

This article was downloaded by: [University of Saskatchewan Library]

On: 18 March 2015, At: 21:02

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



Psychotherapy Research

Publication details, including instructions for authors and subscription information:
<http://www.tandfonline.com/loi/tpsr20>

Cognitive behavioral therapy: Current status and future research directions

Shelley McMain^a, Michelle G. Newman^b, Zindel V. Segal^c & Robert J. DeRubeis^d

^a Centre for Addiction and Mental Health - Borderline Personality Disorder Service, Toronto, ON, Canada

^b Department of Psychology, Penn State University, University Park, PA, USA

^c Department of Psychology, University of Toronto, Toronto, ON, Canada

^d Department of Psychology, University of Pennsylvania, Philadelphia, PA, USA

Published online: 17 Feb 2015.



[Click for updates](#)

To cite this article: Shelley McMain, Michelle G. Newman, Zindel V. Segal & Robert J. DeRubeis (2015): Cognitive behavioral therapy: Current status and future research directions, *Psychotherapy Research*, DOI: [10.1080/10503307.2014.1002440](https://doi.org/10.1080/10503307.2014.1002440)

To link to this article: <http://dx.doi.org/10.1080/10503307.2014.1002440>

PLEASE SCROLL DOWN FOR ARTICLE

Taylor & Francis makes every effort to ensure the accuracy of all the information (the "Content") contained in the publications on our platform. However, Taylor & Francis, our agents, and our licensors make no representations or warranties whatsoever as to the accuracy, completeness, or suitability for any purpose of the Content. Any opinions and views expressed in this publication are the opinions and views of the authors, and are not the views of or endorsed by Taylor & Francis. The accuracy of the Content should not be relied upon and should be independently verified with primary sources of information. Taylor and Francis shall not be liable for any losses, actions, claims, proceedings, demands, costs, expenses, damages, and other liabilities whatsoever or howsoever caused arising directly or indirectly in connection with, in relation to or arising out of the use of the Content.

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden. Terms & Conditions of access and use can be found at <http://www.tandfonline.com/page/terms-and-conditions>

EMPIRICAL PAPER

Cognitive behavioral therapy: Current status and future research directions

SHELLEY MCMAIN¹, MICHELLE G. NEWMAN², ZINDEL V. SEGAL³, & ROBERT J. DERUBEIS⁴

¹Centre for Addiction and Mental Health – Borderline Personality Disorder Service, Toronto, ON, Canada; ²Department of Psychology, Penn State University, University Park, PA, USA; ³Department of Psychology, University of Toronto, Toronto, ON, Canada & ⁴Department of Psychology, University of Pennsylvania, Philadelphia, PA, USA

(Received 16 September 2014; revised 6 December 2014; accepted 20 December 2014)

Abstract

Cognitive behavioral therapy (CBT), an umbrella term that includes a diverse group of treatments, is defined by a strong commitment to empiricism. While CBT has a robust empirical base, areas for improvement remain. This article reviews the status of the current empirical base and its limitations, and presents future directions for advancement of the field. Ultimately, studies are needed that will identify the predictors, mediators, and moderators of treatment response in order to increase knowledge on how to personalize interventions for each client and to strengthen the impact of CBT. Efforts to advance the dissemination and implementation of CBT, innovative approaches such as practice-oriented research, and the advantages of incorporating new and existing technologies, are discussed as well.

Keywords: cognitive behavioral therapy; psychotherapy; treatment outcome

A strong commitment to empiricism led to the development of cognitive behavioral therapy (CBT) in the 1950s, and continues to define this approach. Since CBT was introduced, it has grown to include a diverse group of treatments that include cognitive therapy, cognitive behavioral therapy, acceptance and commitment therapy, dialectical behavior therapy (DBT), schema-focused therapy, rational-emotive behavior, mindfulness-based cognitive therapy, metacognitive therapy, cognitive behavioral analysis system of psychotherapy, and cognitive processing therapy. Published investigations of CBT far outnumber those of any other psychotherapeutic approach, and numerous studies provide strong support for the efficacy of CBT across a broad range of disorders. However, while the current evidence base is robust, areas for improvement remain. This article highlights potential avenues for achieving such improvement. We begin by briefly summarizing the current status of empirical evidence on the

efficacy of CBT. Next, we identify some limitations of the evidence base. Finally, we identify a few specific areas for future research directions.

Status of the Empirical Evidence on CBT

Over the past four decades, a huge volume of well-controlled trials and replication studies, as well as more than 250 meta-analytic studies, has been amassed on various forms of CBT. While most research has focused on the applications of CBT for depression and anxiety, studies have also been conducted on its use with a myriad of other diagnoses, including schizophrenia, personality disorders, bipolar disorder, eating disorders, addictive behaviors, insomnia, anger, criminal behavior, marital discord, pain management, and general stress related to medical conditions. For a recent review, see Hollon and Beck (2013).

Correspondence concerning this article should be addressed to Shelley Mcmain, Centre for Addiction and Mental Health – Borderline Personality Disorder Service, Toronto, ON, Canada. Email: shelley.mcmmain@camh.ca

The superiority of CBT compared to wait-list or nonspecific controls has been consistently demonstrated. The strongest support is seen with anxiety disorders, for which CBT is considered a first-line treatment (Hofmann & Smits, 2008). Effect size estimates in comparisons of CBT with control conditions range from medium to large for various anxiety disorders (e.g., generalized anxiety disorder, panic disorder, social anxiety, obsessive compulsive disorder, post-traumatic stress disorder (PTSD), and specific phobias; Deacon & Abramowitz, 2004), unipolar depression (e.g., van Straten, Geraedts, Leeuw, Andersson, & Cuijpers, 2010), bulimia nervosa (Thompson-Brenner, 2002), borderline personality disorder (BPD) (e.g., Stoffers et al., 2012), anger (e.g., Saini, 2009), and specific substance dependence disorders (e.g., cannabis and nicotine; Dutra et al., 2008). For a recent review of meta-analytic studies, see Hofmann, Asnaani, Vonk, Sawyer, and Fang (2012).

