Cognitive Therapy of Anxiety Disorders

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A review of studies of cognitive-behavioral therapy (CBT) for generalized anxiety disorder, panic disorder with and without agoraphobia, and social phobia indicates that CBT is consistently more effective than waiting-list and placebo control groups. In general, CBT has proved more beneficial than supportive therapy as well. Comparisons with active behavioral treatments provide more variable results. Converging evidence suggests that cognitive change may be a strong predictor of treatment outcome, but that such change may be produced by a number of therapeutic approaches. Pretest-posttest change with CBT is depicted in meta-analytic summary form for each disorder.

In a seminal article, Beck, Laude, and Bohnert (1974) demonstrated that anxious clients report characteristic patterns of thinking, such that increments in anxiety are accompanied by thoughts and images of social or physical harm, or both. The results of this early report have proved consistent with an emerging body of self-report and laboratory experimental findings concerning the cognitive psychopathology of anxiety disorders (see review by Chambless, 1988). Analysis of the content of anxiety clients' thoughts provides some support for Beck and Emery's (1985) hypothesis of disorder specificity in anxious cognitions. Thus, clients with panic disorder, with or without agoraphobia, are primarily concerned with harm to their physical well-being caused by panic symptoms (part of the process dubbed "fear of fear" by Goldstein & Chambless, 1978), whereas clients with social phobia are more concerned with social failure (e.g., see Chambless & Gracely, 1989; Hope, Rapee, Heimberg, & Dombeck, 1990). The concerns of clients with generalized anxiety disorder are more diffuse, involving thoughts of loss of control (e.g., Chambless & Gracely, 1989) and heightened vigilance for threats of both a social and physical nature (e.g., MacLeod, Mathews, & Tata, 1986). The centrality of this diffuse pattern of worry for clients with generalized anxiety disorder has been sufficiently documented (see review by Borkovec, Shadick, & Hopkins, 1991) that the criteria of the third edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-III) were changed to require excessive worry for assignment of the generalized anxiety disorder diagnosis (see DSM-III vs. DSM-III-R criteria; American Psychiatric Association, 1980, 1987).

A variety of approaches have been used to modify cognitions of anxious clients, most commonly rational-emotive therapy (RET; Ellis, 1962), self-instructional training (SIT; Meichenbaum, 1975), and Beck and Emery's (1985) model of cognitive therapy. Therapy components include teaching clients to identify and label irrational thoughts and to replace them with positive self-statements or modify them by challenging their veracity. The cognitive modification approaches are often combined with behavioral treatments such as exposure or relaxation training. The behavioral components are viewed either as important in their own right or as a vehicle for practicing cognitive techniques. Hence, we will use the term cognitive-behavioral therapy (CBT) in this review.

For this brief review, we surveyed the results of cognitive therapies for three anxiety disorders for which a substantial body of treatment research on clinical samples is available: generalized anxiety disorder, panic disorder with and without agoraphobia, and social phobia. For a descriptive summary, we have converted treatment findings into effect sizes when authors provided means and standard deviations for the measures across treatment. We calculated two types of effect sizes using M. L. Smith and Glass's delta (1977). To include the many studies in which the effects of one treatment were compared, not with a waiting-list control or placebo group, but only with another treatment, we first computed crude pretest-posttest and pretest-follow-up effects using the following formula: \( (M_{\text{posttest}} - M_{\text{pretest}})/SD_{\text{pretest}} \). Second, for those studies with waiting-list or placebo controls, we calculated controlled effect sizes comparing the posttest or follow-up scores of treatment groups with control groups using the formula \( (M_{\text{control}} - M_{\text{treatment}})/SD_{\text{control}} \). When multiple measures of a construct were used, we averaged effect sizes for that construct within each study.

Generalized Anxiety Disorder

We located nine clinical trials for generalized anxiety disorder in which clients were selected according to DSM-III or DSM-III-R criteria (American Psychiatric Association, 1980, 1987) or Research Diagnostic Criteria, thus enhancing the probability of reasonably homogeneous samples. In seven of these studies with panic disorder were included in the sample. These investigations have been retained for this article because in both cases there...
studies, data necessary for inclusion in a meta-analytic summary were published or provided by the authors (see Table 1). Measures included in this analysis were interview (typically the Hamilton Anxiety Scale [Hamilton, 1959]) and self-report questionnaires (e.g., the Zung Self-Rating of Anxiety [Zung, 1971] and the Beck Anxiety Inventory [Beck & Steer, 1990]).

In almost all trials, Beck and Emery's (1985) version of CBT was combined with one or more additional behavioral techniques, most commonly progressive relaxation training and more rarely self-control desensitization or electromyogram biofeedback. The exception is the study by Butler, Fennell, Robinson, and Gelder (1991), who seem to have used Beck-Emery CBT alone. The one study not based on the Beck and Emery manual was that by Butler, Cullington, Hibbert, Klimes, and Gelder (1987), who examined the effects of an anxiety management training package including positive self-talk, relaxation, exposure, and pleasant events scheduling, as well as challenging irrational thoughts.

Is CBT for Generalized Anxiety Disorder Effective?

The uncontrolled pretest–posttest effect sizes in Table 1 indicate that CBT consistently has a substantial impact on anxiety measures. The effect sizes for the studies by Power and colleagues (Power, Jerrom, Simpson, Mitchell, & Swanson, 1989; Power et al., 1990) are unusually large; however, the placebo response effect sizes are also very high for these studies, yielding controlled effect sizes comparable to those for other investigations. Although the reasons for these investigators' discrepant findings are not clear, the brief duration of their clients' disorder (3 or 4 months on average) may be related to an especially powerful response to any intervention. When compared with the effects of control groups, the average effect size for CBT (including the Power et al. data) continues to be quite large (M = 1.54).

