freiberg Mindfulness Inventory; CSQ = Client Satisfaction Questionnaire;; WEMWBS = Short Warwick-Edinburg Mental Well-Being Scale; CNS = Central Nervous System; PE - psychoeducation; HAMD-24 = Hamilton Depression Scale-24; HAMA = Hamilton Anxiety Scale.

Table 3

Efficacy of MBCT for OCD on Primary Outcome Measures

Study	Design	*N*	MBCT type	Number of sessions	Primary outcome measure	Outcome
Cludius et al. (2020)	12-month follow-up on Külz et al., 2019; using active OCD-EP comparison group	125	MBCT augmentation on patients with residual symptoms from past CBT	8 (120 minutes/1x per week)	Y-BOCS	Independent of group allocation, a significant reduction of OCD symptoms was demonstrated for the 4 assessments points. Contrary to expectation, MBCT was not superior to OCD-EP
Hertenstein et al. (2012)	Pilot study using qualitative methodology	12	MBCT augmentation on patients with residual symptoms from past CBT	8 (120 minutes/1x per week)	Qualitative data from patient interviews	Over 2/3 of participants reported a decline in OCD symptom severity and many reported an increased willingness to experience unpleasant emotions
Key et al. (2017)	Two-arm parallel design using a RCT with waitlist control	36	MBCT augmentation on patients with residual symptoms from past CBT	8 (120 minutes/1x per week)	Y-BOCS-SR	In MBCT condition participants had a reduction in their Y-BOCS scores whereas the WLC condition had increased Y-BOCS scores. The mean decrease in scores for MBCT was 2.5 and did not reach criteria for reliable clinically meaningful change (i.e., 6 points)
Külz et al. (2019)	Prospective, bicentric active RTC with active OCD-EP comparison group	125	MBCT augmentation on patients with residual symptoms from past CBT	8 (120 minutes/1x per week)	Y-BOCS	At post-treatment there were no differences between OCD-EP and MBCT on the Y-BOCS clinical interview measure, but there was more improvement for MBCT on the OCI-R self-report measure; At 6-month follow-up OCD symptoms were further improved in both groups and there were no longer any significant group differences
Leeuwerik et al. (2020)	Qualitative study based on Strauss et al. (2018)	14	Hybrid: MB-ERP	10 (120 minutes/1x per week)	Change Interview	71% of participants reported a reduction in OCD symptoms; 93% reported increased awareness of and ability to manage OCD symptoms
Mathur et al. (2021)	Two-arm parallel design using an RCT and active SMT comparison group	60	MBCT Standalone	12 (35-40 minutes/1xweek)	Y-BOCS-SR; CGI	At post-treatment significantly more improvements in OCD severity as measured in the Y-BOCS-SR and CGI in MBCT group as compared to SMT. There was no follow-up
Selchen et al. (2018)	Experimental Design	37	Both MBCT augmentation for patients with residual symptoms from past CBT and standalone MBCT	8 (120 minutes/1x per week)	Y-BOCS-SR	Post-treatment change on Y-BOCS-SR revealed significant improvements across the 8-week MBCT for both groups, but no group differences

Study	Design	*N*	MBCT Type	Number of sessions	Primary outcome measure	Outcome
Sguazzin et al. (2017)	Qualitative study based on RCT by Key et al. (2017)	28	MBCT augmentation on patients with residual symptoms from past CBT	8 (120 minutes/1x per week)	Satisfaction interview based on CSQ	A high rate of participants verbally reported a reduction in their OCD symptom severity, an increase in their mindfulness skills and improved quality of life. Treatment acceptability did not necessarily translate to a change in the symptoms for all the participants
Strauss et al. (2018)	Pilot study for RCT with two parallel groups, MB-ERP and ERP	37	MBCT augmentation on patients with residual symptoms from past CBT	10 (120 minutes/1x per week)	Y-BOCS	Post-treatment found improvements in both study arms from pre-to post-treatment and post-treatment to 6-month follow-up, but negligible between group differences
Zhang et al. (2021)	Prospective RTC with three arms	36	MBCT as standalone as compared to PE and SSRIs	11 (150 minutes/1x per week)	Y-BOCS	At post-treatment MBCT and SSRI had a more positive treatment response than PE on the Y-BOCS, but no differences between MBCT and SSRI. At 6-month follow-up there were no significant differences among the 3 groups on Y-BOCS severity scores

Note. MBCT = Mindfulness-based cognitive therapy; PE = psychoeducation; CBT = Cognitive Behavioral Therapy; Y-BOCS. = Yale-Brown Obsessive-Compulsive Scale; OCD = obsessive-compulsive disorder; RCT = Randomized Control Trial; Y-BOCS=SR = Yale-Brown Obsessive-Compulsive Scale- Self-Report; WLC = Waitlist control; OCI-R= Obsessive Compulsive Inventory -Revised; MB-ERP = Mindfulness-based Exposure and Response Prevention; SMT = Stress management training; CGI = Clinical Global Impression scales; CSQ = Client Satisfaction Questionnaire; SSRI = serotonin selective reuptake Inhibitor.

