
Cognitive and Behavioral Treatments for Anxiety Disorders: A Review of Meta-analytic Findings

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Behavioral and cognitive psychotherapies are the most widely studied psychological interventions for anxiety disorders. In the present article, the results of ten years of meta-analytic studies on psychotherapies for the various anxiety disorders are reviewed and the relative effectiveness of cognitive and behavioral therapeutic methods is examined. Meta-analytic results support the effectiveness of combined cognitive and behavioral approaches for anxiety disorders. *Pure* behavioral therapies also are effective and appear to work as well as combined treatment for some disorders. Due to the small number of outcome studies involving pure cognitive treatments, reliable conclusions about the effectiveness of this approach cannot be offered. Additional theoretical and practical considerations are discussed. © 2004 Wiley Periodicals, Inc. *J Clin Psychol* 60: 429–441, 2004.

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Psychotherapies involving cognitive and behavioral procedures have been established as empirically supported treatments for anxiety disorders (e.g., Chambless & Ollendick, 2001). A strength of this approach over other approaches to therapy (e.g., hypnosis) is that cognitive and behavioral techniques are derived logically from scientifically supported theoretical models of anxiety problems. Thus, there exists a theoretically coherent and empirically consistent relationship between the treatment techniques and symptoms of the disorders they are used to treat.

Behavioral theories of anxiety disorders (e.g., Mowrer, 1960) posit that pathological fears are acquired through classical conditioning processes and maintained through operant conditioning (i.e., reinforcement) of avoidance behavior. Accordingly, behavioral treatments for anxiety disorders use experimentally established learning principles to extinguish anxious responses to inappropriately feared stimuli. The most widely employed behav-

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ioral technique is systematic exposure to situations and stimuli that evoke pathological fear. With repeated and prolonged exposure, anxiety responses gradually diminish, a process known as habituation (Wolpe, 1958). Other theorists (e.g., Foa & Kozak, 1986) have postulated that exposure procedures work by providing the patient with corrective information about the dangerousness of feared situations.

Cognitive theories of emotional disorders posit that maladaptive thinking styles lead to emotional upset (e.g., Beck, 1976; Ellis, 1962). Anxiety disorders in particular are believed to result from distorted beliefs focused on physical or psychological threat and an increased sense of personal vulnerability (Beck, Emery, & Greenberg, 1985). For example, individuals with social phobia often overestimate the probability that others are evaluating them negatively, whereas those with panic disorder misinterpret benign body sensations (e.g., heart palpitations) as signals of an impending catastrophe (e.g., heart attack). Accordingly, cognitive treatments help patients identify and correct these distorted cognitions to reduce their fear.

Behavioral and cognitive psychotherapies are the most widely studied psychological interventions for anxiety disorders (Barlow, 2002). Numerous controlled and uncontrolled trials indicate that these methods can be highly effective in reducing symptoms. Additionally, researchers have compared various combinations of cognitive and behavioral interventions to one another in efforts to determine the optimal treatment for specific anxiety disorders. Meta-analysis (i.e., quantitative review) allows researchers to synthesize quantitatively the results from multiple studies in an effort to characterize the general effectiveness of various treatments. The past decade has seen a notable increase in the use of meta-analysis for this purpose. In the present article, the results of ten years of meta-analytic studies on psychotherapies for the various anxiety disorders are integrated and the relative effectiveness of cognitive and behavioral therapeutic methods is studied. The article concludes with a discussion of the results and limitations of these reviews, as well as issues that affect comparisons between cognitive and behavioral therapies.

Panic Disorder

Treatments using cognitive and behavioral techniques consistently have demonstrated efficacy in the treatment of panic disorder with or without agoraphobia (Gould, Otto, & Pollack, 1995). These interventions typically include:

1. education about the nature and physiology of anxiety and panic,
2. cognitive techniques designed to modify the tendency to misinterpret catastrophically bodily sensations,
3. exposure to feared bodily sensations (i.e., interoceptive exposure), and
4. coping skills for managing bodily symptoms.

Prior to the advent of modern cognitive-behavioral approaches (e.g., Barlow, Craske, Cerny, & Klosko, 1989; Clark et al., 1994), behavior therapies using *in vivo* exposure to agoraphobic situations were evaluated commonly in treatment outcome studies. More recently, a smaller number of studies have examined the effectiveness of cognitive therapy without the use of exposure (e.g., Beck, Stanley, Baldwin, Deagle, & Averill, 1994) in the treatment of panic disorder.

Seven meta-analytic reviews of panic-disorder treatment studies have appeared in the past 10 years, all of which support the efficacy of cognitive-behavioral interventions. Behavioral treatments (e.g., exposure *in vivo*) similarly have been shown effective when compared to other psychological interventions. Clum, Clum, and Surls (1993) reported

that exposure *in vivo* or flooding did not differ significantly in effectiveness from *psychological-coping* interventions, and they concluded that both types of therapy constituted the treatments of choice for panic disorder. van Balkom et al. (1997) identified 55 studies that examined the effectiveness of exposure *in vivo*. Effect sizes, calculated within groups from pre- to posttreatment, indicated that exposure was highly effective in reducing symptoms of panic ($ES = 0.79$; $SD = 0.41$) and agoraphobia ($ES = 1.38$; $SD = 0.84$).^{1,2} That exposure *in vivo* produces greater effects on agoraphobic avoidance than on panic attacks is not surprising, given the explicit emphasis on confronting feared situations and the fact that it was developed prior to contemporary conceptualizations of panic disorder that emphasized sensitivity to interoceptive cues (Goldstein & Chambless, 1978; Weeks, 1978).