Overall, CBT has performed well in comparison with well-defined comparative treatments. For example, CBT has been shown to be superior to other treatments for various anxiety disorders (e.g., social phobia, generalized anxiety disorder; Hofmann & Smits, 2008). CBT has been found to be effective for unipolar depression (Pfeiffer, Heisler, Piette, Rogers, & Valenstein, 2011), specific phobias (Hofmann & Smits, 2008), PTSD (Bisson et al., 2007), and BPD (Stoffers et al., 2012), though not superior to other specific psychological treatments and this has prompted questions about what accounts for the efficacy of CBT. CBT alone has been found to not be sufficient for the treatment of bipolar disorder (Gregory, 2010), although some evidence suggests that it may help to prevent relapses (Cakir & Ozerdem, 2010). Evidence to support the efficacy of CBT for the treatment of anorexia nervosa (McIntosh et al., 2005) or chronic symptoms associated with psychotic disorders (Bird et al., 2010) is not strong.

Compared to pharmacotherapy, CBT is superior and preferable for the treatment of specific anxiety disorders (e.g., social anxiety, obsessive compulsive disorder; Hofmann & Smits, 2008), and gambling disorders (Leung & Cottler, 2009); is the first-line intervention for BPD, for which there is no medication of choice; is at least as efficacious in the treatment of specific anxiety disorders (e.g., generalized anxiety disorder and panic disorder; Hofmann & Smits, 2008), and bulimia nervosa (Thompson-Brenner, 2002); and is an effective adjunct to medication for the treatment of schizophrenia (Zimmermann, Favrod, Trieu, & Pomini, 2005) and bipolar disorder. For severe depression, the evidence is mixed: some studies indicate that medications are superior (Elkin et al., 1995) while

others indicate that CBT is as efficacious as medication (e.g., DeRubeis et al., 2005). For the treatment of alcohol and opioid dependence, CBT is less efficacious than agonist medications (Dutra et al., 2008).

In sum, CBT has a robust evidence base for many disorders. Consequently, in the past 10 years, published guidelines by the American Psychiatric Association and the National Institute for Health and Care Excellence have recommended this therapy for the treatment of depression, obsessive compulsive disorder, generalized anxiety disorder, panic disorder, PTSD, BPD, schizophrenia, and bulimia nervosa.

Limitations of Research on CBT

Most of the published investigations seeking to describe the mechanisms of change that underlie the effects of psychotherapeutic treatment have been in the area of cognitive therapy, and much of the research has addressed the role of cognitive change in the reduction of symptoms and prevention of relapse (cf., Ingram, Atchley, & Segal, 2011). However, most reviewers of this literature conclude that at this stage, we do not know the answers to the most important questions concerning how CBT ameliorates and prevents symptoms (e.g., Crits-Christoph, Gibbons, & Mukherjee, 2013; Oei & Free, 1995).

The question remains as to how best to test the hypothesis that cognitive change, or for that matter other purported mechanisms of change (such as skills acquisition, mindfulness, schema change), is an important link in the causal chain that connects the delivery of CBT with symptom reduction and relapse prevention. A major challenge in this endeavor is the difficulty in disentangling cause from consequence (or from coincidence). For example, testing whether symptom change is due cognitive change in cognitive therapy is challenging, given the brief time lag between cognitive change and cognitive changes in mood that is assumed in cognitive therapy. Another impediment to advancing our understanding is that the term “cognition” can mean many different things, and cognitive change can be measured in a variety of ways. The most common type of measure used for studying mechanisms of change is the self-report questionnaire. It may be that other, less frequently used methods, such as those involving negative mood inductions (Segal, Gemar, & Williams, 1999), ratings of in-session client verbalizations (Tang & DeRubeis, 1999), or ecological momentary assessments (Stone & Shiffman, 1994), will provide more informative insights into the mechanisms of change in CBT.

As important as it is to answer questions about how CBT works in general, it is perhaps of even greater practical significance to discover how they can be adapted to best suit the needs of individual clients. In CBT, as in other therapies, there is a place for evidence-based principles that clinicians can use, in conjunction with clinical intuition, to adjust the focus of the therapy to the client. Distinctions that are likely to matter, and that have and should continue to be the subject of empirical research, include the chronicity of dysfunction and the presence of comorbid disorders, especially personality dysfunction. For example, Strunk, Brotman, DeRubeis, and Hollon (2010) found that the relation between a measure of cognitive therapy, therapist competence and outcome was stronger in a subgroup of clients with more complex presentations of depression, as indexed by these variables.

Despite the strong evidence base of CBT, and even if that evidence base is further strengthened, its full impact cannot be realized unless it is utilized more widely and reaches more of those in need. Among individuals diagnosed with serious mental health problems, 35.5–50.3% of those in developed countries and 76.3–85.4% of those in less-developed countries had received no treatment in the last 12 months (Demyttenaere, Bruffaerts, & WHO World Mental Health Survey Consortium, 2004). Although CBT is widely utilized in the USA, Canada, and the UK (Norcross, Karpiak, & Santoro, 2005), its practice is limited in other developed countries. Even in North America, the availability of CBT is often limited to urban centers; and even within large metropolitan centers, access to specialized CBT treatment programs, such as those for eating disorders, obsessive compulsive disorder, and BPD, are limited since the demand for service outweighs the available resources. The numerous barriers that impede the uptake and dissemination of CBT are detailed below.

One such barrier is an over-reliance on randomized controlled trials (RCTs) over other forms of research designs, such as effectiveness studies and process outcome studies. Whereas RCTs are important and are widely regarded as the gold standard for rigorous research, they have been criticized as being limited with regard to advancing the understanding of complex dynamic phenomena such as treatment implementation (Goldfried & Wolfe, 1996). The strict exclusion criteria that often characterize RCTs have produced client samples that in many cases are not representative of the populations seen in routine settings (Westen, Novotny, & Thompson-Brenner, 2004), and many clinicians have expressed concerns that the findings from efficacy trials are not clinically relevant and do not transfer easily to

routine practice. Awareness of this problem has prompted a rise in the number of CBT trials that include participants who are more typical of those in routine practice, such as individuals with significant comorbidities and/or who are receiving concurrent medication (e.g., DeRubeis et al., 2005; McMain et al., 2009).