Table 4

Efficacy of MBCT for OCD on Secondary Outcome Measures

Study	Depression	Anxiety	Quality of life	Obsessive beliefs	Mindfulness	Self-compassion
Cludius et al. (2020)	BDI-II: Both MBCT and OCD-EP reduced depression but no significant group differences at 12-month follow-up	Not measured	WHOQOL-BREF: 12-month follow-up no difference between MBCT and OCD-EP	OBQ-44: 12-month follow-up no differences between MBCT and EP	KIMS: 12-month follow-up no significant difference between MBCT and OCD-EP	SCS: 12-month follow-up no difference between MBCT and OCD-EP
Key et al. (2017)	BDI-II: Significant improvements in depression pre-to-post-treatment for MBCT as compared to WLC	BAI: Significant reduction of anxiety for MBCT as compared to WLC	Not Measured	OBQ-44: Significant reduction for MBCT compared to WLC	FFMQ: Significant improvement for MBCT as compared to WLC	SCS: Significant improvements for MBCT compared to WLC
Külz et al. (2019)	BDI-II: Significantly greater reduction for MBCT as compared to OCD-EP post-treatment, but no group difference at follow-up	Not Measured	WHOQOL-BREF: Significant reduction -post-treatment for MBCT compared to OCD-EP but no group difference at follow-up	OBQ-44: Significant improvement for MBCT post-treatment but no difference with OCD-EP at follow-up	KIMS: Significant improvement for MBCT as compared to EP post-treatment but no difference at follow-up	SCS: Significant improvement for MBCT post-treatment but no difference with OCD-EP at follow-up
Mathur et al. (2021	MADRS: Both SMT and MBCT reduced depression but no group differences	HARS: MBCT showed significant reduction of anxiety as compared to SMT from pre-to-post-treatment	WHOQOL-BREF: No differences between MBCT and SMT pre-to-post-treatment	OBQ-44: Both MBCT and SMT showed significant within group reductions, but no between group differences	FMI: No significant differences between groups pre- to post-treatment	Not Measured
Selchen et al. (2018)	BDI-II: Significant improvement at post-treatment for both pre- and post-CBT groups but no group differences	Not Measured	Not Measured	OBQ-44: Significant improvements for both pre-and post-CBT groups. No significant group differences	FFMQ: Significant improvements for both pre-and post-CBT groups but no group differences	Not Measured

Study	Depression	Anxiety	Quality of life	Obsessive beliefs	Mindfulness	Self-compassion
Strauss et al. (2018)	BDI-II Only between group reported. Negligible group effect sizes between MB-ERP and ERP post-treatment and follow-up	Not Measured	WEMWBS: Negligible differences between MB-ERP and ERP at post-treatment and follow-up	OBQ-44: Negligible difference between ERP and MB-ERP at post-treatment and follow-up	FFMQ: Significantly more mindfulness compared to ERP at both post-treatment and follow-up	Not Measured
Zhang et al. (2021)	HAM-D24 Results complicated by differences in depression between baseline groups Reported significant interaction of time point and group is not clearly stated	HAMA: All treatment groups showed reductions in anxiety but no significant between group differences post-treatment and follow-up	Not Measured	Not Measured	FFMQ: All treatment groups showed significant increases in mindfulness, but no significant between groups at post-treatment and follow-up	Not Measured

Notes. MBCT = Mindfulness-based Cognitive Therapy*;* BD-III = Beck Depression Inventory – Second Edition; OCD-EP = psychoeducation; WHOQOL-BREF = World Health Organization Quality of Life-abbreviated*;* OBQ-44 = Obsessive Beliefs Questionnaire*;* KMS = Kentucky Inventory of Mindfulness Skills; SCS= Self-Compassion Scale; WLC = Wait List Control; BAI = Beck Anxiety Inventory; FFMQ,= Five-Facet Mindfulness Questionnaire ; MADRS = Montgomery-Asberg Depression Rating Scale; SMT = Stress management training; HARS = Hamilton Anxiety Rating Scale; FMI = Freiberg Mindfulness Inventory disorder; WEMWBS = Short Warwick-Edinburg Mental Well-Being Scale; HAM-D24 = Hamilton Depression Scale-24; HAMA = Hamilton Anxiety Scale.

Table 5

ACT-Informed Treatments for OCD

Study	Assessment/psychoeducation	Psychological flexibility	Creative hopelessness	Cognitive defusion	Willingness/acceptance	Present moment awareness	Urge surfing
Capel et al. (2022)	2-hour general but no ACT-specific (creative hopelessness addressed sessions 2-3	Assessment during assessment session	Addressed during assessment and sessions 2-3	Through WISE MOVES retrieval cue: *watch your mind*	Through WISE MOVES retrieval cue: *invite the obsession*	Through WISE MOVES retrieval cue: *stay with your experience*	Through WISE MOVES retrieval cue (overall)
Thompson et al. (2021)	2-hour create exposure hierarchy; no ACT specific (creative hopelessness in ACT session 1)	Not explicitly addressed	Addressed through 2 experiential exercises in session 1 of ACT phrase	Introduced ACT session 2: identifying obsessive thoughts and writing them on notecards	Acceptance of Thoughts and Feelings meditation and Acceptance of Anxiety meditation	Not explicitly addressed	Not explicitly addressed
Twohig et al. (2010a)	Session 1 assessment of OCD symptoms	Addressed	Addressed session 1	Addressed session 6	Addressed sessions 3-4	Addressed session 6	Not explicitly addressed
Twohig et al. (2018)	General introduction to self-monitoring obsessions and compulsions; discuss ACT model of OCD and ERP	Addressed in ACT model of OCD and ERP (framed as model to promote psychological flexibility)	Not explicitly addressed	Addressed	Addressed	Not explicitly addressed	Not explicitly addressed
Vakili et al. (2015)	Participant's OCD symptoms in session 1	Not explicitly addressed	Addressed Session 2	Addressed sessions 5-6	Addressed sessions 3-4	Addressed sessions 5-6	Not explicitly addressed
Wheeler (2017)	General (4 sessions); ACT specific (2 sessions)	Not explicitly addressed	During ACT assessment	Addressed	Addressed	Addressed	Framed as response prevention
Zemestani et al. (2022)	Inferred; 2 sessions addressed attitude towards mental health problems and psychotherapy (cultural adaptations)	Addressed	Addressed	Addressed	Framed as "control as the problem"	Addressed	. Not explicitly addressed