Bakker, van Balkom, Spinhoven, Blaauw, & van Dyck (1998) re-analyzed data from their 1997 review and reported on results of studies that conducted follow-up analyses at intervals of at least three months. Treatments using exposure *in vivo* demonstrated an effect size of 1.09 ($SD = 0.44$) for panic symptoms and 1.48 ($SD = 0.72$) for agoraphobic symptoms. Exposure *in vivo* was found equally as effective as *psychological panic management* and psychological panic management combined with exposure. These studies indicate that behavior therapy alone is an effective treatment for panic disorder in general, and agoraphobic avoidance in particular.

The growing interest in cognitive therapy raises the issue of how cognitive interventions fare when compared to behavioral treatments for panic. However, a number of problems complicate attempts to determine the relative effectiveness of behavioral versus cognitive therapy. First, the majority of treatment-outcome studies involved either behavioral (e.g., exposure *in vivo*) or cognitive-behavioral interventions (e.g., exposure plus cognitive restructuring), leaving few studies of strictly cognitive approaches for comparison. Indeed, only one meta-analysis provided an effect size for cognitive therapy: Gould et al. (1995) reported a mean effect size of 0.18 (range = -0.95 to 1.10) in three studies of cognitive restructuring alone as a treatment for panic disorder. Although several subsequent studies have examined the effectiveness of cognitive interventions (e.g., Williams & Falbo, 1996), more recent meta-analytic reviews have not reported separate effect sizes for cognitive therapy (Oei, Llamas, & Devilly, 1999; Weston & Morrison, 2001).

The failure of meta-analysts to calculate separate effect sizes for cognitive and behavioral treatments presents a second difficulty for determining the relative efficacy of these modalities. Each review in the panic literature, with the exception of Cox, Endler, Lee, and Swinson (1992), reported effect sizes for a heterogeneous compilation of cognitive and behavioral techniques rather than individually for cognitive and behavioral treatments. This approach allows for greater confidence in meta-analytic comparisons between the broad category of *cognitive-behavioral therapy* and, say, pharmacological treatment; however, it obscures differences between specific psychological interventions (i.e., cognitive restructuring alone vs. exposure alone).

¹Cohen (1977) suggested that effect sizes of 0.2, 0.5, and 0.8 represent small, medium, and large effects respectively.

²Effect sizes for treatments may be calculated in two ways. For our purposes, *within-group* or *pre-post* effect sizes refer to those calculated from the difference in a treatment group's scores from pre- to posttreatment or from pretreatment to follow up. Between-group effect sizes refer to those calculated as the difference between a treated group and a control group (or a second treated group) at posttreatment or a follow up. Lipsey and Wilson (1993) described strengths and limitations of each calculation method: in particular, *within-group* effect sizes tend to overestimate treatment effects because they do not control for nonspecific effects of therapy. In addition, individual effect sizes may vary systematically with the research design used. For example, all else being equal, a wait-list control will yield a larger effect size than a credible placebo control. For further discussion of these issues, the reader should refer to Lipsey and Wilson (1993).

In summary, the existing meta-analytic literature is insufficient for generating clear claims about the relative efficacy of cognitive versus behavioral interventions for panic disorder. Relatively few studies have examined the effectiveness of strictly cognitive interventions, and meta-analytic reviewers usually grouped these interventions with others when computing effect sizes. Another source of confusion is that treatment packages involving the same procedures are sometimes referred to as *cognitive* (e.g., Beck, Sokol, Clark, Berchick, & Wright, 1992; Clark et al., 1994) and sometimes as *behavioral* (e.g., Barlow et al., 1989; Craske, Brown, & Barlow, 1991). Whereas these treatment programs may emphasize specific techniques to different degrees (e.g., cognitive restructuring versus exposure) and have different theoretical explanations for the benefits of a particular technique (e.g., belief change vs. habituation in the case of exposure), they are more alike than distinct from a procedural standpoint.

Social Phobia

Psychological treatments for social phobia typically involve cognitive restructuring, various forms of exposure (imaginal, *in vivo*), social-skills training, or combinations of these approaches. Behavioral approaches emphasize prolonged exposure to social stimuli both within and between sessions via homework assignments (e.g., Newman, Hofmann, Werner, Roth, & Taylor, 1994). Cognitive therapy relies on techniques aimed at correcting maladaptive beliefs about the self and others, particularly beliefs that exaggerate the probability and consequences of negative social evaluation (Rapee & Heimberg, 1997). Cognitive-behavioral therapies typically use both cognitive restructuring and exposure to feared social situations as means of addressing negative cognitive appraisals and overestimations of negative consequences of social evaluation. Cognitive-behavioral treatment for social phobia often is delivered in a group format (e.g., cognitive-behavioral group therapy or CBGT; Heimberg et al., 1990) since this setting constitutes a form of exposure and affords many opportunities to confront feared social situations.

Four meta-analytic reviews of cognitive-behavioral treatments for social phobia were published over the last decade. The first (Feske & Chambless, 1995) examined 15 treatment-outcome studies, nine of which included exposure therapy alone and 12 of which examined the combination of exposure plus cognitive restructuring. Studies involving cognitive therapy alone were excluded. Across studies, exposure alone and exposure plus cognitive restructuring were equally effective at both posttreatment and follow up on most measures of social phobia, depression, and general anxiety. Exposure also was found as effective as specific combined cognitive-behavioral approaches considered to be of superior efficacy (e.g., Heimberg's CBGT). The relatively small number of studies included by Feske and Chambless limited the statistical power available for comparisons between the treatment conditions they reviewed. Nevertheless, their review suggests that both exposure and cognitive-behavioral interventions are effective treatments for social phobia that do not differ substantially in their potency.