Figure 1 depicts the results of five studies in which CBT was compared with one of several control conditions: pill placebo (Power et al., 1989, 1990), nondirective therapy (Borkovec & Costello, 1992), or waiting list (Butler, Cullington, et al., 1987; Butler et al., 1991). Not shown (requisite data were not available), but also including nondirective therapy, waiting-list control groups, or both, are studies by Barlow et al. (1984) and Blowers, Cobb, and Mathews (1987). In all seven investigations, CBT was more effective than waiting list or pill placebo at posttest.

The results of the two studies using nondirective therapy to control for nonspecific treatment effects are conflicting, despite some collaboration between the two research groups. Whereas Borkovec and Costello (1992) found CBT superior to nondirective therapy, Blowers et al. (1987) did not. However, in the latter study CBT was superior to a waiting-list control when nondirective therapy, yielding an intermediate response rate, was not. A number of methodological differences between the two studies might account for the discrepant findings. In the more recent study, Borkovec and Costello included a number of important methodological refinements that should reduce variance and provide a cleaner picture of the results. In addition, Borkovec and Costello provided subjects with 50% more treatment sessions (12 vs. 8), including slower and more thorough training in relaxation, and added self-control desensitization to their treatment package.

Do CBT Effects Persist Once Treatment Has Ended?

Examination of the uncontrolled pretest–follow-up effect sizes in Table 1 demonstrates that treatment effects were maintained or augmented over 6–12 months of follow-up. The large effect size for the Borkovec and Costello (1992) study is particularly impressive in that the data reported are for subjects who received no further treatment during the follow-up period. Comparison of CBT and control groups at follow-up is problematic in that, for ethical reasons, control subjects generally receive treatment after posttest. Thus, the only controlled follow-up contrasts are from the two trials comparing CBT with nondirective therapy. In the Blowers et al. (1987) study, CBT and nondirective therapy continued to be equivalent 6 months after treatment. Borkovec and Costello (1992) also found no differences between treatments at follow-up, but these long-term outcome data were confounded in that, because of their poor initial treatment response, significantly more nondirective therapy clients received additional treatment during the follow-up period (61% of nondirective clients vs. 16% of CBT clients).

Is CBT More Effective Than Behavioral Treatments for Generalized Anxiety Disorder?

Borkovec and colleagues compared CBT plus relaxation and nondirective therapy plus relaxation in studies with college students with generalized anxiety disorder (Borkovec et al., 1987) and with a more severely anxious community sample (Borkovec & Mathews, 1988). Despite the similarity in the protocols and high level of methodological refinement in both studies, the results are conflicting. Only with the student sample was CBT superior to nondirective therapy plus relaxation; for the clinical sample, effects of the two treatments were similar at posttest and 12-month follow-up. However, these differences may be more apparent than real. The superiority of CBT for the student sample was found only for self-report questionnaires. The effect sizes for comparison of CBT and nondirective therapy plus relaxation on the assessor-rated Hamilton Anxiety Scale are comparable and modestly, if not statistically significantly, in favor of CBT in both investigations (student effect size = 0.32, clinical effect size = 0.43). Hence, these discrepancies may reflect the sampling variance associated with tests of modest effects at low power. Nevertheless, on the basis of this research, one cannot safely conclude that the CBT effects depicted in Table 1 and Figure 1 reflect more than simple nonspecific treatment effects in combination with relaxation training.

For a diagnosis of generalized anxiety disorder according to the DSM-III-R, symptoms must have persisted for 6 months; however, a duration of only 1 month was required under the DSM-III scheme.
Table 1
Effect Sizes for Reduction in Anxiety Following Cognitive Therapy for Generalized Anxiety Disorder

<table>
<thead>
<tr>
<th>Study</th>
<th>Pre-post effect size</th>
<th>Pre-follow-up effect size</th>
<th>Length of follow-up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Borkovec et al. (1987)</td>
<td>1.59</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Borkovec &amp; Costello (1992)</td>
<td>1.81</td>
<td>1.26</td>
<td>1 year</td>
</tr>
<tr>
<td>Borkovec &amp; Mathews (1988)</td>
<td>1.67</td>
<td>1.53</td>
<td>1 year</td>
</tr>
<tr>
<td>Butler, Cullington, Hibbert, Klimes, &amp; Gelder (1987)</td>
<td>1.68</td>
<td>2.15</td>
<td>6 months</td>
</tr>
<tr>
<td>Butler, Fennell, Robson, &amp; Gelder (1991)</td>
<td>1.67</td>
<td>1.79</td>
<td>6 months</td>
</tr>
<tr>
<td>Power, Jerrom, Simpson, Mitchell, &amp; Swanson (1989)</td>
<td>5.48*</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Power et al. (1990)</td>
<td>4.29*</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Weighted average</td>
<td>1.69*</td>
<td>1.95</td>
<td></td>
</tr>
</tbody>
</table>

Note. Cognitive-behavioral therapy was the treatment used in all studies except Butler, Cullington, Hibbert, Klimes, and Gelder (1987).

More complete behavioral treatment programs were used by Borkovec and Costello (1992) and Butler et al. (1991). The former compared a CBT package and an applied relaxation treatment in which clients were taught to identify early signs of anxiety and apply their relaxation skills to dampen incipient arousal. CBT and applied relaxation were similar in their effects, with both being superior to nondirective therapy at posttest. Butler et al. (1991) compared 4–12 sessions of pure CBT (without relaxation) with behavior therapy consisting of progressive relaxation, exposure, graded task assignments, and pleasurable activities to combat demoralization. Improvements with CBT were greater than those with behavior therapy on several, but not all, anxiety measures at posttest and at 6-month follow-up; differences were apparent on the most extensively validated anxiety measures used (the Hamilton Anxiety Scale and the Beck Anxiety Inventory). At long-term follow-up (11–24 months), significantly more behavior therapy clients than CBT-treated clients were found to have sought extensive additional treatment. Because both studies were methodologically sophisticated, there are no obvious reasons for the discrepant findings. It is possible that the pure and thorough approach taken to CBT by Butler et al. (1991) yields more effective results in a short-term treatment than more complex treatment packages. Only 10–15 min per session were devoted to cognitive therapy in the Borkovec and Costello CBT program.