Study	Committed Action	Self-as-context	Values	Fear Hierarchy	In-session exposure	Monitoring	Homework	Relapse prevention
Capel et al. (2022)	Through WISE MOVES retrieval cue: *make a choice*, make several commitments per week to engage in compulsions	Through WISE MOVES retrieval cue	Addressed	Addressed with values-based exposure plan	15-120 minutes. in-session exposures chosen by participant, number of sessions not reported	*Willingness to* engage in exposure despite discomfort, in keeping with pursuit of values	Through WISE MOVES retrieval cue (overall)	Not reported
Thompson et al. (2021)	Not explicitly addressed	Introduced in session 4 of ACT phase	Bull's Eye assessment (session 3 ACT phase)	During assessment phase	12 ERP Sessions	Tracked SUDs during in-session and homework exposures (ERP phases)	ERP: 45-minutes daily exposures; ACT: Acceptance of Thoughts and Feelings	Not reported
Twohig et al. (2010a)	Behavioral commitments sessions 2-3	Addressed session 6	Session 7-8 ; Valued Living Questionnaire	Not applicable	Not applicable	Not applicable	Each session	Sessions 7-8
Twohig et al. (2018)	Not explicitly addressed	Addressed in session 6	Addressed sessions 7-8; use of Valued Living Questionnaire (Wilson et al., 2010)	Not applicable	Not applicable	Not applicable	Addressed each session	Addressed sessions 7-8
Vakili et al. (2015)	Not explicitly addressed;	Not explicitly addressed	Addressed Sessions 7-8	Not applicable	Not applicable	Not Applicable	Not explicitly addressed	Addressed sessions 7-8
Wheeler (2017)	Addressed	Addressed	Introduced in ACT ax, reviewed in last session	Addressed with "hierarchy of goals"	6 exposures	Not reported	Not reported	Not reported

Zemestani et al. (2022)	Addressed as opportunities to engage in valued activities while practicing ACT skills.	Addressed	Addressed	Not applicable	Not applicable	Not applicable	Instructed to practice assignments between sessions for 30 minutes	Not explicitly addressed

Note. ACT = Acceptance and Commitment Therapy; OCD = obsessive-compulsive disorder; ERP = Exposure and Response Prevention; SUDS = Subjective Units of Distress Scale.

Table 6

ACT Study Design Characteristics

Study	*N*	Inclusion	Exclusion	Session duration	Total sessions	Comparison group	Time points measured	Primary measure	Secondary measures	Attrition	Quality appraisal
Capel et al. (2022)	8	Primary diagnosis of OCD	None stated	3 hours 5X week	15	None	Pre-and post-treatment; weeks 1,2,3; follow-up	Y-BOCS	DASS-21; AAQ-II	Not reported	20
Ong et al. (2020)	58	Medication free or stable for 1 month prior; no other therapy or previous ERP or ACT	Psychosis; mania; severe depression; suicidality; Borderline or Schizotypal Personality Disorder	120 minutes 2x per week	16	ERP	Pre-and post-treatment; weekly sessions; follow-up	DOCS	AAQ-II; III-31	17% ACT/ERP; 17.9% ERP	34
Thompson et al. (2021)	4	No previous ERP or ACT; if prescribed benzodiazepine, not take them while in study	Disabilities that would preclude participation such as thought disorder and ASD	45 minutes 1x per week	12	Sequential ERP and ACT	Baseline, mid and post-treatment; BSQ after each session	Y-BOCS	OCI-R; AAQ-II; CFQ; PHLMS; BSQ	Not reported	19
Twohig et al. (2010b)	6	Not receiving any psychotherapy	None stated	60 minutes 1x per week	12	CT; ERP	Pre- and post-treatment Y-BOCS; per session Effects of Therapy	Y-BOCS	Effects of Therapy. Measure	None	36
Twohig et al. (2010a)	79	Medication free or stable for 1 month; no other therapy past 30 days	Psychosis; organic mental disorder with impairment	60 minutes 1x per week	8	PMR	Pre-and-post-treatment and follow-up	Y-BOCS	CEQ; BDI-II; TEI- SF; TAFS; TCQ; AAQ-II; QOL	9.8% ACT; 13.2% PMR	36
Twohig et al. (2018)	58	Medication free or stable for 1 month prior; no other therapy or previous trial of ERP or ACT	Psychosis; mania; severe depression; suicidality; Borderline or Schizotypal Personality Disorder	120 minutes 2x per week	16	ERP	Pre- and post-treatment and follow-up	Y-BOCS	DOCS; BDI-II; TCEQ. PEAS; TEI-SF; AAQ-II; OBQ	17% ACT;17.9 % ERP	34