Taylor's (1996) meta-analysis reviewed 24 treatment-outcome studies yielding 42 trials for social phobia. Psychological treatments were classified as exposure ($n = 8$), cognitive therapy ($n = 5$), cognitive therapy plus exposure ($n = 12$), and social-skills training ($n = 5$); the remaining 12 trials included wait-list control and placebo conditions. Analysis of pre-to-posttreatment effect sizes indicated that all psychological treatments were superior to control. On measures of social phobia, mean effect sizes were 1.06 for cognitive therapy plus exposure, 0.82 for exposure alone, and 0.63 for cognitive therapy alone. None of these treatment effects differed significantly from each other. Follow-up analyses indicated that gains were maintained across treatment conditions, although most

patients received further treatment during follow-up intervals. The results of Taylor's study (1996) strengthen the conclusion that cognitive-behavioral therapies are effective treatments for social phobia, but diverge from the results of Feske and Chambless (1995) in suggesting that the effectiveness of exposure can be enhanced by the addition of cognitive restructuring.

Gould, Buckminster, Pollack, Oto, and Yap (1997) reviewed 16 studies that examined cognitive-behavioral treatment, yielding nine comparisons with exposure alone, eight with exposure plus cognitive restructuring, and four with cognitive restructuring alone. Within-group effect sizes at posttreatment, averaged across dependent variables, were 0.89 for exposure, 0.80 for exposure plus cognitive restructuring, and 0.60 for cognitive restructuring. Although statistical tests of differences between these conditions were not conducted, the results of Gould, Buckminster, et al. (1997) suggest that exposure therapy either alone or in combination with cognitive restructuring is somewhat more effective than cognitive restructuring alone.

In the most recent meta-analytic review of social-phobia treatment, Fedoroff and Taylor (2001) computed effect sizes for seven trials of exposure therapy, seven of cognitive therapy, and 21 of combined exposure and cognitive therapy. Confidence intervals were calculated for each effect size, and intervals overlapping with zero were interpreted as meaning that the treatment's effects were not significantly different from no effect. Cognitive therapy alone ($ES = 0.72$) and exposure plus cognitive therapy ($ES = 0.84$) were considered highly effective and no different from one another. Exposure therapy had the largest mean effect size of all the psychotherapies ($ES = 1.08$). However, because the 95% confidence interval included zero ($CI = -0.13-2.29$), Fedoroff and Taylor (2001) concluded that the effects of exposure alone were not significantly greater than zero. At follow up, behavioral, cognitive, and combination treatments were judged efficacious with no differences in efficacy. The conclusion that exposure was no more effective than wait list at posttreatment contradicts findings from previous reviews and probably resulted from the reliance on confidence intervals. Confidence intervals are highly dependent on sample size, and given the large mean effect size for exposure, lack of statistical power is likely to have obscured this intervention's effects.

Meta-analytic findings on psychological treatments for social phobia provide consistent support for the effectiveness of cognitive-behavioral interventions. Exposure therapy alone appears to be effective, and results are equivocal about whether adding cognitive restructuring confers additional benefits. Mean effect sizes for cognitive approaches tend to be lower than those for exposure alone, which suggests the superiority of behavior therapy. However, it should be noted that relatively few studies have examined strictly cognitive interventions for social phobia; thus, there may not be sufficient power for reliable conclusions to be drawn. Nevertheless, the existing literature suggests that exposure is a necessary ingredient for effective treatment of social phobia.

Generalized Anxiety Disorder

Exposure methods have enjoyed longstanding acceptance as effective treatments for anxiety disorders in which specific fear-provoking stimuli can be identified. However, the obscure nature of external triggers for anxiety found in generalized anxiety disorder (GAD) makes the applicability of exposure less clear (Borkovec & Whisman, 1996). Consequently, psychological treatments for GAD have been characterized by a variety of techniques, including progressive muscle relaxation, self-monitoring and early cue detection, applied relaxation, self-control desensitization (Goldfried, 1971), and cognitive

restructuring, or combinations of the above (e.g., Borkovec & Costello, 1993). Three meta-analytic studies have reviewed treatment-outcome results for GAD and will be discussed in this section.

Borkovec and Whisman (1996) summarized results from 11 controlled trials. Within-group effect sizes were calculated separately for each of five commonly used measures of anxiety and depression. At posttreatment, all psychological treatments reviewed (including *nonspecific* treatments) were superior to wait list. Although effect sizes varied somewhat across dependent variables, behavioral techniques (i.e., relaxation training, imaginal exposure) tended to have higher effect sizes than cognitive therapy, whereas the highest effect sizes were evidenced by treatments incorporating the combination of behavioral and cognitive procedures. For example, at posttreatment, effect sizes on the State-Trait Anxiety Inventory—Trait version (STAI-T; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983) were 0.24 for cognitive therapy ($n = 2$), 0.90 for behavior therapy ($n = 7$), and 1.01 for combined approaches ($n = 7$). At follow up, combined treatment demonstrated higher effect sizes than behavior therapy for each dependent measure (only one study reported follow-up results for cognitive therapy). These findings provide support for the effectiveness of behavioral, and particularly cognitive-behavioral, interventions for GAD. Although the effect size of cognitive therapies lagged somewhat behind that of other interventions, only two studies of cognitive therapy were reviewed.