Effects on Depression

Clients with generalized anxiety disorder frequently complain of depression, with perhaps one third meeting criteria for dysthymia (e.g., de Ruiter, Rijken, Garssen, van Schaik, & Kraaimaat, 1989). Does CBT benefit their depression, in addition to their anxiety? Clients with severe or primary depression were generally excluded from the studies reviewed, but less severe depressive symptomatology was common. The three studies providing data comparing CBT with other psychological treatments yield mixed results. Butler et al. (1991) found CBT to have greater impact on depression than behavior therapy, whereas Borkovec and Costello (1992) determined that CBT was superior to nondirective therapy but not to applied
relaxation. In contrast, Borkovec et al. (1987) found no significantly superior CBT effects for depression among treatment completers. However, the low levels of pretreatment depression in this student sample may have made the detection of differential treatment effects unlikely. In all three studies, the authors reported having to drop clients from the non directive, applied relaxation, or behavior therapy conditions because of increased depression; no such losses occurred in the CBT groups. Thus, CBT may have an added benefit in addressing mixed anxiety and depression among clients with generalized anxiety disorder. Given the considerable comorbidity of anxiety and depression, this question warrants further study.

**Effects on Cognitive Measures**

Only three of the studies reviewed here included an examination of cognitive changes. In the earliest effort, Blowers et al. (1987) assessed self-report of the perceived controllability and intensity of cognitive symptoms of anxiety. Both non directive and CBT groups reported greater reduction in intensity than the waiting-list group, but only the CBT group reported significantly enhanced control over cognitive symptoms compared with the waiting-list group. Butler et al. (1991) used five measures of anxious cognition. Pure CBT yielded better results than behavior therapy on two measures at posttest and on all five measures at 6-month follow-up. Using the Penn State Worry Questionnaire (Meyer, Miller, Metzger, & Borkovec, 1990), Borkovec and Costello (1992) found that CBT led to greater reductions in worry than did non directive therapy; applied relaxation and CBT were equivalent in their effects. Laboratory measures of thoughts and imagery also showed that treatment responders in this study became more like normal subjects in their mentation, regardless of therapy type (Borkovec & Inz, 1990). Thus, a variety of treatment procedures may lead to change on cognitive measures; CBT may result in greater cognitive change than other therapies only when it is the more effective treatment for the clients' overall symptoms.

**Panic Disorder and Agoraphobia**

Although dichotomizing clients with panic disorder into those with and without agoraphobia belies a continuum of avoidance, we will follow this convention because (a) samples are described in this fashion and (b) severity of phobic avoidance may have some effect on outcome (Clum, 1989). Studies included in our meta-analysis all followed DSM-III or DSM-III-R criteria for selection. Samples in some earlier studies on agoraphobia described here were selected on the basis of clinical interviews, whereas later studies relied on structured, reliable diagnostic interviews.

Because the effects of exposure on phobic features of panic disorder are well documented and have already been summarized in meta-analytic form (see reviews by Jansson & Øst, 1982; Trull, Nietzel, & Main, 1988), and because studies with cognitive therapy omitting exposure are rare, we did not focus on avoidance behavior in our meta-analytic summary. Rather, we prepared effect size summaries of data on generalized anxiety, diary-rated panic frequency, and fear of fear. Measures of fear of fear included the Agoraphobic Cognitions Questionnaire (Chambless, Caputo, Bright, & Gallagher, 1984), the Panic Belief Questionnaire (Greenberg, 1989), and the Body Sensation Interpretation Questionnaire (Clark et al., 1991), all of which measure catastrophic misinterpretation of panic symptoms or fear of interoceptive cues associated with panic. Also, we note the percentage of subjects reporting themselves to be panic free after treatment.

**Cognitive Therapy of Agoraphobia**

Is cognitive therapy effective for agoraphobia? There are no trials of CBT as a sole treatment for agoraphobia compared with control groups. Rather, the research question has been whether CBT can equal or surpass the established treatment of choice, in vivo exposure. In two studies, Emmelkamp and colleagues (Emmelkamp, Brillman, Kuiper, & Mersch, 1986; Emmelkamp, Kuipers, & Eggeraat, 1978) compared the efficacy of SIT or RET alone with exposure. In each case, brief cognitive interventions (5 or 6 sessions over a 1- or 3-week period) failed to equal the success of equivalent amounts of the benchmark exposure treatment.

Does cognitive therapy add to the effects of exposure for agoraphobia? Investigators comparing cognitive modification plus exposure with exposure alone have used a variety of approaches: paradoxical intention, SIT, RET, and Beck-Emery CBT (Emmelkamp & Mersch, 1982; Michelson, Mavissakalian, & Marchione, 1988; Michelson, Marchione, & Greenwald, 1989; Øst, Westling, & Hellstrom, 1991; Williams & Rappoport, 1983). Pretest-posttest effect sizes are depicted in Table 2; the subset from studies comparing combined treatments with a control group are included in Figure 2. Combined treatments were consistently more effective than waiting-list control groups, but in only one investigation did combined treatment exceed the effects of exposure alone. In that study, Michelson et al. (1989) found that adding Beck-Emery CBT to exposure for agoraphobia led to significantly better results on some measures of phobia and panic and on a composite measure of high end-state functioning at follow-up. Michelson et al.'s data may be unique because they are the only investigators to have combined Beck-Emery CBT with exposure for agoraphobics (all cognitive therapies may not be created equal). Another important factor may be the longer treatment (16 sessions) Michelson et al. provided.