Study	*N*	Inclusion	Exclusion	Session duration	Total Sessions	Comparison group	Time points measured	Primary measures	Secondary measures	Attrition	Quality appraisal
Vakili et al. (2015)	32	OCD symptom duration of at least a year	Psychosis; suicidality; medical disease; personality disorder; medication or psychotherapy in last month	90 minutes 1x per week	8	ACT+SSRI; SSRI- only	Pre- and post-treatment	Y-BOCS	AAQ	10% ACT; 9% ACT+SSRI; 27% SSRI	16
Wheeler (2017)	32	Diagnosis of OCD on Y-BOCS-SR or OCI-II	None stated	60 minutes 1x per week	13	ACT/ERP	Pre-treatment then sessions 3-13	Y-BOCS-SR	None	None stated	19
Zemenstani et al. (2022)	40	Stable on medication for 6 months and no changes during study; Y-BOCS-SR > 16; at least high school education	Psychosis; bipolar disorder, suicidality; substance abuse or dependence; personality disorder	90 minutes 1x per week	12	ERP+ SSRI; SSRI-only	Pre-and-post-treatment and follow-up	Y-BOCS-SR	AAQ-II; SSQ; TCQ	1 participant	33

Note. ACT = Acceptance and Commitment Therapy; OCD = Obsessive-Compulsive Disorder*;* Y-BOCS = Yale-Brown Obsessive-Compulsive Scale; DASS-21 = Depression Anxiety Stress Scale-21; AAQ-II = Acceptance and Action Questionnaire- II; ERP = Exposure and Response Prevention; DOCS = Dimensional Obsessive-Compulsive Scale; III-31 = Interpretation of Intrusions Inventory-31; ASD = Autism Spectrum Disorder; OCI-R = Obsessive-Compulsive Inventory Revised; CFQ = Cognitive Fusion Questionnaire – 7; PHLMS = Philadelphia Mindfulness Scale; BSQ = Before Session Questionnaire; PMR= Progressive Muscle Relaxation; CEQ = Credibility/Expectancy Questionnaire; BDI-II = Beck Depression Inventory-Second Edition; TEI-SF = Treatment Evaluation Inventory – Short Form; TAFS = Thought Action Fusion Scale; TCQ = Thought Control Questionnaire; QOL = Quality of Life Scale; TCEQ = Treat Credibility and Expectancy Questionnaire; PEAS= Patient ERP Adherence Scale; OBQ-44 = Obsessive Beliefs Questionnaire; SSRI = selective serotonin reuptake inhibitor; AAQ = Acceptance and Action Questionnaire; Y-BOCS-SR =Yale-Brown Obsessive-Compulsive Scale-Self Report; SSQ = Stop Signals Questionnaire.

Table 7

Efficacy of ACT for OCD on Primary Outcome Measures

Study	Design	*N*	ACT implementation	Number of sessions	Primary outcome measure	Outcome
Capel et al. (2022)	Open trial design; no comparison group	8	Hybrid ACT/ERP	15 (3 hours 5X per week for 3 weeks)	Y-BOCS	At post-treatment all participants had marked improvement in OCD symptoms. Gains made during treatment completion were maintained at 1-month follow-up
Ong et al. (2020)	Two-arm parallel design RTC; secondary analysis of Twohig et al. (2018) data	58	Hybrid ACT/ERP	16 (120 minutes/2 X per week for 8 weeks)	DOCS	Results provide equivalent support for both treatments except when patients report less maladaptive interpretations of intrusions, in which case ERP is preferred
Thompson et al. (2021)	Nonconcurrent multiple baseline design	4	Sequential ERP+ACT	12 (45 minutes/1x per week for 12 weeks)	Y-BOCS	On Y-BOCS 3/4 participants had > 35% reduction reflective of treatment response. On OCI-R 3/4 were below cut off for clinically significant OCD at post-treatment
Twohig et al. (2010b)	Single subject experimental design with CT and ERP comparison groups	6	ACT Standalone	12 (60-minutes/1x per week for 12 weeks)	Y-BOCS	When obsessions, compulsions or both were reported as being present, a reduction was reported regardless of the form of therapy
Twohig et al. (2010a)	RTC with active comparison group PRT	79	ACT Standalone	10 (120 minutes/1x per week)	Y-BOCS	Although both conditions showed improving slopes, ACT was superior to PRT on the severity of OCD at both post-treatment and 3-month follow-up
Twohig et al. (2018)	Two-arm parallel design RCT with active ERP comparison group	58	Hybrid ACT/ERP	16 (120 minutes 2X per week for 8 weeks)	Y-BOCS	Results showed both treatments were highly effective with significant reductions in OCD symptom severity. No between group differences on any indices of symptom outcome
Vakili et al. (2015)	RTC with ACT+SRI and SSRI alone comparison groups	32	ACT standalone; ACT+SSRI	8 (90 minutes/1x per week for 8 weeks)	Y-BOCS	All 3 treatments were effective in reducing total scores in Y-BOCS at post-treatment, but ACT and ACT+SSRI while equivalent, were both superior to SSRI-alone

Study	Design	*N*	ACT implementation	Number of sessions	Primary outcome measure	Outcome
Wheeler (2017)	Single Case Design study with no comparison group	1	Hybrid ACT/ERP	13 (60 minute /1X per week for 13 weeks)	Y-BOCS-SR	Reliable and clinical change in severity of patient's symptoms during course of therapy.
Zemestanti et al. (2022)	RCT, ERP+SSRI, and SSRI-only comparison groups	40	ACT+SSRI	12 (90 minutes/2 X per week for 12 weeks)	Y-BOCS-SR	ACT+ SSRI and ERP+ SSRI were both highly effective with significantly greater reductions in symptom severity compared to SSRI-only. ACT+ SSRI and ERP + SSRI were comparable with no significant differences between groups.