Gould, Otto, Pollack, and Yap (1997), who included 22 comparisons of cognitive-behavioral treatments, conducted the most thorough meta-analysis of GAD treatment studies. Between-group effect sizes were calculated for measures of anxiety and depression and were reported separately for a variety of procedures and their combination. Combined treatment approaches and anxiety-management training had the highest effect sizes (ES for both = 0.91), followed by relaxation ($ES = 0.64$), cognitive therapy ($ES = 0.59$), behavior therapy ($ES = 0.51$), and relaxation with biofeedback ($ES = 0.34$). Statistical comparisons among these conditions yielded only one significant finding: combined treatment was significantly more effective than relaxation with biofeedback. Although limited by power restrictions, these findings are consistent with those reported by Borkovec and Whisman (1996) in suggesting that combining cognitive with behavioral techniques is more effective for GAD than either behavior or cognitive therapy alone. Cognitive and behavioral therapies produced roughly equivalent effect sizes, suggesting no differences in their short-term effectiveness for GAD.

Weston and Morrison (2001) recently examined five controlled trials for GAD published from 1990 to 1998. Their relatively small sample size appears to be a product of their restricted time frame, conservative inclusion criteria, and the small number of controlled trials on GAD available for review. Reinforcing earlier meta-analytic findings on the effectiveness of cognitive-behavioral treatments for GAD, the treatments reviewed produced an effect size of 2.09 ($SD = 0.76$) on anxiety symptoms at posttreatment. The small number of studies in this review precludes examination of differences among psychological treatments for GAD.

Overall, the meta-analytic literature most strongly supports the effectiveness of combined cognitive-behavioral interventions for GAD. The relative effectiveness of strictly cognitive or behavioral interventions is less clear. Although reviews by Borkovec and Whisman (1996) and Gould, Otto, et al. (1997) explicitly addressed this issue, the small number of controlled studies of these approaches (this is particularly the case for cognitive therapy) thus far has precluded reliable tests of differences between them. The findings of Gould, Otto, et al. (1997) suggest that behavioral and cognitive interventions equally are effective. A more reliable finding, however, is that combined approaches are more effective than either cognitive or behavior therapy alone in the treatment of GAD.

Obsessive–Compulsive Disorder

Until the 1960s, obsessive–compulsive disorder (OCD) was considered unresponsive to psychotherapy. However, with the advent of behavioral procedures, namely exposure and response prevention (ERP; Meyer, 1966), the prognosis for OCD improved substantially. Numerous studies conducted in various centers around the world have established ERP as a highly efficacious therapy for OCD (e.g., Franklin, Abramowitz, Kozak, Levitt, & Foa, 2000). A series of studies by Emmelkamp and colleagues in the 1980s and early 1990s (e.g., Emmelkamp & Beens, 1991) also examined the effects of cognitive therapy, which primarily involved cognitive restructuring methods based on Ellis' Rational Emotive Behavior Therapy (Ellis, 1994). More recently, cognitive procedures based on Beck's (1976) cognitive therapy for depression and novel cognitive conceptualizations of OCD (e.g., Rachman, 1998) have been developed (e.g., Rachman, 1998; Salkovskis, 1999; van Oppen & Arntz, 1994) and compared with ERP.

Although several meta-analytic reviews of OCD treatment studies have been published, only three have reported differential effect sizes for cognitive therapy and behavior therapy, and these will be discussed below. Because the use of cognitive therapy for OCD has undergone recent transformations based on the elaboration of cognitive models of this disorder, few data are available comparing new sprung cognitive techniques to the traditional ERP approach. Below, the meta-analytic findings in OCD are discussed, as well as some of the difficulties that obfuscate comparisons (and indeed the distinction) between cognitive and behavioral therapy for this disorder.

Van Balkom and colleagues (Van Balkom et al., 1994) included 86 studies in their comprehensive meta-analytic review. Treatments were classified as behavior therapy if they involved procedures based on learning theory, such as exposure or relaxation; cognitive therapy was defined as cognitive restructuring in the absence of any behavioral techniques; and cognitive plus behavioral therapy was defined as treatments that incorporated both behavioral and cognitive procedures. Within-group effect sizes were used to examine treatment efficacy. These were calculated as the difference between pre- and posttreatment mean scores divided by a standard deviation that was pooled from both groups.

Forty-five studies of behavior therapy yielded effect sizes of 1.46 ($SD = 0.75$) for self-rated OCD symptoms and 1.47 ($SD = 0.70$) for assessor-rated OCD symptoms. Three studies of cognitive therapy yielded effect sizes of 1.09 ($SD = 0.43$) and 1.04 ($SD = 1.47$) for self- and assessor-rated symptoms, respectively. Finally, four studies of cognitive plus behavioral therapy yielded effect sizes of 1.30 ($SD = 0.63$) for self-ratings and 1.85 ($SD = 1.51$) for assessor ratings. These findings indicate that patients treated with any of these interventions improved considerably from pre- to posttreatment. Although no direct comparisons between the various forms of therapy were reported, the effect sizes indicated that treatments involving behavioral procedures, namely ERP, were more effective than cognitive therapy in which these procedures were not used.

Abramowitz's (1997) OCD treatment meta-analysis included only controlled trials in which treatments were compared to another treatment or to a control condition. Effect sizes were calculated as the standardized comparison between treatments (or between treatment and control) at posttreatment, thereby providing an effect-size estimate that capitalized on internal validity gained from random assignment of patients to treatment conditions. Two comparisons between ERP and a relaxation control yielded a large effect size in favor of ERP, 1.18 ($SD = 0.05$). Across four studies directly comparing ERP and cognitive restructuring, a small effect size of 0.19 ($SD = 0.13$) in favor of cognitive therapy was found. This small effect size suggests that the ERP and cognitive therapy employed in these studies produced similar rates of improvement.

