Psychology Publications   Psychology Department

1-1-2008

A meta-analysis of CBT for pathological worry among clients with GAD.

Roger Covin

Allison J Ouimet

Pamela M Seeds

David J A Dozois

Running head: META-ANALYSIS OF CBT FOR WORRY

A Meta-Analysis of CBT for Pathological Worry

Among Clients With GAD

Roger Covin, M.A.

Allison J. Ouimet, B.A.

Pamela M. Seeds, B.A.

David J. A. Dozois, Ph.D

University of Western Ontario

Address for Correspondence
David J. A. Dozois, Ph.D., C.Psych.
Associate Professor
Department of Psychology
 The University of Western Ontario
London, Ontario, CANADA
N6A 5C2

tel: (519) 661-2111 ext. 84678
email: ddozois@uwo.ca

Abstract

Previous meta-analyses assessing the effectiveness of Cognitive Behavioural Therapy (CBT) for Generalized Anxiety Disorder (GAD) used general measures of anxiety to assess symptom severity and improvement (e.g., Hamilton Anxiety Ratings Scale or a composite measure of anxiety). While informative, these studies do not provide sufficient evidence as to whether CBT significantly reduces the cardinal symptom of GAD: pathological worry. The current meta-analysis employed stringent inclusion criteria to evaluate relevant outcome studies, including the use of the Penn State Worry Questionnaire as the main outcome variable. Results showed a large overall effect size (ES) that was moderated by age and modality of treatment. Specifically, the largest gains were found for younger adults and for individual treatment. Analyses also revealed overall maintenance of gains at 6- and 12-month follow-up. Clinical implications of different treatment packages are discussed, as well as potential explanations for the differential effectiveness of CBT.

A Meta-Analysis on CBT for Pathological Worry Among GAD Clients

Generalized Anxiety Disorder (GAD) is characterized by uncontrollable and excessive worry, a necessary feature for its diagnosis. Although other cognitive and/or physical symptoms, such as muscle tension and poor concentration, must be present for diagnosis, the fundamental component is pathological worry across multiple domains of life (e.g., work, health, relationships; American Psychiatric Association [APA], 2000). While everyone worries to some degree, pathological worry is distinguished from "normal" worry when it becomes chronic, excessive, uncontrollable, and essentially removes joy from a person's life (Borkovec, Ray, & Stöber, 1998). Pathological worry is the central feature of GAD but it is often present in other anxiety disorders as well (e.g., excessive worry over future panic attacks). As such, identifying treatments that significantly reduce worry is clinically valuable.

Although there currently exist meta-analyses assessing Cognitive-Behavioural Therapy's (CBT) ability to reduce the number and severity of anxiety symptoms in GAD patients, no quantitative review has examined CBT's ability to reduce worry specifically. Although worry and anxiety are clearly related, research demonstrates that worry is certainly a distinct construct. As such, the goal of the present study is to determine a) whether CBT effectively reduces pathological worry in GAD samples, b) if so, estimate the size of the effects, and c) determine the durability of treatment gains.

Historically, GAD has been a disorder whose diagnostic criteria have been under continual construction across several versions of the Diagnostic and Statistical Manual (DSM) (see Brown, O'Leary, & Barlow, 2001). In fact, the diagnostic criteria for GAD that are used today have only been in place for a little over a decade. Unfortunately, due to this inconsistency in diagnostic criteria, conceptual models of GAD – and therefore, assessment and evaluation of

these models – have lagged behind, relative to other anxiety disorders. Nevertheless, there are currently several excellent theoretical models of GAD published in the literature (Barlow, 2002; Borkovec et al., 1998; Dugas, Gagnon, Ladouceur, & Freeston, 1998; Wells, 1999). Although these models differ to some degree, they share an underlying commonality in their specific focus on cognitive factors implicated in the vulnerability, onset and maintenance of the disorder. This coincides with the increasing recognition of the important role of worry in GAD.

The advancement of theory and research on pathological worry and GAD has contributed significantly to a variety of CBT protocols. For example, two of the more empirically tested models of GAD are Borkovec and colleagues' (see Borkovec et al., 1998) *cognitive avoidance* model, and Dugas and colleagues' (see Dugas et al., 1998) *intolerance of uncertainty* model. Both models attempt to elucidate the etiology and maintenance of worry. Both groups of researchers have also developed CBT protocols that reflect the conceptual ideas of their respective models. For example, Borkovec and colleagues have argued that worry serves as a cognitive avoidance strategy in three ways: (1) worry suppresses anxious arousal; (2) worry functions as an attempt to prevent or prepare for future negative events; and (3) worry focuses on superficial events and distracts from deeper topics. Consequently, a key element of Borkovec and colleagues' CBT package involves exposure to anxiety-based imagery which is then paired with a relaxation response (i.e., a desensitization procedure). This procedure exposes clients to the very imagery and physiological arousal that they tend to avoid (see Borkovec, Newman, Pincus, & Lytle, 2002).