Note. ACT = Acceptance and Commitment Therapy; ACT/ERP = Acceptance and Commitment Therapy combined with Exposure and Response Prevention; Y-BOCS = Yale-Brown Obsessive Compulsive Scale; OCD = Obsessive Compulsive Disorder; RTC = Randomized Clinical Trial; DOCS = Dimensional Obsessive-Compulsive Scale; ERP = Exposure and Response Prevention; ERP+ ACT = Exposure and Response Prevention sequenced with Acceptance and Commitment Therapy; OCI-R = Obsessive-Compulsive Inventory- Revised; CT = Cognitive Therapy; PRT = Progressive relaxation training; ACT+ SSRI = Acceptance and Commitment Therapy combined with serotonin selective reuptake inhibitor; Y-BOCS-SR = Yale-Brown Obsessive Compulsive Scale – Short Form; ERP + SSRI = Exposure and Response Prevention combined with serotonin selective reuptake inhibitor.

Table 8

Efficacy of ACT for OCD on Secondary Outcome Measures

Study	Depression	Anxiety	Cognitive Fusion	Psychological Inflexibility (AAQ-II)	Well -Being
Capel et al. (2022)	DASS-21 Significant reduction baseline to post-treatment	DASS-21 Significant reduction baseline to post-treatment	Not measured	Mean scores reduced from clinical to non-clinical range pre-to-post-treatment	Not measured
Thompson et al. (2021)	Not Measured	Not measured	CFQ: Decreases reflecting more distance and objectivity pre-to- post-treatment	Mean scores for combined ERP+ ACT treatment reduced pre-to-post-treatment but no correlation with improvement on Y-BOCS	Not measured
Twohig et al. (2010b)	No measured	Not measured	Not measured	Although tracked over time, AAQ-II was computed as process rather than change score	Not measured
Twohig et al. (2010a)	BDI-II: Significant improvement within groups; For BDI-II > 13, ACT superior to PRT	Not Measured	TAFS: Within group significant improvement in decentering, but only a trend for ACT compared to PRT	ACT superior to PRT pre-to-post-treatment but no differences at follow-up; both interventions significantly reduced psychological inflexibility	Significant improvement In QOL within groups but no between group differences
Twohig et al. (2018)	BDI-II: Significant improvement within groups but no between group difference	Not measured	Not measured	Significant improvement within groups but no between group difference	Not measured
Vakili et al. (2015)	Not measured	Not measured	Not measured	Significant improvement within groups but no between group difference	Not measured
Wheeler (2017)	Not measured	Not measured	Not measured	Not measured	CORE-OM: Clinical improvement in functioning
Zemestani et al. (2022)	Not measured	Not measured	Not measured	ACT+SSRI group superior to ERP+SSRI group	Not measured

Note. ACT = Acceptance and Commitment Therapy; *AAQ*-II = Acceptance and Action Questionnaire-II; DASS-21 = Depression, Anxiety and Stress Scale-21; CFQ = Cognitive Fusion Questionnaire; ERP + ACT = Exposure and Response Prevention combined with Acceptance and Commitment therapy; Y-BOCS = Yale Brown Obsessive-Compulsive Scale; BDI-II = Beck Depression Inventory-Second Edition; PRT= Progressive Relaxation Training; TAFS = Thought Action Fusion Scale; QOL = Quality of Life; CORE-OM = CORE-Outcome Measure; ACT + SSRI = Acceptance and Commitment Therapy and serotonin selective reuptake inhibitor; ERP + SSRI = Exposure and Response Prevention and serotonin selective reuptake inhibitor.

APPENDIX A

Search Terms

Search Term	Search Syntax	Fields Searched	Dates	Publication type
07, 02	CBT OR (Cognitive Behavior Therapy) AND Mindfulness	All	1982-2022	Peer-reviewed articles only
01, 02	ERP OR (Exposure and Response Prevention) AND Mindfulness	All	1982-2022	Peer-reviewed articles only
O1,03	ERP OR (Exposure and Response Prevention) AND MBCT OR (Mindfulness-based Cognitive Therapy)	All	1982-2022	Peer-reviewed articles only
01,04	ERP OR (Exposure and Response Prevention) AND MBSR OR (Mindfulness-based Stress Reduction)	All	1982-2022	Peer-reviewed articles only
01 05	ERP or (Exposure and Response Prevention) AND ACT OR Acceptance and Commitment Therapy	All	1982=2022	Peer-reviewed articles only
02,06	Mindfulness AND OCD OR (Obsessive-Compulsive Disorder)	All	1982-2022	Peer-reviewed articles only
03,06	MBCT OR (Mindfulness Based Cognitive Therapy) AND OCD OR (Obsessive-Compulsive Disorder	All	1982-2022	Peer-reviewed articles only
04,06	MBSR OR (Mindfulness-Based Stress Reduction) AND OCD OR (Obsessive-Compulsive Disorder	All	1982-2022	Peer-reviewed articles only
05,06	ACT OR (Acceptance and Commitment Therapy) AND OCD OR (Obsessive-compulsive Disorder)	All	1982-2022	Peer-reviewed articles only

Note. CBT = Cognitive Behavioral Therapy; ERP = Exposure and Response Prevention; MBCT = Mindfulness=Based Cognitive Therapy; MBSR = Mindfulness-Based Stress Reduction; ACT = Acceptance and Commitment Therapy; OCD = obsessive-compulsive disorder.