Because a number of studies comparing cognitive therapy to ERP were conducted following publication of Abramowitz's (1997) meta-analysis, Abramowitz, Foa, and Franklin (2002) conducted an updated meta-analytic study that focused exclusively on cognitive and behavioral treatment procedures for OCD. These authors reviewed 16 controlled studies that had examined the efficacy of ERP, cognitive therapy, and their combination. Effect sizes again were calculated as the difference between treatment groups (or treatment vs. control) at posttreatment. In eight comparisons to no-treatment control, ERP yielded an effect size of 1.50 ($SD = 0.46$). Cognitive therapy, in two studies, had an effect size of 1.19 ($SD = 0.67$). However, in five direct comparisons between ERP and cognitive therapy, a small mean effect size ($M = 0.07$, $SD = 0.35$) was found, again suggesting equal effectiveness of these modalities. This result is puzzling given that ERP was a stronger treatment than cognitive therapy in comparisons to no treatment.

To explain this inconsistency, Abramowitz et al. (2002) noted some methodological difficulties with the direct-comparison studies between ERP and cognitive therapy. First, cognitive therapy in these studies often included behavioral experiments (cf. Whittal & McLean, 1999) that involved exposure to feared stimuli; thus, there was some procedural overlap with ERP. Perhaps, more importantly, many of the ERP treatments used in these studies failed to include therapist-supervised exposure. Thus, all exposure was performed for homework, which calls into question the integrity of the ERP treatment condition. When the procedural overlap is considered along with the suboptimal ERP protocols, it appears that the appropriate conclusion to derive from the existing meta-analytic findings is that cognitive therapy involving exposure in the form of behavioral experiments is as effective as a suboptimal ERP treatment. Indeed, definitive comparisons between optimal behavioral (ERP) and cognitive therapy have yet to be conducted for OCD.

Posttraumatic Stress Disorder

Most psychotherapy programs for posttraumatic stress disorder (PTSD) involve behavioral and cognitive treatment procedures in the form of exposure, cognitive restructuring, and anxiety-management skills. Exposure-based treatments emphasize confrontation with fear-evoking memories of the traumatic event (i.e., imaginal exposure), as well as situations or stimuli that have come to evoke avoidance or anxiety symptoms (i.e., *in vivo* exposure). Foa, Steketee, and Rothbaum (1989) asserted that the purpose of therapeutic exposure is twofold: first, to weaken conditioned fear responses associated with trauma cues; and second, to modify overestimates of the dangerousness of the world and threat to personal safety. Stress-inoculation training (SIT; Veronen & Kilpatrick, 1983) and cognitive-processing therapy (CPT; Calhoun & Resick, 1993) involve combinations of educational, exposure, relaxation, and cognitive interventions to help the patient manage anxiety symptoms and challenge maladaptive beliefs.

Eye-movement desensitization and reprocessing (EMDR; Shapiro, 1991) is an effective, yet controversial, treatment involving imaginal exposure to traumatic memories with coping statements that are introduced during recall of the trauma. Simultaneously, patients engage in saccadic eye movements such as tracking the therapists' finger from side to side across the field of vision. Shapiro (1995) suggested that the eye movements specifically aide processing and integration of the traumatic memories, thus reversing neural pathology. Others have proposed that it is imaginal exposure, not lateral eye movements, that accounts for the effectiveness of EMDR (e.g., Lilienfeld, 1996).

Over the last decade, two meta-analyses have been published on the effects of cognitive-behavioral treatments for PTSD. One review by Van Etten and Taylor (1998) included 61 trials from 39 treatment studies. Psychotherapies were grouped as either

behavior therapy (13 trials), EMDR (11 trials), relaxation (1 trial), hypnosis (1 trial), and dynamic therapy (1 trial). Effect sizes were calculated as the standardized difference from pre- to posttreatment. Mean effect sizes for *behavior therapies* were 1.27 and 1.89 for self-report and observer-rated measures of PTSD severity, respectively. For EMDR, which also was considered a cognitive-behavioral therapy, self-report and observer-rated effect sizes were 1.24 and 0.69, respectively. Unfortunately, because the group of *behavior therapies* actually incorporated both cognitive and behavioral interventions (e.g., exposure-based treatments, SIT, and CPT) averaged together, comparisons between cognitive and behavioral treatment procedures could not be gleaned from this study. Nevertheless, Van Etten and Taylor's (1998) results suggest that cognitive-behavioral treatments, including EMDR therapy, are highly effective in reducing PTSD symptoms.

The second meta-analytic review on PTSD, published by Sherman (1998), included only those treatment studies comparing an active treatment to a comparison group (e.g., wait-list control). Seventeen such studies were identified, and the authors attempted to locate unpublished findings by contacting prominent researchers in the field. The specific treatment interventions studied included exposure therapy, EMDR, SIT, CPT, hypnosis, and various in-patient treatment programs. Comparison group conditions included no treatment (waiting list), supportive counseling, and dynamic therapy. All effect sizes were calculated as the standardized difference between treatment and control groups at posttreatment and follow up.

The average mean effect size between treatment and control across all studies was 0.52 at posttreatment and 0.53 at follow up. These findings indicate that, overall, psychological treatments yield moderate positive effects on symptoms of PTSD. Unfortunately, however, no separate analyses of the effects of individual types of treatment were reported; thus, the effectiveness of primarily cognitive or behavioral treatments could not be determined from this meta-analysis. As has been observed with each of the previous anxiety disorders, most of the therapies studied for PTSD also involve combinations of behavioral (e.g., exposure) and cognitive (e.g., cognitive restructuring) procedures. Thus, as with the other conditions, it may be difficult to determine the relative efficacy of cognitive versus behavioral procedures for PTSD through meta-analysis.

Summary and Conclusions

The past decades have witnessed an increase in the development and evaluation of innovative cognitive-behavioral approaches for treating anxiety disorders. A corresponding increase in the number of published meta-analytic reviews has ensued as researchers and clinicians have attempted to keep pace with new developments in the treatment-outcome literature. The purpose of the present review is to provide a summary of recent meta-analytic findings of psychological treatments for specific anxiety disorders, with an emphasis on the differential effectiveness of behavioral and cognitive treatments.