Confidence in a treatment is stronger if the effects observed in RCTs are replicated in effectiveness trials. Unfortunately, the CBT effectiveness studies done to date have limitations. Although the findings of several “real world” studies have suggested that CBT can be effectively delivered in routine practice settings, some experts reject this conclusion, pointing to the weaknesses in the quality of many of these studies. A meta-analysis by Hans and Hiller (2013) of 70 non-randomized CBT effectiveness studies for adult anxiety disorders identified numerous methodological limitations of the data: 30% of studies failed to report dropout rates; outcome analyses were largely restricted to completers (63% of all trials); and few of the studies had examined generalized anxiety disorder and specific phobias, which precluded conclusions about the evidence.

Another impediment to bridging the gap between science and practice is that CBT research has typically evolved without input from relevant knowledge users. Several scholars propose that barriers to advancing the dissemination and implementation of CBT can be overcome through broader alliances and crosstalk between relevant stakeholders including clients, practitioners, health-care decision-makers, oversight organizations, and other researchers (McHugh & Barlow, 2010). For example, Goldfried et al. (2014) contend that a practitioner’s experience in delivering CBT needs to be factored into training regimens and dissemination efforts. By virtue of being closer than researchers are to clinical phenomena, practitioners could help operationalize relevant variables such as client characteristics and adherence for training studies (Boswell et al., 2013). Others contend that the field of CBT research has often developed in a fragmented manner, and that we need to coordinate the work of scholars working globally in an effort to advance knowledge systematically (e.g., Linehan, personal communication). Finally, to ensure that CBT has maximal impact, we need to ensure that it is culturally relevant and feasible for use across diverse settings and populations.

The impact of CBT has also been impeded by overly restrictive and ineffective aspects of dissemination efforts. Although several ideas have been put forth, few have been tested empirically. Initial efforts focused on attempting to refute clinician concerns with data from benchmarking studies (e.g., McEvoy &

Nathan, 2007). However, benchmarking studies, which are typically published in academic journals and contain scholarly jargon, are geared toward academics rather than practitioners; and many practitioners do not have the time, resources, or inclination to access journals in libraries or to search databases.

The attitudes and experience of practitioners may also interfere with expanding the availability of CBT. There are practitioners who lack knowledge of or training in CBT (Becker & Stirman, 2011), hold negative attitudes toward it (e.g., it is too mechanistic), and/or consider it ill-suited to the typical client populations seen in the community (Nakamura, Higa-McMillan, Okamura, & Shimabukuro, 2011). The limited number of providers in certain demographic regions is another problem. Finally, some practitioners who believe that they are delivering CBT are in fact doing so with low fidelity (Woody, Weisz, & McLean, 2005), and there is evidence to suggest that therapist self-reports show little correspondence with behavioral observations of therapy sessions (Brosan, Reynolds, & Moore, 2008). Research on optimal therapist training is at an early stage, and more is needed.

Finally, attitudes on the part of clients themselves can be a factor. Individuals in need of help may avoid CBT because of a preference for other types of treatment, a lack of knowledge regarding options and efficacy, inability to access the therapy, or lack of financial resources (Gunter & Whittal, 2010). Client viewpoints and knowledge may be particularly relevant with respect to CBT, given that it requires their active participation both within and between sessions.

Future Research Directions

To address the limitations in CBT research identified above, we propose the following two broad areas for future research directions: (i) individualizing CBT for optimal client outcomes and (ii) building an evidence base to advance dissemination and implementation. Within each of these areas, we point to a few specific directions.

Individualizing CBT for Optimal Client Outcomes

There is increasing awareness that even a treatment that is generally potent is unlikely to be effective for everybody. When more than one evidence-based treatment exists for a given problem, therapists should have the ability to select the most promising treatment based on each client's unique characteristics. This is one of the aims of "personalized medicine", a concept that has recently received

greater focus in mental health, especially in the CBT community. Spurred by calls to identify potential moderators of treatment outcome in randomized trials (e.g., Kraemer, Wilson, Fairburn, & Agras, 2002), there recently been a dramatic increase in research activity that focuses on the prediction of outcome: in particular, the differential prediction of outcome as a function of the treatment that is provided to the client.

A number of variables have predicted differential response to CBT. For example, in a study that compared CBT to interpersonal psychotherapy (IPT) for the treatment of depression (Barber & Muenz, 1996), it was found that clients with avoidant features had a better response to CBT relative to IPT, whereas the opposite was true for clients high on a measure of obsessiveness. Similarly, in another study that compared DBT to a psychodynamic approach for BPD, client agreeableness was associated with stronger alliances and better clinical outcomes in the DBT group but not in the psychodynamic group (Hirsh, Quilty, Bagby, & McMMain, 2012).

Two groups have published on the differential response to CBT versus antidepressant medications (ADMs). In these reports, the focus is as much on utility of the methods and the ways they point to distinctive mechanisms of change in the two kinds of treatment as it is one of the aims of personalized recommendations per se. McGrath et al. (2013) used indexes of brain metabolism from positron emission tomography to predict response, and found that hypometabolism in the insula was associated with a better response to CBT while hypermetabolism predicted a better response to ADM. DeRubeis et al. (2014) applied linear regression models to improve the selection of a treatment by generating a score for each client, the Personalized Advantage Index (PAI), which indicates which treatment is likely to provide greater benefits. A higher PAI score (either positive or negative) indicates a higher magnitude of the expected difference between the symptom reductions that will be experienced by the client depending on whether he or she received the indicated treatment, relative to the non-indicated treatment. In a study comparing CBT and ADM for moderately to severely depressed clients, DeRubeis et al. (2005) showed how such a system could be used to individualize treatment selection. Moreover, the system quantifies the benefit that would accrue, on average, to clients whose treatment is determined by the PAI relative to those whose treatment is determined by other means. Variables that contributed to a PAI score indicating CBT as the preferred treatment included being married, having recently experienced many stressful life events (see also

Bulmash, Harkness, Stewart, & Bagby, 2009), and being unemployed. The presence of a comorbid personality disorder was a strong contributor to PAI scores that indicated better prognosis with ADM relative to CBT.