APPENDIX B

Table of Included Studies

Study	Aim	Design	Sample characteristics	Mode	Intervention and comparison group(s)
Capel et al. (2022)	Efficacy of combined ACT/ERP treatment for OCD in IOP setting	Open trial design	Total *N* = 8; Mean age 29.12; 3 females, 5 males	Individual	Combined ERP/ACT; no control group
Chien et al. (2022)	Examine and synthesize existing evidence of the effectiveness of MBI's for OCD	Meta-analysis: all RCTs with parallel comparison groups	10 studies included in review	Not applicable	MBCT or MB-ERP, Detached Mindfulness; Control groups: Active and inactive control
Cludius et al. (2020)	Examined long-term efficacy of MBCT on patients with residual symptoms post-CBT	12-month follow-up on Külz et al. (2019)	Total *N* = 125; Mean age 38.62; 77 females, 48 males; duration of OCD mean = 11.70	Group	MBCT intervention and psychoeducation group control
Hertenstein et al. (2012)	Examine subjective experiences of OCD patients in MBCT treatment condition	Pilot study using qualitative methodology	Total *N* = 12; mean age = 41.8; 3 females, 9 males	Individual assessment	MBCT
Key et al. (2017)	Efficacy of MBCT on residual symptoms of patients with past CBT treatment	Two-arm parallel design using a RCT with waitlist control	Total *N* = 36; mean age = 43.3; 17 females, 19 males	Group	MBCT and wait-list control group
Külz et al. (2019)	Efficacy of MBCT on residual symptoms of patients with past CBT treatment	Prospective, bicentric active RCT	Total *N* = 125; Mean age 38.62; 77 females, 48 males; Baseline severity Y-BOCS= 22; Duration of OCD mean 11.70	Group	MBCT intervention and psychoeducational group control
Leeuwerik (2020)	Explore participant perceptions of benefits and acceptability of MB-ERP	Qualitative study based on Strauss, 2018	Total *N* = 14 Mean age =34.57; 11 females, 3 males	Individual assessment	MB-ERP
Mathur et al. (2021)	Efficacy of a 12 session MBCT treatment of OCD in an RCT	Two-arm parallel design using a RCT	Total *N* = 60; mean age = 28.25; 20 females, 40 males	Group	MBCT and stress management training
Ong et al. (2020)	Secondary analysis of Twohig et al. (2018); examine moderators and change processes of ERP and ACT/ERP	Secondary analysis of Twohig et al. (2018)	Total *N* = 58; mean age = 27.80; 68% females, 32% males	Individual	ACT/ERP and ERP
Selchen et al. (2018)	Efficacy of 8 session MBCT treatment of OCD as adjunctive and standalone treatment	Experimental design	Total *N* = 37; mean age = 42.11; 22 females, 15 males	Group	Pre-CBT MBCT and Post-CBT-MBCT
Sguazzin et al. (2017)	Explore participants percepts of benefits and acceptability of MBCT	Qualitative study based on RCT by Key et al. (2017)	Total *N* = 28; Mean age = 44.04; 12 females, 16 males	Not applicable	MBCT and WLC
Soondrum et al. (2022)	Examine whether ACT can be adjunct or viable alone therapy and distinct from CBT processes	Meta-Analysis in accordance with PRISMA	14 studies included in review; mean ages ranging from 19–40	Not applicable	All studies used ACT with other comparison groups

Study	Aim	Design	Sample characteristics	Mode	Intervention and comparison group(s)
Strauss et al. (2018)	Compare efficacy of MB-ERP with ERP in group treatment of OCD	Pilot for RCT with two parallel groups	Total *N* = 37; Median age MB-ERP=; 33; Median age ERP=27; 24 females, 13 males	Group	MB-ERP and ERP
Thompson et al. (2021))	Examine psychological flexibility in sequential ACT and ERP treatment for OCD	Nonconcurrent multiple baseline design	Total *N* = 4; 4 females ranging in age from late 20's to late 30's	Individual	Sequential ERP and ACT; no comparison group
Twohig et al. (2010b)	Examine change mechanisms of ACT, CT, and ERP	Single subject experimental design	Total *N* = 6; mean age = 30.17; 4 females, 2 males	Individual	ACT for OCD compared with CT and ERP
Twohig et al. (2010a)	Examine efficacy of ACT compared to active control (PRT)	RCT	Total *N* = 79; mean Age = 37; 61% females, 39% males	Individual	ACT compared to active comparison group PRT
Twohig et al. (2018)	Examine efficacy of combined ACT/ERP compared to ERP	RCT with a two-armed parallel design	Total *N* = 58; mean age =27.80; 68% females 32% males	Individual	ACT/ERP compared to ERP
Vakili et al. (2015)	Compare efficacy of ACT, SSRI only and ACT+SSRI in treatment of OCD	RCT	Total *N* = 32; mean age=26.96; Females 44.4%; Males 56%	Individual	ACT -alone as compared to ACT+SSRI and SSRI-only
Wheeler (2017)	Examine outcomes in single case combined ACT/ERP viewed by client as well as therapist	Single case design study	Total *N* = 1; female in her 20's	Individual	Combined ACT/ERP; no control group
Zemestani et al. (2022)	Relative effectiveness of ACT+SSRI, ERP+SSRI and SSRI-only	RCT	Total *N* = 40; mean age 34.33; 23 females. 17 males	Individual	ACT+SSRI compared to ERP+SSRI and SSRI-only
Zhang et al. (2021)	Efficacy and acceptability of MBCT compared to SSRI only and active comparison group (PE)	Prospective RTC with three-arms	Total *N* = 58; mean age = 27.80; 68% females, 32% males	Group	MBCT compared to active comparison group (PE) and SSRI