Meta-analytic findings clearly support the efficacy of combined cognitive-behavioral treatments for anxiety disorders. Behavioral interventions, such as exposure-based procedures, also demonstrate consistently strong effects. This was particularly the case with respect to OCD and social phobia, where meta-analyses found that ERP and situational exposure were at least as effective as combined cognitive-behavioral treatments. Therefore, it can be concluded that behavioral procedures in the form of exposure constitute the critical ingredient in therapy for these two particular conditions. Individual studies have demonstrated that this also may be the case with PTSD, yet meta-analytic studies have yet to address this specific issue. Thus, there does not appear to be an additive effect of combining cognitive and behavioral techniques for these disorders.

In contrast to the extensive treatment-outcome literature on behavior therapy, cognitive interventions for anxiety disorders have been evaluated much less frequently. Consequently, attempts to determine the effectiveness of cognitive therapy from recent meta-analytic reviews face a nearly insurmountable problem: most reviews failed to report separate effect sizes for cognitive interventions. The majority of meta-analyses combined cognitive and/or behavioral treatments into a heterogeneous *cognitive-behavioral therapy* group (e.g., Bakker et al., 1998) or reported effect sizes for behavioral but not cognitive treatments (e.g., Feske & Chambless, 1995). Because of the paucity of controlled studies of pure cognitive treatments, meta-analysts may be excused for their lack of specificity in many cases.

To illustrate, Gould et al. (1995) located only three controlled studies of cognitive restructuring alone for panic disorder. The wide range in effect sizes for these studies (-0.95 to 1.10), as well as the different control groups these studies employed (e.g., wait list, exposure), prompted Gould and co-workers to conclude that the effectiveness of cognitive therapy for panic disorder is difficult to interpret using meta-analytic techniques. In our opinion, this same conclusion applies to all anxiety disorders in this review. Currently, there are simply too few controlled studies of strictly cognitive interventions for reliable conclusions to be drawn about their efficacy. Thus, compared to existing meta-analytic reviews, methodologically rigorous controlled trials that directly compare cognitive and behavioral interventions are likely to reveal more information about the relative efficacy of these treatments.

Inconsistencies in how cognitive and behavioral treatments are labeled by their developers and proponents constitute another barrier to attempts to determine their relative efficacy. A number of examples help to illustrate this point. First, in the panic-disorder literature, highly similar treatment packages that use both cognitive restructuring and exposure components have been termed variously *cognitive therapy* (e.g., Beck et al., 1992), *behavioral therapy* (e.g., Barlow et al., 1989), and *cognitive-behavioral therapy* (e.g., Telch et al., 1993). Similarly, a recently developed treatment package for OCD that includes cognitive restructuring and exposure in the form of *behavioral experiments* (McLean et al., 2001) was described as *cognitive therapy*. McLean et al. reported that their behavioral experiments appeared similar to ERP (i.e., behavior therapy), but differed in that they always were carried out to test patients' appraisals, in contrast to ERP, where the purpose of exposure is to promote habituation.

A common definition of cognitive therapy is that it involves the use of certain techniques such as logical discussions of automatic thoughts (Kozak, 1999). Another view, the one taken by McLean et al. (2001), is that a therapy is *cognitive* if cognitive mechanisms are presumed to account for changes it produces. According to this view, traditional behavioral techniques (e.g., exposure) can be considered cognitive interventions if they are used to produce cognitive change. Using exposure with the explicit intention of testing appraisals, however, does not presumably rob this technique of its behavioral effects (i.e., habituation). Thus, a purely cognitive account of exposure does not seem entirely accurate, nor does a strictly behavioral account because this technique is thought to work by disconfirming faulty appraisals of threat (Foa & Kozak, 1986). Debates about the definition and scope of cognitive and behavior therapy doubtlessly will continue in the foreseeable future, as will the practice of assigning different labels to cognitive-behavioral treatments that use highly similar techniques. Thus, we agree with Kozak (1999), who noted that, "all this terminological ambiguity gets rather confusing, and leaves it difficult for even the most patiently discerning scholar to unpack generalizations about specific efficacy" (p. 423).

In conclusion, meta-analytic results from the past decade support the effectiveness of combined cognitive-behavioral treatments for anxiety disorders. Exposure-based behavior therapies also are effective and appear to work as well as combined cognitive-behavioral treatment in OCD and social phobia. Due to the small number of outcome studies involving pure cognitive treatments, reliable conclusions about the effectiveness of this approach cannot be offered. Thus, the current meta-analytic literature does not provide sufficient data from which to evaluate the differential effectiveness of cognitive and behavioral treatments for anxiety disorders. Perhaps a more important issue than the relative potency of cognitive and behavioral therapies is the issue of which type of psychological treatment is most effective for specific anxiety disorders. The current meta-analytic literature suggests that combined cognitive-behavioral treatments constitute the psychological treatments of choice for most anxiety disorders.