These systems are being developed just as researchers are evaluating the potential for genetic testing to help determine which among many available ADMs to select (Uhr et al., 2008). Although findings from these efforts have thus far not been promising, genetic information may play a role in future studies, along with neuroimaging findings, demographic factors, personality profiles, etc., in predicting the optimal treatment path for each person.

It is appropriate that trial and error, clinical intuition, and case conceptualization methods continue to guide the focus of CBT. However, as research findings emerge that provide an evidence base that can augment clinical judgment, CBT can become even more efficient and effective. A recent example of this type of research is an investigation reported by Keefe (2014) on the treatment processes in CBT for depressed clients with or without personality disorders. Different interventions predicted treatment response in the two subgroups. A greater focus early in therapy on general beliefs, including core beliefs and schemas, predicted better response in clients with Axis II comorbidity, and worse response in those without it. The opposite was found with regard to a focus on specific (moment-to-moment) beliefs, which predicted poorer outcome in those with Axis II comorbidity and better outcome in those without. Used prescriptively, an increased focus on core beliefs could improve response rates in those with Axis II comorbidity, as was suggested by Svartberg, Stiles, and Seltzer (2004).

Another strategy to increase the effectiveness and efficient delivery of CBT is to increase research efforts to predict risk of relapse and readiness to terminate CBT. Among clients treated with CBT for depression, the ability to apply the skills that were taught in therapy sessions predicted resistance to relapse (Strunk, DeRubeis, Chiu, & Alvarez, 2007). Two examples of measures used to predict resistance to relapse are the "Skills of Cognitive Therapy" (Jarrett, Vittengl, Clark, & Thase, 2011) and the Competencies of Cognitive Therapy Scale (Strunk et al., 2007). Such measures are meant to reflect the mechanisms of change and relapse prevention; thus, development and testing of their predictive validity in CBT should yield tools that a therapist can use to help determine whether a client is ready to reduce session frequency or terminate from CBT.

Developing an Empirical Base to Advance the Dissemination and Implementation of CBT

For years, psychotherapy researchers have been aware of the gap between research and practice. If CBT is to increase its impact, it is necessary to change the way we evaluate it. There are growing calls to examine the effect of CBT in real-world settings and to study treatment effects beyond outcomes. Critical aspects of this work include attention to the feasibility of interventions, factors that impact the uptake of CBT (e.g., satisfaction, costs, acceptability), and strategies that help to modify clinician behavior. Effectiveness trials of high quality are urgently needed across all forms of cognitive behavioral treatments.

One approach being recommended to close the research-practice gap is practice-oriented research, a concept that was introduced in primary care medicine in the 1950s and adopted in mental health care in the mid-1990s. This approach involves an active collaboration between researchers and clinicians to generate knowledge. Often conducted within the context of practice-based research networks (PBRNs), practice-based research develops through a process of shared decision-making (e.g., Castonguay, 2013). Although the study of psychotherapy and CBT through PBRNs is in its infancy, several researchers advocate greater use of this method because of the numerous benefits gained through such efforts. For a review, see Koerner and Castonguay (2014).

A major advantage of PBRNs is that they are an ideal vehicle for conducting clinically relevant research that can easily modify clinicians' behavior and improve treatment outcomes. As one example, in a study by Adelman, Castonguay, Kraus, and Zack (2014), clinicians, researchers, and administrators collaborated on collecting clinical outcomes as part of routine practice in a residential setting for adolescents being treated for concurrent substance use and mental health problems. The incorporation of clinical assessment tools provided the clinicians with information that led them to reconceptualize the primary problem, identifying violence as a more central issue than anxiety and depression. This prompted the team to modify its clinical approach by introducing rational emotive therapy (RET) for anger. By monitoring outcomes, the clinicians were able to determine that treatment was more effective after the introduction of RET. In sum, within this PBRN, clinicians adopted an evidence-based intervention and were able to observe first hand that they could achieve better outcomes.

The advantages of conducting CBT research through PBRNs include increasing the likelihood

of clinicians utilizing evidence-based treatments, increasing fidelity to treatment protocols, and improving outcomes (e.g., Koerner & Castonguay, 2014). We know of one PBRN that has focused on helping clinicians learn how to use and obtain good outcomes with evidence-based therapies such as DBT. The Evidence-based Practice Institute, established by Kelly Koerner, involves a network of practitioners, clinical administrators, trainers, and researchers who have a shared interest in learning how to implement evidence-based practices and evaluate outcomes. This PBRN has focused on the training in competencies in modules (e.g., exposure protocols, skills training, and goal setting), an approach that Koerner and Castonguay (2014) contend is highly applicable to the dissemination of CBT protocols.

Importantly, the development of a more robust and clinically relevant CBT evidence base can develop through the collaboration between internationally dispersed researchers who adopt a systematic approach to addressing a specific CBT model or clinical problem. For example, Marsha Linehan, the developer of DBT, initiated an international strategic planning group to advance knowledge on the practice of this treatment. Members of the DBT Strategic Planning Network include an international group of clinician scientists which hold annual strategic planning meetings to review DBT research findings, present research proposals, identify gaps in knowledge, and provide oversight of the advancement of the study of DBT. The advantage of a network of clinical researchers who are dispersed globally across academic and clinical settings is that it enables a methodical approach in examining the same intervention practiced across diverse cultures and populations. One example of a project from this group includes an investigation into enhancing DBT with prolonged exposure (PE) to improve treatment outcomes for individuals with trauma and BPD. This PE-enhanced DBT was tested in an inpatient DBT context in Germany (Bohus et al., 2013) and an outpatient context in the US (Harned, Korlsund, Foa, & Linehan, 2012). The findings showed that the inclusion of more distressed actively self-harming individuals was suitable for the inpatient context, whereas abstinence from self-harm was a critical inclusion for the outpatient intervention. Any group of CBT researchers could similarly initiate a network with other researchers, as well as with clients and health-care decision-makers who are geographically dispersed, in order to learn from one another and broaden the scope of understanding.