Note. ACT/ERP = Acceptance and Commitment Therapy and Exposure and Response Prevention combined; OCD = Obsessive Compulsive Disorder; IOP = Intensive Outpatient Program; MBCT = Mindfulness-based Cognitive Therapy; CBT = Cognitive Behavioral Therapy; MBI = Mindfulness-based intervention; RCT = Randomized control trial; MB-ERP = Mindfulness-based Exposure and Response Prevention; ERP = Exposure and Response Prevention; WLC = Wait list control; CT = Cognitive Therapy; PRT = Progressive Relaxation Training; ACT+SSRI = Acceptance and Commitment therapy and serotonin selective reuptake inhibitor; ERP+SSRI = Exposure and Response Prevention and serotonin selective reuptake inhibitor; PE = psychoeducation.

APPENDIX C

Sample Quality Appraisal Form

Psychotherapy outcome study methodology rating form. Total =

1. Clarity of sample description.
0=Poor. Vague description (e.g., only mentioned whether patients were diagnosed
1=Fair. Fair description (e.g., mentioned inclusion/exclusion, demographics etc.
2=Good. Good description (all above plus prevalence of comorbid disorders.

2. Severity/chronicity of the disorder.
0=Poor. Not reported and/or subsyndromal patients were included in sample
1=Fair. All patients met the criteria. Sample includes acute and/or low severity
2=Good. Sample includes all chronic (>1 year) and some moderate acuity

3. Representativeness of the sample.
0=Poor. Different from patients seeking tx for the dx. (Excessively strict exclusion)
1=Fair. Somewhat representation (e.g., excluded only if met criterion of major dx)
2=Good Very representative of pts seeking treatment for this dx

4. Reliability of the diagnosis in question.
0= Poor. Diagnostic process was not reported or not assessed by trained interviewer
1= Fair. Dx was assessed with structured interview by trained interviewer
3= Good As above + inter-rater reliability demonstrated (e.g., Kappa coefficient)

5. Specificity of outcome measures.
0= Poor. Very broad outcome measures, not specific to the dx
1= Fair. Moderately specific outcome measures
2=Good. Specific outcome measures, such as a measure for each symptom cluster

6. Reliability and validity of outcome measures**.**
0=Poor. Unknown psychometric properties or fail to meet acceptability standards
1=Fair. Some but not all measures have adequate psychometric properties
2=Good. All measures have above and are best available for authors' purpose

7. Use of blind evaluators.
0=Poor. Not used e.g., assessor not blind or authors do not specify
1=Fair. Blind assessor but no checks to assess the blind
3=Good. Blind assessor plus checks to assess awareness of treatment condition

8. Assessor training.
0=Poor. Not specified or unacceptable

1=Fair. Minimum training but accuracy is not monitored or reported
2=Good. Minimum training, reliability checked, and/or recalibration to prevent drift.

9. Assignment to treatment.
0=Poor. Biased assignment, e.g., patients self-select, or there is only 1 group
1=Fair. Random with possible bias e.g., therapist treatment confounds, small N
2=Good. Random with large enough therapists and sample size

10. Design.
0=Poor. Active treatment vs WLC, or briefly described TAU
1=Fair. Active treatment vs TAU with good description or placebo
2=Good. Active treatment vs another empirically documented active tx

11. Power Analysis**.**
1=Poor. No power analysis was made prior to initiation of the study
2=Fair. A power analysis based on an estimated effect size was used
3=Good. Data informed power analysis and sample size then determined

12. Assessment points.
0=Poor. Only treatment and post-treatment or pre-and follow-up
1=Fair. Pre-, Post-, and follow-up < 1 year
2=Good. Pre-, Post, and follow=up = or > 1 year

13. Manualized, replicable specific treatment programs.
0=Poor. Description unclear, tx not based on publicly available tx manual
1=Fair. Tx is not designed for dx or ambiguity re procedure, uncontrolled
2=Good. Tx designed for dx, detailed manual and no ambiguities

14. Number of therapists**.**
0=Poor. Only one i.e., complete confounding between tx and therapist
1=Fair. At least 2, but effect of therapist on outcome is not analyzed.
2=Good. 3 or more and effect of therapist on outcome is analyzed

15. Therapist training experience.
0= Poor. Very limited clinical experience
1=Fair. Some clinical experience of the treatment or disorder
2=Good. Long clinical experience of the tx and dx (e.g., practicing therapists)

16. Checks for treatment adherence.
0=Poor. No checks were made
1=Fair. Some checks were made (e.g., assessed proportion of therapy tapes)
2=Good. Frequent (e.g., weekly supervision of each session with detailed forms)

17. Checks for therapist competence.
0=Poor. No checks were made
1=Fair. Some checks were made (e.g., assessed proportion of therapy tapes)

2=Good. Frequent (e.g., weekly supervision of each session with detailed forms)

18. Control of concomitant treatments (e.g., medications).
0=Poor. No attempt to control or no information about concomitant tx
1=Fair. Asked to keep medications stable and/or discontinue tx while in study
2=Good. Ensured no other tx were given during the study