**Cognitive Therapy of Panic Disorder**

CBT of panic disorder, following Clark and Salkovskis's (in press) model (an adaptation of Beck-Emery CBT specifically devised for this disorder), has now been tested in six trials conducted in four nations (see Table 3). In all studies, CBT yielded very large effect sizes for fear of fear, generalized anxiety, and panic frequency; these effect sizes were maintained or enhanced at follow-up of 1-12 months duration (effect sizes at follow-up averaged 1.00-1.73). An average of 85% of the clients were panic free at posttest and 88% at follow-up. Comparisons with control groups. For three of the six studies described, control group data are available for either a waiting-
Table 2
Treatment of Agoraphobia and Panic Disorder by Interoceptive or in Vivo Exposure Plus Various Cognitive Techniques: Pretest–Posttest Effect Sizes

<table>
<thead>
<tr>
<th>Study</th>
<th>Sample</th>
<th>No. of sessions</th>
<th>Anxiety</th>
<th>No. of panic attacks</th>
<th>Fear of</th>
<th>% panic free</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barlow, Craske, Cerny, &amp; Klosko (1989)</td>
<td>PD 15</td>
<td>1.11</td>
<td>0.20</td>
<td>—</td>
<td>87</td>
<td></td>
</tr>
<tr>
<td>Chambless, Goldstein, Gallagher, &amp; Bright (1986)</td>
<td>AG 10</td>
<td>—</td>
<td>0.33</td>
<td>0.52</td>
<td>43</td>
<td></td>
</tr>
<tr>
<td>Klosko, Barlow, Tassinari, &amp; Cerny (1990)</td>
<td>PD 15</td>
<td>1.31</td>
<td>—</td>
<td>—</td>
<td>87</td>
<td></td>
</tr>
<tr>
<td>Margraf &amp; Schneider (1991)</td>
<td>PD 15</td>
<td>0.90</td>
<td>0.88</td>
<td>1.77</td>
<td>75</td>
<td></td>
</tr>
<tr>
<td>Michelson, Marchione, &amp; Greenwald (1989)</td>
<td>AG 16</td>
<td>1.22</td>
<td>0.89</td>
<td>1.34</td>
<td>68</td>
<td></td>
</tr>
<tr>
<td>Michelson et al. (1990)</td>
<td>PD 13</td>
<td>1.08</td>
<td>1.31</td>
<td>1.10</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Öst, Westling, &amp; Hellstrom (1991)</td>
<td>AG 12</td>
<td>—</td>
<td>—</td>
<td>0.91</td>
<td>—</td>
<td></td>
</tr>
<tr>
<td>Weighted average</td>
<td></td>
<td>1.14</td>
<td>0.63</td>
<td>1.03</td>
<td>66</td>
<td></td>
</tr>
</tbody>
</table>

Note. PD = panic disorder with no, mild, or moderate avoidance; AG = agoraphobia.

list period or for response to supportive psychotherapy (Beck, Sokol, Clark, Berchick, & Wright, 1992; Clark et al., 1991; Margraf & Schneider, 1991; see Figure 2). The controlled effect sizes are very large for all three variables (weighted mean ranges from 1.12–1.71). An average of 83% of CBT clients were panic free at posttest, compared with 12% of the control subjects.

Comparisons with other treatments. Three groups of investigators have compared the Clark and Salkovskis (in press) CBT model with another modality: applied relaxation (Clark et al., 1991; Öst & Westling, 1991) or exposure to body sensations associated with panic (interoceptive exposure; Margraf & Schneider, 1991). In only one case did CBT clients improve more than clients in the behavioral treatments (Clark et al., 1991). The discrepancy between the Clark et al. and Öst and Westling studies is puzzling given the similarity of the studies and the cross-fertilization between the two research groups. Investigator effects may play a role in that Clark's group is most closely identified with CBT, whereas Öst has been prominent in the development of applied relaxation. Investigator allegiance may affect the quality and enthusiasm of treatment interventions; however, absent comparative therapist competency ratings for these two studies, such an explanation is speculative.

Data from Barlow's research group (Barlow, Craske, Cerny, & Klosko, 1989; Craske, Brown, & Barlow, 1991) suggest that a treatment package of CBT plus exposure may more successfully retain clients in treatment than relaxation-based therapies; however, there was no differential treatment dropout in the Clark et al. (1991) and Öst and Westling (1991) studies. Thus, although more evidence attests to the efficacy of CBT for panic disorder than for any other psychosocial treatment approach, CBT has not been clearly established as more effective than other panic-focused behavioral treatment programs.

Combination Treatment Approaches to Agoraphobia and Panic Disorder

Table 2 shows the results of six studies in which some form of systematic in vivo exposure or exposure to panic-related interoceptive cues was used concurrently with a variety of cognitive strategies. It is difficult to draw meaningful conclusions from this set because of the heterogeneous interventions used and the sample variability. The effect sizes indicate consistently strong effects for generalized anxiety, with more variable findings for panic and fear of fear. In particular, the effect sizes seem to be lower for the Chambless, Goldstein, Gallagher, and Bright (1986) study, the only trial in which the cognitive component was not Beck-Emery CBT. These investigators used a combination of paradoxical intention and attention manipulation procedures.

Figure 2 depicts the results for the four studies of panic disorder or panic disorder with agoraphobia samples wherein CBT plus exposure was compared with a waiting-list control or with pill placebo. These effects are similar, although slightly lower, than those for uncontrolled studies (weighted M = 0.49–1.07). An average of 72% of clients receiving combined treatment are panic free at posttest versus 25% in control groups. In each

CBT for anxiety disorders often includes some exposure in the form of behavioral experiments or probes for anxious cognitions, except when, for theoretical reasons, investigators exclude such interventions (e.g., Margraf & Schneider, 1991). Treatments we are calling combinations differ from CBT alone in the extent to which exposure was provided or assigned by the therapist as an important treatment component in its own right and in the systematic manner in which exposure was performed.
study, CBT was associated with more change than a waiting period. Although Klosko, Barlow, Tassinari, and Cerny (1990) did not find CBT to yield better results than pill placebo, with the exception of the CBT clients' greater achievement of panic-free status, posttest comparisons of completer samples in this study are compromised by the significantly higher placebo group drop-out rate.