New and existing technologies need to be further examined for their potential to support efforts to disseminate and implement CBT. CBT is partic-

ularly well suited to interactive computer and smart phone programs because it has well-delineated procedures, is highly structured, targets specific behaviors and symptoms, and proceeds in a systematic manner (Newman, Consoli, & Taylor, 1997). CBT that is delivered via technology offers many unique advantages and has been found to be acceptable to clients (e.g., Andrews, Cuijpers, Craske, McEvoy, & Titov, 2010). Clients decide how often, when, and for how long to use the program, and are therefore chiefly responsible for their own treatment, which encourages a greater sense of mastery and control. In standard therapy sessions, the failure of some techniques may be due to low therapist fidelity or a pacing that does not suit the client, whereas a computer delivery allows clients to proceed at their own pace; as well, treatment elements can be added, withdrawn, and personalized to the individual. Technology also offers the advantage of exact reproducibility of therapy, thus ensuring that the treatment is provided with high fidelity. In addition, the accessibility and privacy of computer-based or smart phone-based interventions may enhance comfort, acceptability, uptake, and treatment response in some clients. Furthermore, in situations where clients cannot access CBT, technology can be used to make it available to those who might otherwise remain untreated (e.g., remote geographic locations, lack of funding, or a condition of agoraphobia that might make a client unwilling or unable to drive to the therapist's office), and can be made available anytime and anyplace. Directly related to cost-benefit issues, technology-based therapy may be implemented when the demand for treatment outweighs what can be provided by human resources.

The efficacy of CBT delivered using technologies has been demonstrated for a variety of problems, including anxiety, depressive disorders, and addictive disorders (e.g., Newman, Szkodny, Llera, & Przeworski, 2011a, 2011b). In numerous studies, computerized treatments delivered to the community have demonstrated comparable efficacy to therapist-delivered treatments and were found to be superior to no treatment or placebo (e.g., Newman et al., 2011a, 2011b). Additional studies are beginning to emerge on the efficacy of the use of momentary intervention tools such as smart phones (e.g., Newman, Przeworski, Consoli, & Taylor, 2014).

In addition to being a means for providing treatment to clients, technology has been used successfully as a resource for training therapists. For example, a number of studies have found that online training sites led to greater success than treatment manuals alone on outcomes such as knowledge, objective performance of therapy strategies, learner satisfaction, and learner self-efficacy in training on

DBT and 12-step therapy (e.g., Dimeff, Woodcock, Harned, & Beadnell, 2011). Another line of research attempted to improve clinicians' attitudes toward and implementation of exposure therapy, as this technique is perceived by many therapists as cruel and unethical (Olatunji, Deacon, & Abramowitz, 2009) and efforts to increase its use are crucial. In an examination of online multimedia training (OLT), online motivational enhancement (OME), and online community support (OCS), Harned et al. (2014) found that while OLT alone, OLT + OME, and OLT + OME + OCS all led to significantly increased use and self-efficacy, the combination of all three interventions resulted in the most improved attitudes toward exposure, significantly enhanced clinical proficiency (determined objectively), and resulted in superior knowledge. Thus, multimedia may aid our ability to both disseminate and implement interventions. As well, the proliferation of smartphones can increase the access of both practitioners and consumers to research findings.

Finally, another approach and natural setting for extending the reach of CBT is in the area of primary care. This is driven by the reality that in depression, for example, fewer than 40% of clients respond to first-line antidepressant therapy, leaving primary care physicians scrambling for additional interventions. Wiles et al. (2013) demonstrated that CBT could be used adjunctively as a second step following medication for depressed clients seen in primary care, finding that 46% of clients achieved a 50% reduction in Beck Depression Inventory scores at six months post-intervention compared to 22% who received usual care. In a similar vein, Nordgren et al. (2014) found that providing clients suffering from anxiety with 7–10 online CBT sessions, in addition to their ongoing management in primary care, was associated with significant symptom reduction (between-group effect sizes $d = 0.20$ – 0.86). What both these studies have in common is the use of CBT in a sequenced manner that is intended to optimize the benefits of multiple interventions. Future research is needed to determine the optimal placement of CBT in a treatment algorithm and the specific disorders for which it is best applied. With the growing recognition that many mental health conditions have a recurrent and often chronic course, it is likely that multiple modalities may enhance treatment response by working through different change mechanisms. This area is ripe for investigation.

Summary

While the evidence base for CBT is robust, it needs to be stronger, and there are currently gaps in several areas of knowledge. We need to advance our understanding of the moderators, mediators, and

predictors of response to CBT, in order to better guide case formulation and enable clinicians to select appropriate strategies to maximize treatment effects. There are a limited number studies on change processes and change mechanisms, and such research is crucial to improving our understanding of how CBT achieves its' effects. The effectiveness of CBT as practiced in diverse real-world settings is not well understood. Many individuals who are in need of CBT cannot access it. Additionally, there is a lack of evidence-based information related to the efficient and effective training of clinicians, and research on how to improve the uptake of CBT is essential.

Several natural directions for future research exist. The first main area to be addressed is how to individualize CBT to each client. It is not clear how CBT achieves its effects, so research on the underlying mechanisms of change in CBT will help us understand how to better predict differential treatment response. A second main direction concerns the building of an evidence base to guide the dissemination and implementation of CBT. Studies carried out in real-world settings, such as those conducted through Practice Based Research Networks, are needed to increase the clinical relevance of research findings and to facilitate the implementation and dissemination of treatments. Finally, we need to make better use of innovative technologies because of their value in facilitating the efforts to disseminate and implement CBT. Taken together, these recommendations can maximize the impact of CBT.