References

- Abramowitz, J.S. (1997). Effectiveness of psychological and pharmacological treatments for obsessive-compulsive disorder: A quantitative review. *Journal of Consulting and Clinical Psychology, 65*, 44–52.
- Abramowitz, J.S., Foa, E.B., & Franklin, M.E. (2002). Empirical status of cognitive-behavior therapy for obsessive-compulsive disorder: A meta-analysis. *Romanian Journal of Cognitive and Behavioral Therapy, 2*, 89–104.
- Bakker, A., van Balkom, A.J.L.M., Spinhoven, P., Blaauw, B.M.J.W., & van Dyck, R. (1998). Follow-up on the treatment of panic disorder with or without agoraphobia. *Journal of Nervous and Mental Disease, 186*, 414–419.
- Barlow, D.H. (2002). *Anxiety and its disorders: The nature and treatment of anxiety and panic*. New York: Guilford.
- Barlow, D.H., Craske, M.G., Cerny, J.A., & Klosko, J.S. (1989). Behavioral treatment of panic disorder. *Behavior Therapy, 20*, 261–282.
- Beck, A.T. (1976). *Cognitive therapy and the emotional disorders*. New York: International Universities Press.
- Beck, A.T., Emery, G., & Greenberg, R. (1985). *Anxiety disorders and phobias: A cognitive perspective*. New York: Basic Books.
- Beck, A.T., Sokol, L., Clark, D.A., Berchick, R., & Wright, F. (1992). A crossover study of focused cognitive therapy for panic disorder. *American Journal of Psychiatry, 149*, 778–783.
- Beck, J.G., Stanley, M., Baldwin, L., Deagle, E., & Averill, P. (1994). Comparison of cognitive therapy and relaxation training for panic disorder. *Journal of Consulting and Clinical Psychology, 62*, 818–826.
- Borkovec, T.D., & Costello, E. (1993). Efficacy of applied relaxation and cognitive behavioral therapy in the treatment of generalized anxiety disorder. *Journal of Consulting and Clinical Psychology, 61*, 611–619.
- Borkovec, T.D., & Whisman, M.A. (1996). Psychosocial treatment for generalized anxiety disorder. In M. Mavissakalian & R. Prien (Eds.), *Long-term treatment of anxiety disorders*. Washington, DC: American Psychiatric Association.
- Calhoun, K., & Resick, P. (1993). Posttraumatic stress disorder. In D.H. Barlow (Ed.), *Clinical handbook of psychological disorders* (2nd ed., pp. 48–98). New York: Guilford.
- Chambless, D.L., & Ollendick, T.H. (2001). Empirically supported psychological interventions: Controversies and evidence. *Annual Review of Psychology, 52*, 685–716.
- Clark, D.M., Salkovskis, P.M., Hackmann, A., Middleton, H., Anastasiades, P., & Gelder, M. (1994). A comparison of cognitive therapy, applied relaxation and imipramine in the treatment of panic disorder. *British Journal of Psychiatry, 164*, 759–769.

- Clum, G.A., Clum, G.A., & Surls, R. (1993). A meta-analysis of treatments for panic disorder. *Journal of Consulting and Clinical Psychology, 61*, 317–326.
- Cohen, J. (1977). *Statistical power analysis for the behavioral sciences* (rev. ed.). New York: Academic.
- Cox, B.J., Endler, N.S., Lee, P.S., & Swinson, R.P. (1992). A meta-analysis of treatments for panic disorder with agoraphobia: Imipramine, alprazolam, and in vivo exposure. *Journal of Behavior Therapy and Experimental Psychiatry, 23*, 175–182.
- Craske, M.G., Brown, T.A., & Barlow, D.H. (1991). Behavioral treatment of panic disorder: A two-year follow-up. *Behavior Therapy, 22*, 289–304.
- Ellis, A. (1994). Rational emotive behavior therapy approaches to obsessive-compulsive disorder. *Journal of Rational-Emotive and Cognitive-Behavioral Therapy, 12*, 121–141.
- Ellis, A.E. (1962). *Reason and emotion in psychotherapy*. Secaucus, NJ: Lyle Stuart.
- Emmelkamp, P.M.G., & Beens, H. (1991). Cognitive therapy with obsessive-compulsive disorder: A comparative evaluation. *Behaviour Research and Therapy, 29*, 293–300.
- Fedoroff, I.C., & Taylor, S. (2001). Psychological and pharmacological treatments of social phobia: A meta analysis. *Journal of Clinical Psychopharmacology, 21*, 311–324.
- Feske, U., & Chambless, D.L. (1995). Cognitive behavioral versus exposure only treatment for social phobia: A meta-analysis. *Behavior Therapy, 26*, 695–720.
- Foa, E.B., & Kozak, M.J. (1986). Emotional processing of fear: Exposure to corrective information. *Psychological Bulletin, 99*, 20–35.
- Foa, E.B., Steketee, G.S., & Rothbaum, B.O. (1989). Cognitive-behavioral conceptualizations of post-traumatic stress disorder. *Behavior Therapy, 20*, 155–176.
- Franklin, M.E., Abramowitz, J., Kozak, M.J., Levitt, J., & Foa, E. (2000). Effectiveness of exposure and ritual prevention for obsessive-compulsive disorder: Randomized compared with nonrandomized samples. *Journal of Consulting and Clinical Psychology, 68*, 594–602.
- Goldfried, M.R. (1971). Systematic desensitization as training in self-control. *Journal of Consulting and Clinical Psychology, 37*, 228–234.
- Goldstein, A.J., & Chambless, D.L. (1978). A reanalysis of agoraphobia. *Behavior Therapy, 9*, 47–59.
- Gould, R.A., Buckminster, S., Pollack, M.H., Otto, M.W., & Yap, L. (1997). Cognitive-behavioral and pharmacological treatment for social phobia: A meta-analysis. *Clinical Psychology: Science and Practice, 4*, 291–306.
- Gould, R.A., Otto, M.W., & Pollack, M.H. (1995). A meta-analysis of treatment outcome for panic disorder. *Clinical Psychology Review, 8*, 819–844.
- Gould, R.A., Otto, M.W., Pollack, M.H., & Yap, L. (1997). Cognitive behavioral and pharmacological treatment of generalized anxiety disorder: A preliminary meta-analysis. *Behavior Therapy, 28*, 285–305.
- Heimberg, R.G., Dodge, C.S., Hope, D.A., Kennedy, C.R., Zollo, L.J., & Becker, R.E. (1990). Cognitive behavioral group treatment for social phobia: Comparison with a credible placebo control. *Cognitive Therapy and Research, 14*, 1–23.
- Kozak, M.J. (1999). Evaluating treatment efficacy for obsessive-compulsive disorder: Caveat practitioner. *Cognitive and Behavioral Practice, 6*, 422–426.
- Lillienfeld, S. (1996). EMDR treatment: Less than meets the eye. *The Skeptical Inquirer, 20*, 25–31.
- Lipsey, M., & Wilson, D. (1993). The efficacy of psychological, educational, and behavioral treatment: confirmation from meta-analysis. *American Psychologist, 48*, 1181–1209.
- McLean, P.D., Whittal, M.L., Thordarson, D.S., Taylor, S., Söchting, I., Koch, W.J., Paterson, R., & Anderson, K.W. (2001). Cognitive versus behavior therapy in the group treatment of obsessive-compulsive disorder. *Journal of Consulting and Clinical Psychology, 69*, 205–214.
- Meyer, V. (1966). Modifications of expectations in case of obsessional rituals. *Behaviour Research and Therapy, 4*, 273–280.
- Mowrer, O.A. (1960). *Learning theory and behavior*. New York: Wiley.