In the one study that compared the effects of combined cognitive therapy plus exposure (interoceptive) with Clark-Salkovskis cognitive therapy alone (carefully eschewing behavioral interventions), Margraf and Schneider (1991) observed no additional benefit for the combined treatment package with their panic disorder clients. Similarly, Barlow and colleagues (Barlow et al., 1989; Craske et al., 1991) found that adding relaxation to their Beck-Emery CBT plus interoceptive exposure package for panic disorder clients after CBT has been investigated by three research groups, with conflicting results. Although both Chambless et al. (1986) and Williams and Rappoport (1983) found decrements in agoraphobic clients' negative cognitions after treatment, clients still reported higher levels of negative thinking about anxiety than did normal control subjects. On the other hand, Michelson, Schwartz, and Marchione (1992), examining the States of Mind ratio (number of positive thoughts divided by the number of positive and negative thoughts), found that agoraphobia.

**CBT Effects on Associated Psychopathology**

*Effects on depression.* Depression is a common feature of panic disorder. For example, Renneberg, Chambless, and Gracely (1992) found 15% of panic disorder clients to suffer from current major depression and 27% from dysthymia. Comparisons with waiting-list control groups demonstrate that depressed mood is ameliorated by CBT (Chambless et al., 1986; Clark et al., 1991). However, the available studies do not indicate that CBT's effects are greater than those of other behavioral or supportive treatments (Beck et al., 1992; Clark et al., 1991; Emmelkamp et al., 1978; Margraf & Schneider, 1991; Michelson et al., 1988). Depression among these clients often results from demoralization, and any treatment instilling hope of change or leading to relief from panic may be sufficient. Note, however, that some investigators excluded clients in a major depressive episode (exclusion when depression was the primary problem was typical), and none have tested the possible moderating effects of major depression on treatment outcome. Given its success in treatment of depression (see Dobson, 1989), CBT might have superior effects for panic disorder clients with major depression. In light of the frequent comorbidity of these disorders, this hypothesis is worth testing.

*Cognitive change.* Comparisons of CBT and waiting-list control groups show that the cognitively based treatments are effective in reducing negative cognitions about the disastrous effects of panic as assessed by questionnaires or audiotaped reports of thoughts collected during behavioral avoidance tests (Chambless et al., 1986; Clark et al., 1991; Margraf & Schneider, 1991; Williams & Rappoport, 1983). Tests of treatment effects on laboratory measures of cognitive schemata have yet to be reported.

The positive effects on cognitive measures cannot be said to be exclusive to CBT. In a set of five studies comparing CBT and other treatments such as exposure alone and applied relaxation (Emmelkamp et al., 1986; Margraf & Schneider, 1991; Michelson et al., 1989; Williams & Rappoport, 1983), only Clark et al. (1991) found CBT to have superior effects on cognitive measures, despite some overlap in the cognitive measures used across investigations. Recall that CBT in the Clark et al. study was the most efficacious treatment on a number of outcome measures.

Normalization of the cognitive responses of panic disorder clients after CBT has been investigated by three research groups, with conflicting results. Although both Chambless et al. (1986) and Williams and Rappoport (1983) found decrements in agoraphobic clients' negative cognitions after treatment, clients still reported higher levels of negative thinking about anxiety than did normal control subjects. On the other hand, Michelson, Schwartz, and Marchione (1992), examining the States of Mind ratio (number of positive thoughts divided by the number of positive and negative thoughts), found that agoraphobia.

**Figure 2.** Average effect sizes of three studies comparing Beck-Emery/Clark-Salkovskis cognitive therapy for panic disorder with waiting list or supportive therapy and four studies comparing cognitive-behavioral therapy for panic disorder (PD) with and without agoraphobia (AGOR) with waiting list or pill placebo. *(Weighted average by outcome measure. Cog = cognitive; TX = treatment; Comb = combined.)*
phobic clients had a lower States of Mind ratio than normals before treatment but an equivalent ratio after treatment. Although differences could be due to variety in the methodologies used, the lengthier and more thorough Beck-Emery CBT provided in the Michelson et al. study might account for their superior results.

A different, but equally important, issue is the relationship of cognitive factors to treatment outcome on panic and avoidance. An emerging body of evidence indicates that cognitive measures of catastrophic thinking about panic predict treatment outcome on measures of panic and avoidance regardless of treatment modality (Chambless & Gracely, 1988; Clark et al., 1991; Margraf & Schneider, 1991; Michelson et al., 1989), with greater improvement on cognitive measures being strongly associated with larger decrements in panic and avoidance or higher levels of negative thinking at pretest predicting poorer treatment response. Indeed, cognitive measures are often the best predictor of treatment outcome. Maintenance of treatment gains may also be related to cognitive variables. Clark et al. found that, controlling for symptom severity at posttest, clients' clinical status at follow-up was predicted by their cognitive distortions at posttest whether they had been treated with CBT, applied relaxation, or even pharmacotherapy. Thus, whatever the method of treatment, clients who continued to report thinking that physical symptoms of panic were signs of physical illness or mishap fared poorly at final evaluation. Although they do not prove causality, such data are consistent with the hypothesis that treatment efficacy is mediated by cognitive processes, whether or not the treatment is explicitly cognitive in nature.

Social Phobia

Because symptoms of social phobia overlap with those of other anxiety disorders and avoidant personality disorder and comorbidity is common, only clinical studies using explicit, standardized diagnostic criteria are included in our statistical analyses. Even so, there are considerable differences among the 10 selected trials in the number of subjects with specific versus generalized social phobias or with additional diagnoses, including avoidant personality disorder. For example, all the subjects included in the Stravynski, Marks, and Yule study (1982) met DSM-III criteria for avoidant personality disorder, whereas Mattick and Peters (1988) and Heimberg et al. (1990) excluded subjects meeting these criteria. Such subtype differences may affect treatment outcome (Chambless, 1989).