References

- Adelman, R. W., Castonguay, L. G., Kraus, D. R., & Zack, S. E. (2014). Conducting research and collaborating with researchers: The experience of clinicians in a residential treatment center. *Psychotherapy Research*, 25(1), 108–120.
- Andrews, G., Cuijpers, P., Craske, M. G., McEvoy, P., & Titov, N. (2010). Computer therapy for the anxiety and depressive disorders is effective, acceptable and practical health care: A meta-analysis. *PLoS ONE*, 5(10), e13196. doi:10.1371/journal.pone.0013196.t002
- Barber, J. P., & Muenz, L. R. (1996). The role of avoidance and obsessiveness in matching patients to cognitive and interpersonal psychotherapy: Empirical findings from the Treatment for Depression Collaborative Research Program. *Journal of Consulting and Clinical Psychology*, 64, 951–958. doi:10.1037/0022-006X.64.5.951
- Becker, K. D., & Stirman, S. W. (2011). The science of training in evidence-based treatments in the context of implementation programs: Current status and prospects for the future. *Administration and Policy in Mental Health and Mental Health Services Research*, 38, 217–222. doi:10.1007/s10488-011-0361-0
- Bird, V., Premkumar, P., Kendall, T., Whittington, C., Mitchell, J., & Kuipers, E. (2010). Early intervention services, cognitive behavioural therapy and family intervention in early psychosis: Systematic review. *The British Journal of Psychiatry*, 197, 350–356. doi:10.1192/bjp.bp.109.074526
- Bisson, J. I., Ehlers, A., Matthews R., Pilling S., Richards, D., & Turner S. (2007). Psychological treatments for chronic

- post-traumatic stress disorder: Systematic review and meta-analysis. *The British Journal of Psychiatry*, 190(2), 97–104. doi:10.1192/bjp.bp.106.021402
- Bohus, M., Dyer, A. S., Priebe, K., Kruger, A., Kleindienst, N., Schmahl, C., ... Steil, R. (2013). Dialectical behaviour therapy for post-traumatic stress disorder after childhood sexual abuse in patients with and without borderline personality disorder: A randomised controlled trial. *Psychotherapy and Psychosomatics*, 82, 221–233.
- Boswell, J. F., Gallagher, M. W., Sauer-Zavala, S. E., Bullis, J., Gorman, J. M., Shear, M. K., ... Barlow, D. H. (2013). Patient characteristics and variability in adherence and competence in cognitive-behavioral therapy for panic disorder. *Journal of Consulting and Clinical Psychology*, 81, 443–454. doi:10.1037/a0031437
- Brosnan, L., Reynolds, S., & Moore, R. G. (2008). Self-evaluation of cognitive therapy performance: Do therapists know how competent they are? *Behavioural and Cognitive Psychotherapy*, 36, 581–587. doi:10.1017/S1352465808004438
- Bulmash, E., Harkness, K. L., Stewart, J. G., & Bagby, R. M. (2009). Personality, stressful life events, and treatment response in major depression. *Journal of Consulting and Clinical Psychology*, 77, 1067–1077. doi:10.1037/a0017149
- Cakir, S., & Ozerdem, A. (2010). Psychotherapeutic and psychosocial approaches in bipolar disorder: A systematic literature review. *Turkish Journal of Psychiatry*, 21, 143–154.
- Castonguay, L. G. (2013). Psychotherapy outcome: An issue worth re-visiting 50 years later. *Psychotherapy*, 50(1), 52–67. doi:10.1037/a0030898
- Crits-Christoph, P., Gibbons, M. B. C., & Mukherjee, D. (2013). Process-outcome research. In M. J. Lambert (Ed.), *Handbook of psychotherapy and behavior change* (6th ed., pp. 298–340). Hoboken: Wiley.
- Deacon, B. J., & Abramowitz, J. S. (2004). Cognitive behavioral treatments for anxiety disorders: A review of meta-analytic findings. *Journal of Clinical Psychology*, 60, 429–441. doi:10.1002/jclp.10255
- Demyttenaere, K., Bruffaerts, R., & WHO World Mental Health Survey Consortium. (2004). Prevalence, severity, and unmet need for treatment of mental disorders in the World Health Organization World Mental Health Surveys. *Journal of the American Medical Association*, 291, 2581–2590. doi:10.1001/jama.291.21.2581
- DeRubeis, R. J., Cohen, Z. D., Forand, N. R., Fournier, J. C., Gelfand, L. A., & Lorenzo-Luaces, L. (2014). The personalized advantage index: Translating research on prediction into individualized treatment recommendations. A demonstration. *PLoS ONE*, 9(1), e83875.
- DeRubeis, R. J., Hollon, S. D., Amsterdam, J. D., Shelton, R. C., Young, P. R., Salomon, R. M., ... Gallop, R. (2005). Cognitive therapy vs. medications in the treatment of moderate to severe depression. *Archives of General Psychiatry*, 62, 409–416. doi:10.1001/archpsyc.62.4.409