- Newman, M.G., Hofmann, S.G., Werner, T., Roth, W.T., & Taylor, C.B. (1994). Does behavioral treatment of social phobia lead to cognitive changes? *Behavior Therapy, 25*, 503–517.
- Oei, T.P.S., Llamas, M., & Devilly, G.J. (1999). The efficacy and cognitive processes of cognitive behavior therapy in the treatment of panic disorder with agoraphobia. *Behavioural and Cognitive Psychotherapy, 27*, 63–88.
- Rachman, S. (1998). A cognitive theory of obsessions: Elaborations. *Behaviour Research and Therapy, 36*, 385–401.
- Rapee, R.M., & Heimberg, R.G. (1997). A cognitive behavioral model of anxiety in social phobia. *Behaviour Research and Therapy, 35*, 741–756.
- Salkovskis, P.M. (1999). Understanding and treating obsessive-compulsive disorder. *Behaviour Research and Therapy, 37*, S29–S52.
- Shapiro, F. (1991). Eye movement desensitization and reprocessing procedure: From EMD to EMD/R-A, and treatment model for anxiety and related trauma. *The Behavior Therapist, 5*, 128–133.
- Shapiro, F. (1995). *Eye movement desensitization and reprocessing: Basic principles, protocols, and procedures*. New York: Guilford.
- Sherman, J.J. (1998). Effects of psychotherapeutic treatments for PTSD: A meta-analysis of controlled clinical trials. *Journal of Traumatic Stress, 11*, 413–435.
- Spielberger, C.D., Gorsuch, R.L., Lushene, R., Vagg, P.R., & Jacobs, G.A. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.
- Taylor, S. (1996). Meta-analysis of cognitive-behavioral treatments for social phobia. *Journal of Behavior Therapy and Experimental Psychiatry, 27*, 1–9.
- Telch, M.J., Lucas, J.A., Schmidt, N.B., Hanna, H.H., LaNae, J.T., & Lucas, R.A. (1993). Group cognitive-behavioral treatment of panic disorder. *Behaviour Research and Therapy, 31*, 279–287.
- van Balkom, A.J.L.M., Bakker, A., Spinhoven, P., Blaauw, B.M.J.W., Smeenk, S., & Ruesink, B. (1997). A meta-analysis of the treatment of panic disorder with or without agoraphobia: A comparison of psychopharmacological, cognitive-behavioral, and combination treatments. *Journal of Nervous and Mental Disease, 185*, 510–516.
- Van Balkom, A.J.L.M., van Oppen, P., Vermeulen, A.W.A., van Dyck, R., Nauta, M.C.E., & Vorst, H.C.M. (1994). A meta-analysis on the treatment of obsessive-compulsive disorder: A comparison of antidepressants, behavior, and cognitive therapy. *Clinical Psychology Review, 14*, 359–381.
- Van Etten, M., & Taylor, S. (1998). Comparative efficacy of treatments for posttraumatic stress disorder: A meta-analysis. *Clinical Psychology and Psychotherapy, 5*, 126–145.
- van Oppen, P.A., & Arntz, A. (1994). Cognitive therapy for obsessive-compulsive disorder. *Behaviour Research and Therapy, 32*, 79–87.
- Veronen, L., & Kilpatrick, D. (1983). Stress management for rape victims. In D. Meichenbaum & M.E. Jaremko (Eds.), *Stress reduction and prevention*. New York: Plenum.
- Weeks, C. (1978). Simple, effective treatment of agoraphobia. *American Journal of Psychotherapy, 32*, 357–369.
- Weston, D., & Morrison, K. (2001). A multidimensional meta-analysis of treatments for depression, panic, and generalized anxiety disorder: An empirical examination of the status of empirically supported therapies. *Journal of Consulting and Clinical Psychology, 69*, 875–899.
- Whittal, M.L., & McLean, P.D. (1999). CBT for OCD: The rationale, protocol, and challenges. *Cognitive and Behavioral Practice, 6*, 383–396.
- Williams, S.L., & Falbo, J. (1996). Cognitive and performance-based treatments for panic attacks in people with varying degrees of agoraphobic disability. *Behaviour Research and Therapy, 34*, 253–264.
- Wolpe, J. (1958). *Psychotherapy by reciprocal inhibition*. Stanford, CA: Stanford University Press.