A variety of interventions have been shown to be effective for social phobia (for reviews, see Agras, 1990; Heimberg, 1989). In the studies reviewed here, cognitive interventions include anxiety management training (relaxation, distraction, and rational self-talk) combined with in vivo exposure (Butler, Cullington, Munby, Amies, & Gelder, 1984), Heimberg's group CBT (Gellert et al., 1991; Heimberg, Becker, Goldfinger, & Vermilyea, 1985; Heimberg et al., 1990), SIT (Emmelkamp, Mersch, Vissia, & van der Helm, 1985; Jerremalm, Jansson, & Öst, 1986), and RET, alone (Emmelkamp et al., 1985; Mattick, Peters, & Clarke, 1989; Mersch, Emmelkamp, Bogels, & van der Sleen, 1989), combined with exposure (Mattick & Peters, 1988; Mattick et al., 1989), or combined with social skills training (Stravynski et al., 1982).

Outcome measures included in our summary in Table 4 include fear of negative evaluation (Fear of Negative Evaluation Scale [FNES; Watson & Friend, 1969]), cognitive measures (e.g., the Irrational Beliefs Test [IBT; Jones, 1969] and the Social Interaction Self-Statement Test [SISST; Glass, Merluzzi, Biever, & Larsen, 1982]), and social phobia or anxiety measures (e.g., the Social Phobia subscale of the Fear Questionnaire [Marks & Mathews, 1979] and the Social Avoidance and Distress Scale [Watson & Friend, 1969]).

Is CBT for Social Phobia Effective?

The consistently large pre-post effect sizes reflect substantial and significant within-group change. Comparisons with waiting-list and supportive therapy control groups (Butler et al.,

---

**Table 3**

**Cognitive Therapy for Panic Disorder: Pretest–Posttest Effects of Studies Using the Beck and Emery/Clark and Salkovskis Model**

<table>
<thead>
<tr>
<th>Study</th>
<th>No. of sessions</th>
<th>Anxiety</th>
<th>No. of panic attacks</th>
<th>Fear of fear % Panic free</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beck, Sokol, Clark, Berchick, &amp; Wright (1992)</td>
<td>12</td>
<td>1.50</td>
<td>1.05</td>
<td>—</td>
</tr>
<tr>
<td>Clark et al. (1991)</td>
<td>12</td>
<td>2.04</td>
<td>2.20</td>
<td>1.26</td>
</tr>
<tr>
<td>Margraf &amp; Schneider (1991)</td>
<td>15</td>
<td>1.18</td>
<td>1.00</td>
<td>1.00</td>
</tr>
<tr>
<td>Newman, Beck, Beck, &amp; Tran (1990)</td>
<td>12–16</td>
<td>1.62</td>
<td>0.51</td>
<td>2.29</td>
</tr>
<tr>
<td>Öst &amp; Westling (1991)</td>
<td>12</td>
<td>2.13</td>
<td>1.21</td>
<td>1.55</td>
</tr>
<tr>
<td>Sokol, Beck, Greenberg, Wright, &amp; Berchick (1989)</td>
<td>15*</td>
<td>1.69</td>
<td>0.80</td>
<td>—</td>
</tr>
<tr>
<td>Weighted average</td>
<td></td>
<td>1.68</td>
<td>0.98</td>
<td>1.75</td>
</tr>
</tbody>
</table>

*Average number of sessions.
SPECIAL SECTION: COGNITIVE THERAPY OF ANXIETY DISORDERS

Table 4

Cognitive-Behavioral Treatment for Social Phobia: Pre- to Posttreatment Effect Sizes

<table>
<thead>
<tr>
<th>Study</th>
<th>Group</th>
<th>Social phobia</th>
<th>Fear of negative evaluation</th>
<th>Cognitive measure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Butler, Cullington, Munby, Amies, &amp; Gelder (1984)</td>
<td>EXP/GAMT</td>
<td>0.62</td>
<td>0.56</td>
<td>—</td>
</tr>
<tr>
<td>Gelernter et al. (1991)</td>
<td>CBGT</td>
<td>1.15</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Heimberg, Becker, Goldfinger, &amp; Vermilyea (1985)</td>
<td>CBGT</td>
<td>1.21</td>
<td>0.78</td>
<td>0.69</td>
</tr>
<tr>
<td>Heimberg et al. (1990)</td>
<td>CBGT</td>
<td>0.73</td>
<td>0.76</td>
<td>—</td>
</tr>
<tr>
<td>Jerremalm, Jansson, &amp; 6st (1986)</td>
<td>SIT</td>
<td>0.94</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Mattick &amp; Peters (1988)</td>
<td>EXP + CBGT</td>
<td>0.71</td>
<td>0.74</td>
<td>0.47</td>
</tr>
<tr>
<td>Mattick, Peters, &amp; Clarke (1989)</td>
<td>CBGT</td>
<td>0.91</td>
<td>0.57</td>
<td>1.04</td>
</tr>
<tr>
<td>Stravynski, Marks, &amp; Yule (1982)</td>
<td>SST + RET</td>
<td>1.53</td>
<td>1.00</td>
<td>0.55</td>
</tr>
<tr>
<td>Weighted average</td>
<td></td>
<td>1.00</td>
<td>0.85</td>
<td>0.67</td>
</tr>
</tbody>
</table>

Note. EXP = exposure; GAMT = group anxiety management training; CBGT = cognitive-behavioral group treatment; SIT = self-instructional training; RET = rational-emotive therapy; SST = self-statement training.

1984; Heimberg et al., 1985, 1990; Jerremalm et al., 1986; Mattick et al., 1989) indicate that CBT-treated clients improved significantly more than did control groups on some, if not all, measures (see Figure 3). Weighted average controlled effect sizes are 0.68 and 0.70 for social phobia and fear of negative evaluation, respectively. Because fear of scrutiny and negative evaluation by others distinguishes social phobia from related diagnoses and change on the FNES has been the best predictor of treatment outcome across a variety of treatments (Mattick & Peters, 1988; Jerremalm et al., 1986), results on fear of negative evaluation bear special attention. CBT has led to consistently large improvements on this variable (Table 4).

Do Treatment Effects Persist?