- Dimeff, L. A., Woodcock, E. A., Harned, M. S., & Beadnell, B. (2011). Can dialectical behavior therapy be learned in highly structured learning environments? Results from a randomized controlled dissemination trial. *Behavior Therapy*, 42, 263–275. doi:10.1016/j.beth.2010.06.004
- Dutra, L., Stathopoulou, G., Basden, S. L., Leyro, T. M., Powers, M. B., & Otto, M. W. (2008). A meta-analytic review of psychosocial interventions for substance use disorders. *The American Journal of Psychiatry*, 165, 179–187.
- Elkin, I., Gibbons, R. D., Shea, M. T., Sotsky, S. M., Watkins, J. T., Pilkonis, P. A., & Hedeker, D. (1995). Initial severity and differential treatment outcome in the national institute of mental health treatment of depression collaborative research program. *Journal of Consulting and Clinical Psychology*, 63, 841–847. doi:10.1037/0022-006X.63.5.841
- Goldfried, M. R., Newman, M. G., Castonguay, L. G., Furlong, J. N., Magnavita, J. J., Sobell, L., & Wolf, A. W. (2014). On the dissemination of clinical experiences in using empirically supported treatments. *Behavior Therapy*, 45(1), 3–6. doi:10.1016/j.beth.2013.09.007
- Goldfried, M. R., & Wolfe, B. E. (1996). Psychotherapy practice and research: Repairing a strained relationship. *American Psychologist*, 51, 1007–1016.
- Gregory, V. L., Jr. (2010). Cognitive-behavioral therapy for mania: A meta-analysis of randomized controlled trials. *Social Work in Mental Health*, 8, 483–494. doi:10.1080/15332981003744388
- Gunter, R. W., & Whittal, M. L. (2010). Dissemination of cognitive-behavioral treatments for anxiety disorders: Overcoming barriers and improving patient access. *Clinical Psychology Review*, 30, 194–202. doi:10.1016/j.cpr.2009.11.001
- Hans, E., & Hiller, W. (2013). A meta-analysis of nonrandomized effectiveness studies on outpatient cognitive behavioral therapy for adult anxiety disorders. *Clinical Psychology Review*, 33, 954–964. doi:10.1016/j.cpr.2013.07.003
- Harned, M. S., Dimeff, L. A., Woodcock, E. A., Kelly, T., Zaverchnik, J., Contreras, I., & Danner, S. M. (2014). Exposing clinicians to exposure: A randomized controlled dissemination trial of exposure therapy for anxiety disorders. *Behavior Therapy*, 45, 731–744. doi:10.1016/j.beth.2014.04.005
- Harned, M. S., Karslund, K. E., Foa, E. B., & Linehan, M. M. (2012). Treating PTSD in suicidal and self-injuring women with borderline personality disorder: Development and preliminary evaluation of a dialectical behavior therapy prolonged exposure protocol. *Behaviour Research and Therapy*, 50, 381–386.
- Hirsh, J. B., Quilty, L. C., Bagby, R. M., & McMMain, S. F. (2012). The relationship between agreeableness and the development of the working alliance in patients with borderline personality disorder. *Journal of Personality Disorders*, 26, 616–627. doi:10.1521/pe.2012.26.4.616
- Hofmann, S. G., Asnaani, A., Vonk, I. J. J., Sawyer, A. T., & Fang, A. (2012). The efficacy of cognitive behavioral therapy: A review of meta-analyses. *Cognitive Therapy and Research*, 36, 427–440. doi:10.1007/s10608-012-9476-1
- Hofmann, S. G., & Smits, J. A. J. (2008). Cognitive-behavioral therapy for adult anxiety disorders: A meta-analysis of randomized placebo-controlled trials. *Journal of Clinical Psychiatry*, 69, 621–632. doi:10.4088/JCP.v69n0415
- Hollon, S. D., & Beck, A. T. (2013). Cognitive and cognitive-behavioral therapies. In M. Lambert (Ed.), *Bergin and Garfield's handbook of psychotherapy and behavior change* (6th ed., pp. 393–442). Hoboken, NJ: John Wiley and Sons Press.
- Ingram, R. E., Atchley, R. A., & Segal, Z. V. (2011). *Vulnerability to depression: From cognitive neuroscience to prevention and treatment*. New York, NY: Guilford Press.
- Jarrett, R. B., Vittengl, J. R., Clark, L. A., & Thase, M. E. (2011). Skills of Cognitive Therapy (SoCT): A new measure of patients' comprehension and use. *Psychological Assessment*, 23, 578–586. doi:10.1037/a0022485
- Keefe, J. (2014). *Patient-technique match in CT for depression*. Paper presented at the SPR, Copenhagen.
- Koerner, K., & Castonguay, L. G. (2014). Practice oriented research: What it takes to do collaborative research in private practice. *Psychotherapy Research*, 25(1), 67–83. doi:10.1080/10503307.2014.939119
- Kraemer, H. C., Wilson, G. T., Fairburn, C. G., & Agras, W. S. (2002). Mediators and moderators of treatment effects in randomized clinical trials. *Archives of General Psychiatry*, 59, 877–883.
- Leung, K. S., & Cottler, L. B. (2009). Treatment of pathological gambling. *Current Opinion in Psychiatry*, 22(1), 69–74. doi:10.1097/YCO.0b013e32831575d9
- McEvoy, P. M., & Nathan, P. (2007). Effectiveness of cognitive behavior therapy for diagnostically heterogeneous groups: A