19. Handling of attrition.
0=Poor. Proportions of attrition not described; no dropout analysis performed
1=Fair. Proportions of attrition described; dropout analysis/intent to treat performed
2=Good. No attrition, or proportions described results presented as intent to treat

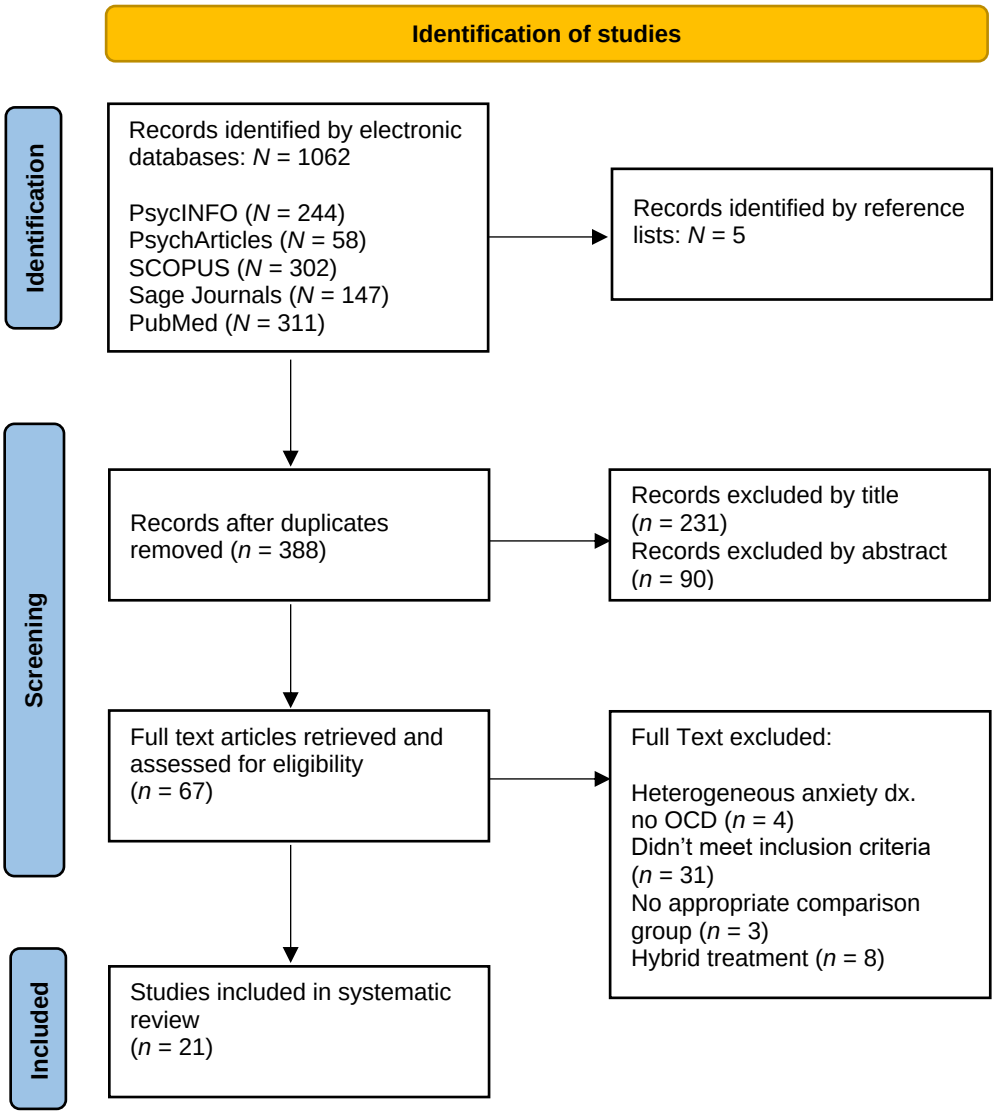
20. Statistical analyses and presentation of results.
0=Poor. Inadequate methods used and/or data not fully presented
1=Fair. Adequate methods, but data not fully presented
2=Good. Adequate methods and data presented with M and SD

21. Clinical significance.
0=Poor. No presentation of clinical significance
1=Fair. Arbitrary criterion for clinical significance; conditions compared % improvement
2=Good. Jacobson's criterion used; conditions compared % improvement

22. Equality of therapy hours (for non-WLC designs only).
0=Poor. Conditions differ markedly (> or = 20%)
1=Fair. Conditions differ somewhat (10-19%)
2=Good. Conditions do not differ (<10%)

APPENDIX D

PRISMA Flow Diagram



Note. From "The prisma 2020 statement: An updated guideline for reporting systematic reviews," by M. J. Page, J. E. McKenzie, P. M. Bossuyt, I. Boutron, T. C. Hoffmann, C. D. Mulrow, L. Shamseer, J. M. Tetzlaff, E. A. Akl, S. E. Brennan, R. Chou, J. Glanville, J. M. Grimshaw, A. Hróbjartsson, M. M. Lalu, T. Li, E. W. Loder, E. Mayo-Wilson, S. McDonald, L, A. McGuiness, L. A. Stewart, J. Thomas, A. C. Tricco, V. Welch, P. Whiting, & D Whiting. Journal of Clinical Epidemiology, 134, pp. 178–189. (https://doi.org/10.1016/j.jclinepi.2021.03.001). Copyright 2020 by The PRISMA Statement.