Overall, CBT treatment gains are maintained or have increased at 1-6 month follow-up. Indeed, Heimberg, Salzman, Holt, and Blendall (1991) found that CBT subjects were still significantly improved 5 years after treatment. Mattick et al. (1989), in comparing CBT, alone or in combination with exposure, with exposure alone, found that both groups of subjects who received CBT required significantly less subsequent treatment than the exposure-only group. Not only do CBT-treated clients maintain their gains after treatment, in some studies they have continued to improve during the follow-up period (Gelernter et al., 1991; Mattick & Peters, 1988).

Is CBT for Social Phobia More Effective Than Behavioral Treatment?

Although clearly effective with the socially phobic clinical population, CBT is not consistently superior to behavioral treatments. Investigators comparing applied relaxation, exposure, or social skills training with CBT have typically found the treatments to be equivalent (Emmelkamp et al., 1985; Gelernter et al., 1991; Jerremalm et al., 1986; Mattick et al., 1988; Mersch et al., 1989; Stravynski et al., 1982). In only two of the eight comparative trials did the effects of combined cognitive-behavioral treatment exceed those of exposure alone (Butler et al., 1984; Mattick & Peters, 1988), although one treatment or another may show superior effects on a given measure. Thus, the determination of which treatment is more effective may be affected by how outcome is assessed, as well as when, but we found no clear association between assessment method and differential treatment effectiveness.

Effects on Depression

Although exclusionary criteria for subjects were not always stated, it appears that about half the studies excluded subjects suffering from current major depression. Comorbidity statistics for clients included in treatment samples were provided only by Gelernter et al. (1991). In that study, 14% of the subjects had a current comorbid diagnosis of dysthymia. Unpublished data from our own laboratory suggest that comorbidity may be as high as 30% for social phobia and depressive disorders. It is therefore an important finding that, in the studies reviewed, CBT for social phobia also had a positive impact on depression, with a large controlled effect size of 0.91. These effects were consistently, but not significantly, greater than the comparison group effects.

Conversely, it is troubling that Mersch et al. (1989) and Stravynski et al. (1982) each reported one treatment dropout resulting from increased suicidality. The Mersch et al. (1989) dropout
was in the RET treatment group; it is unclear, however, whether the dropout in the Stravynski et al. (1982) study was receiving social skills training alone or with cognitive modification. These reports contrast with the apparent absence of depression-related dropout for CBT-treated clients in studies of panic disorder and generalized anxiety disorder. Note that the socially phobic clients were treated in groups, perhaps making it more difficult to manage depressive episodes before they escalated.

Effects on Cognitive Measures

Not all outcome studies have included measures of cognitive change. The importance of assessing cognition is highlighted by Mattick and Peters's (1988) findings that clients who improved more on the IBT were more likely to have achieved high end-state functioning at both posttest and follow-up.

Using a measure of thoughts collected during a behavioral test, Jerremalm et al. (1986) found that SIT led to significant improvement over a waiting-list control group, whereas applied relaxation did not. However, the difference between the two treatment groups reached significance only for the half of the subjects in the SIT treatment classified as cognitive reactors. This classification was made before treatment assignment on the basis of high scores on a measure of negative thoughts following a behavior test and low heart rate reactivity during that test. Because the same measure was used in classifying subjects and assessing outcome, regression-to-the-mean effects may account for this result. Other investigators found that, at posttest, behavioral treatment, supportive-educational therapy, and CBT produced equivalent cognitive change as measured by the IBT, thought listing, or the SISST (Emmelkamp et al., 1985; Heimberg et al., 1990; Mattick & Peters, 1988; Mattick et al., 1989; Stravynski et al., 1982). However, both Emmelkamp et al. (1985) and Mattick et al. (1989) found that clients receiving CBT improved significantly more on cognitive measures after treatment ended than clients in behavioral treatment groups. Similarly, Heimberg et al. (1990) observed that, at follow-up, CBT-treated clients listed significantly fewer negative and more positive thoughts after role plays than did clients in the educational-supportive condition.

Thus, evidence that CBT is more effective than other treatments in reducing cognitive distortions associated with social phobia is mixed, with differential results most apparent at follow-up. Few studies using laboratory measures of cognitive processes or self-report questionnaire measures specifically tailored to cognitive assessment of social phobia have yet been published. Such research would provide a better test of CBT's effects on the cognitive pathology of these clients.

Discussion

The findings from our review of studies on generalized anxiety disorder, panic disorder-agoraphobia, and social phobia demonstrate that CBT is an effective treatment for these anxiety disorders. Clients in CBT changed significantly more than those who were in waiting-list control groups or who received pill placebos. On the whole, CBT's effects have also been found to exceed those of supportive therapy and education, although the differential response rate is not always large or apparent on all measures. Comparisons with focused behavioral treatments yield more mixed results: In general, CBT's effects equal and sometimes surpass those of behavior therapy without explicit cognitive components. The exception appears to be brief CBT excluding exposure instructions for highly avoidant clients with agoraphobia, for which there is a poor track record.

At follow-up, maintenance of treatment gains is typical of CBT-treated clients. Indeed, an impressive feature of CBT is that clients in a number of studies continued to improve during the follow-up period, which has not typically been the case with behavioral treatments of anxiety. In yet other studies, CBT clients were less likely to seek treatment during follow-up than clients in other treatment conditions, suggesting more durable or more generalized treatment effects.

Clients also seem to find CBT an acceptable treatment. Although investigators often did not present dropout rates as clearly as we would have liked, we estimate that CBT has a relatively low rate of premature termination, about 8% for panic disorder, 14% for generalized anxiety disorder, and 13% for social phobia. In several studies of generalized anxiety disorder (Borkovec et al., 1987; Borkovec & Costello, 1992; Butler et al., 1991), CBT's additional effects on depression seem to have enabled investigators to reduce depression-related treatment drop-
out. Reporting on treatment of panic disorder, Barlow et al. (1989) noted a lower dropout rate for CBT than for behavior therapy alone, although it is not known whether the increased dropout rate with relaxation training was related to depression. On the other hand, in the literature on group CBT of social phobia there have been one or two reports of dropout associated with increased suicidality. We urge researchers to report comorbidity and dropout data carefully to allow more definitive conclusions to be drawn.