- benchmarking study. *Journal of Consulting and Clinical Psychology*, 75, 344–350. doi:10.1037/0022-006X.75.2.344
- McGrath, C. L., Kelley, M. E., Holtzheimer, P. E., Dunlop, B. W., Craighead, W. E., Franco, A. R., ... & Mayberg, H. S. (2013). Toward a neuroimaging treatment selection biomarker for major depressive disorder. *JAMA Psychiatry*, 70, 821–829. doi:10.1001/jamapsychiatry.2013.143
- McHugh, R. K., & Barlow, D. H. (2010). The dissemination and implementation of evidence-based psychological treatments: A review of current efforts. *American Psychologist*, 65(2), 73–84. doi:10.1037/a0018121
- McIntosh, V. V. W., Jordan, J., Carter, F. A., Luty, S. E., McKenzie, J. M., Bulik, C. M., ... Joyce, P. R. (2005). Three psychotherapies for anorexia nervosa: A randomized, controlled trial. *The American Journal of Psychiatry*, 162, 741–747. doi:10.1176/appi.ajp.162.4.741
- McMain, S. F., Links, P. S., Gnam, W. H., Guimond, T., Cardish, R. J., Korman, L., & Streiner, D. L. (2009). A randomized trial of dialectical behavior therapy versus general psychiatric management for borderline personality disorder. *The American Journal of Psychiatry*, 166, 1365–1374. doi:10.1176/appi.ajp.2009.09010039
- Nakamura, B. J., Higa-McMillan, C. K., Okamura, K. H., & Shimabukuro, S. (2011). Knowledge of and attitudes towards evidence-based practices in community child mental health practitioners. *Administration and Policy in Mental Health and Mental Health Services Research*, 38, 287–300. doi:10.1007/s10488-011-0351-2
- Newman, M. G., Consoli, A., & Taylor, C. B. (1997). Computers in assessment and cognitive behavioral treatment of clinical disorders: Anxiety as a case in point. *Behavior Therapy*, 28, 211–235. doi:10.1016/S0005-7894(97)80044-5
- Newman, M. G., Przeworski, A., Consoli, A. J., & Taylor, C. B. (2014). A randomized controlled trial of ecological momentary intervention plus brief group therapy for generalized anxiety disorder. *Psychotherapy*, 51, 198–206. doi:10.1037/a0032519
- Newman, M. G., Szkodny, L. E., Llera, S. J., & Przeworski, A. (2011a). A review of technology-assisted self-help and minimal contact therapies for anxiety and depression: Is human contact necessary for therapeutic efficacy? *Clinical Psychology Review*, 31(1), 89–103. doi:10.1016/j.cpr.2010.09.008
- Newman, M. G., Szkodny, L. E., Llera, S. J., & Przeworski, A. (2011b). A review of technology-assisted self-help and minimal contact therapies for drug and alcohol abuse and smoking addiction: Is human contact necessary for therapeutic efficacy? *Clinical Psychology Review*, 31, 178–186.
- Norcross, J. C., Karpia, C. P., & Santoro, S. O. (2005). Clinical psychologists across the years: The division of clinical psychology from 1960 to 2003. *Journal of Clinical Psychology*, 61, 1467–1483. doi:10.1002/jclp.20135
- Nordgren, L. B., Hedman, E., Etienne, J., Bodin, J., Kadowaki, Å., Eriksson, S., ... Carlbring, P. (2014). Effectiveness and cost-effectiveness of individually tailored internet-delivered cognitive behavior therapy for anxiety disorders in a primary care population: A randomized controlled trial. *Behaviour Research and Therapy*, 59, 1–11. doi:10.1016/j.brat.2014.05.007
- Oei, T. P. S., & Free, M. L. (1995). Do cognitive behaviour therapies validate cognitive models of mood disorders? A review of the empirical evidence. *International Journal of Psychology*, 30, 145–180.
- Olatunji, B. O., Deacon, B. J., & Abramowitz, J. S. (2009). The cruelest cure? Ethical issues in the implementation of exposure-based treatments. *Cognitive and Behavioral Practice*, 16, 172–180. doi:10.1016/j.cbpra.2008.07.003
- Pfeiffer, P. N., Heisler, M., Piette, J. D., Rogers, M. A. M., & Valenstein, M. (2011). Efficacy of peer support interventions for depression: A meta-analysis. *General Hospital Psychiatry*, 33(1), 29–36. doi:10.1016/j.genhosppsych.2010.10.002
- Saini, M. (2009). A meta-analysis of the psychological treatment of anger: Developing guidelines for evidence-based practice. *Journal of the American Academy of Psychiatry and the Law*, 37, 473–488.
- Segal, Z. V., Gemar, M., & Williams, S. (1999). Differential cognitive response to a mood challenge following successful cognitive therapy or pharmacotherapy for unipolar depression. *Journal of Abnormal Psychology*, 108(1), 3–10.
- Stoffers, J. M., Völlm, B. A., Rucker, G., Timmer, A., Huband, N., & Lieb, K. (2012). Psychological therapies for people with borderline personality disorder. *Cochrane Database of Systematic Reviews*, 8, 1–255.
- Stone, A. A., & Shiffman, S. (1994). Ecological momentary assessment (EMA) in behavioral medicine. *Annals of Behavioral Medicine*, 16, 199–202.
- Strunk, D. R., Brotman, M. A., DeRubeis, R. J., & Hollon, S. D. (2010). Therapist competence in cognitive therapy for depression: Predicting subsequent symptom change. *Journal of Consulting and Clinical Psychology*, 78, 429–437. doi:10.1037/a0019631
- Strunk, D. R., DeRubeis, R. J., Chiu, A. W., & Alvarez, J. (2007). Patients' competence in and performance of cognitive therapy skills: Relation to the reduction of relapse risk following treatment for depression. *Journal of Consulting and Clinical Psychology*, 75, 523–530.
- Svartberg, M., Stiles, T. C., & Seltzer, M. H. (2004). Randomized, controlled trial of the effectiveness of short-term dynamic psychotherapy and cognitive therapy for cluster C personality disorders. *American Journal of Psychiatry*, 161, 810–817. doi:10.1176/appi.ajp.161.5.810
- Tang, T. Z., & DeRubeis, R. J. (1999). Sudden gains and critical sessions in cognitive-behavioral therapy for depression. *Journal of Consulting and Clinical Psychology*, 67, 894–904.
- Thompson-Brenner, H. J. (2002). *Implications for the treatment of bulimia nervosa: A meta-analysis of efficacy trials and a naturalistic study of treatment in the community*. Michigan: University of Michigan.
- Uhr, M., Tontsch, A., Namendorf, C., Ripke, S., Lucae, S., Ising, M., ... Holsboer, F. (2008). Polymorphisms in the drug transporter gene ABCB1 predict antidepressant treatment response in depression. *Neuron*, 57, 203–209. doi:10.1016/j.neuron.2007.11.017
- van Straten, A., Geraedts, A., Leeuw, I. V., Andersson, G., & Cuijpers, P. (2010). Psychological treatment of depressive symptoms in patients with medical disorders: A meta-analysis. *Journal of Psychosomatic Research*, 69(1), 23–32. doi:10.1016/j.jpsychores.2010.01.019
- Westen, D., Novotny, C. M., & Thompson-Brenner, H. (2004). The empirical status of empirically supported psychotherapies: Assumptions, findings, and reporting in controlled clinical trials. *Psychological Bulletin*, 130, 631–663. doi:10.1037/0033-2909.130.4.631
- Wiles, N., Thomas, L., Abel, A., Ridgway, N., Turner, N., Campbell, J., ... Lewis, G. (2013). Cognitive behavioural therapy as an adjunct to pharmacotherapy for primary care based patients with treatment resistant depression: Results of the CoBaIT randomised controlled trial. *The Lancet*, 381, 375–384. doi:10.1016/S0140-6736(12)61552-9
- Woody, S. K., Weisz, J., & McLean, C. (2005). Empirically supported treatments 10 years later. *The Clinical Psychologist*, 58, 5–11.
- Zimmermann, G., Favrod, J., Trieu, V. H., & Pomini, V. (2005). The effect of cognitive behavioral treatment on the positive symptoms of schizophrenia spectrum disorders: A meta-analysis. *Schizophrenia Research*, 77(1), 1–9. doi:10.1016/j.schres.2005.02.018