Although investigators have shown that clients change in CBT, they have inadequately assessed or reported the clinical significance of that change. When indices of clinically significant change are reported, comparisons across studies are made difficult by variable and often arbitrary criteria. Estimates of clinically significant change or high end-state functioning range from 7%–75% for social phobia, 46%–86% for panic disorder, and 32%–73% for generalized anxiety disorder. These data suggest that even more powerful treatment interventions are needed. Moreover, end-state functioning criteria based solely on compilations of focused measures for the disorder may obscure remaining psychopathology. For example, on interviewer-rated global assessment of severity, Michelson et al. (1989) found that only 24% of the CBT clients were rated as completely recovered after treatment (although this figure had risen to 47% at 3-month follow-up), whereas 86% were rated as having achieved high end-state functioning on the major outcome measures. Thus, CBT may be effective, but, as practiced in research trials, it is no panacea.

In the search for more effective treatments, investigators have turned to combinations of treatment components. Given the multiple ways in which anxiety is manifest (physiological arousal, maladaptive cognition, behavioral disturbance or avoidance, and subjective distress), the idea that using different treatments to attack each aspect of the problem would be maximally effective has great intuitive appeal. Unfortunately, our review of the results of studies on combination treatments indicates that this is not uniformly true. The incremental efficacy of combination treatments seems to differ according to diagnosis and the particular outcome measures used.

There seem to be at least two possible limitations to the utility of combination treatments. First, given a fixed number of sessions, as is typical in research or managed care settings, introducing a variety of treatment approaches may preclude the client from becoming the master of any of them. Second, a jumble of treatments may prevent the client from having a clear sense of the rationale and direction of the treatment, which is problematic because the rationale itself is an important therapeutic component (Butler, Gelder, Hibbert, Cullington, & Klimes, 1987). Whether combinations could be used more effectively in lengthier treatments is yet to be explored. If so, it may be necessary to develop strategies for determining the best sequence or integration of treatment elements. Extrapolating from the present set of studies, we suggest that vigorous, systematic exposure instructions in addition to cognitive modification techniques will be required for clients who consistently avoid phobic situations.

We know that CBT works, but does it work in the way it should? Theoretically, CBT should lead to improvement and maintenance of treatment gains via alteration of maladaptive cognitions. Relatively few studies have addressed this issue, and the measures have almost exclusively been limited to self-report of thoughts and attribution. The results indicate that CBT does lead to cognitive change and that cognitive change is related to reduction of anxious symptoms and to the durability of treatment gains at follow-up. In fact, cognitive measures have proved to be the best predictor of outcome in several investigations. Nevertheless, CBT is not the only road to cognitive modification. The pattern of results across studies suggests that successful treatment will be accompanied by change on cognitive measures and that cognitive measures predict outcome with a variety of treatment approaches, including pharmacotherapy.

There are a number of possible explanations for such findings; these have been described by Hollon, DeRubeis, and Evans (1987) in the context of the CBT depression literature. At least three explanations seem pertinent here: (a) cognitive change represents a common mechanism for change with various treatments (Bandura, Adams, & Beyer, 1977) and is necessary for durable benefits; (b) cognition, anxiety, and avoidance are linked so that changing any one aspect of the system leads to changes in other components; or (c) cognitive change covaries with change in anxiety and has no special explanatory properties. The latter explanation becomes less likely in the face of studies such as that by Clark et al. (1991), who controlled for posttreatment severity in anxiety symptoms when demonstrating that cognitive measures predicted outcome on anxiety symptoms at follow-up.

More research using statistical approaches allowing approximation of causal explanations is required (see Baron & Kenny, 1986). Greater attention to cognitive assessment procedures is also necessary (for a review, see Arnkoff & Glass, 1989). Measures often used to assess cognitions in anxiety disorders research, such as the IBT (see T. W. Smith & Zurawski, 1983) and the FNES, may not discriminate adequately between anxiety and cognitions. In addition, studies assessing change with laboratory rather than self-report measures are highly desirable. On transparent questionnaires, CBT-treated clients might feel greater pressure to report increased rational thinking after treatment than clients in noncognitive therapies. Moreover, not all important aspects of cognitive psychopathology (e.g., schemata) may be accessible to self-report.

Heterogeneous approaches to cognitive modification were taken in the studies we reviewed, yet few studies have provided comparisons among the types of cognitive treatments. Currently, the most common cognitive treatment used is some form of Beck-Emery (1985) CBT. Michelson and Marchione (1991) have suggested that Beck-Emery CBT may prove to be a more powerful approach for anxiety than other cognitive approaches (e.g., SIT) because it is designed to change not only the content of clients' thoughts but also the process and structure of cognition. Indeed, CBT seems to add to the effectiveness of exposure for agoraphobia when RET and SIT have not. However, a variety of cognitive approaches have proved effective for social phobia, including SIT and RET. Hence, whether one cognitive treatment is better than another remains an open question, although the documentation of the efficacy of Beck-Emery CBT is more extensive at present. The development of...
more sophisticated laboratory measurement of cognitive schemata for research on psychopathology of anxiety disorders makes possible a test of whether more explicitly metacognitive therapies (see Hollon & Kriss, 1984) have stronger effects on deeper structures than therapies that rely on distraction or self-statement training. We encourage anxiety researchers to include such tests in their trials on treatment outcome.

In a final point, we note the dearth of studies comparing CBT with psychodynamic therapies. Both psychotherapies rely on introspection and client-therapist verbal interaction for their effects, although the type of insight sought differs. With the current emphasis in CBT on modification of self-schemata, CBT has moved closer to psychodynamic therapy in its goals. These similarities appear to make CBT more acceptable to psychodynamically oriented practitioners than behavior therapy. Given the continued popularity of psychodynamic approaches with American clinical psychologists (Norcross & Prochaska, 1982), controlled comparisons of process and outcome of these approaches would be fruitful.

References


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