Similarly, Dugas and colleagues (1998) have not only developed and tested a theoretical model of GAD, they have designed a treatment package addressing the key psychological factors outlined by this model. Specifically, their conceptual model centers around the idea that

individuals with GAD are much more intolerant of the uncertainty inherent in life, compared to those without the disorder. Intolerance of uncertainty (IU) is currently conceptualized as a dispositional characteristic "that results from a set of negative beliefs about uncertainty and its implications" (Dugas, 2006). As such, their treatment package is designed to specifically target clients' IU. A unique element of this treatment is that clients are taught to separate their worry into two categories: those that are amenable to problem-solving and those that are not. The therapist helps the client to implement problem-solving strategies for the problems that can be changed, and worry exposure is used for those issues that the client cannot exert control over (see Ladouceur, Dugas, et al., 2000).

Relative to other anxiety disorders, the treatment outcome literature for GAD has a fairly short history. Nevertheless, there have been enough CBT outcome studies to warrant the recent publication of four separate meta-analyses (Borkovec & Ruscio, 2001; Gould et al., 1997; Gould et al., 2004; Westen & Morrison, 2001). The first published meta-analysis, from Gould and his colleagues (1997), included any study (n = 13) using either a cognitive or behavioural technique, but not necessarily both (cognitive restructuring, situational exposure, interoceptive exposure, systematic desensitization, relaxation training [both with and without biofeedback], anxiety management). Treatment outcome was assessed using an effect size (ES) that was an average of scores obtained on a variety of instruments designed to assess the cognitive, somatic and psychological symptoms of anxiety in general. Compared to control groups, the overall ES of CBT for GAD was 0.70. These researchers recently updated this meta-analysis (Gould et al., 2004), and concluded that CBT is effective at reducing symptoms of GAD in both the short- and long-term.

Borkovec and Ruscio (2001) also reviewed 13 outcome studies involving CBT for GAD. Any study using an experimental group who received both cognitive therapy and some form of behavioural therapy (usually relaxation training) was included in the meta-analysis. ESs were calculated by averaging scores on the Hamilton Anxiety Rating Scale (HARS; Hamilton, 1959), the State Trait Anxiety Inventory (STAI; Spielberger, Gorusch & Lushene, 1970), and assessor severity ratings of overall GAD severity. Within-group analyses demonstrated that CBT was effective in reducing symptoms at posttreatment and at follow-up (average follow-up was 9 months). These within-group ESs for CBT were somewhat higher than those obtained for placebo and alternative treatments, as well as for either the behavioural (BT) or cognitive (CT) components alone. Furthermore, CBT was found to produce decreases in anxiety at post-treatment, on average, more than one standard deviation (1.09) greater than waiting-list controls. Similar to Gould and colleagues (1997, 2004) Borkovec and Ruscio (2001) concluded that CBT is an effective intervention for GAD.

Westen and Morrison (2001) conducted a meta-analysis examining the effectiveness of Empirically Supported Treatments (ESTs) for GAD. Five studies were included for a total of 11 active interventions. Of these, 9 comprised either a behavioural or cognitive component, some of which used both. The remaining 2 were brief supportive/expressive psychotherapy and analytic psychotherapy. Unlike the previous meta-analyses, Westen and Morrison included far fewer studies in their meta-analysis (n = 5) and placed far less emphasis on within group ESs. While Westen and Morrison (2001) agreed with Borkovec and Ruscio (2001) that CBT (in its role as an EST) produces significant and meaningful change initially, they were quite critical of the data, or lack thereof, regarding CBT's ability to produce lasting effects. Indeed, their findings led them to conclude that the available outcome data for GAD "do not strike us as encouraging, especially

for treatments that have undergone 20 years of testing and empirical refinement…[and compared to other disorders and consumers' expectations] suggest that we should begin testing different treatments for these disorders" (p. 887).

Responding to Westen and Morrison's conclusions, Aikens, Hazlett-Stevens and Craske (2001) argued that the outcome measures used to calculate ESs did not comprehensively reflect the central symptom (i.e., worry) that is theoretically central to GAD. In fact, Westen and Morrison (2001) used the HARS as the primary indicator of CBT's effectiveness for treating GAD. While the HARS is a scale used to measure generalized anxiety, it does not comprehensively measure pathological worry. Indeed, elevated scores may not necessarily indicate worry to any extent, as there are 14 symptom clusters measuring a broad range of anxiety symptoms (Roemer, 2001). Thus, one could argue that the outcome measures used in this meta-analysis lacked sufficient specificity to warrant their subsequent conclusions.

Similarly, Gould et al. (1997, 2004) and Borkovec and Ruscio (2001) both calculated average ES's across multiple measures of anxiety. While this method controls for scale differences across questionnaires, it relies on the assumption that all measures of anxiety assess similar constructs. In fact, the measures utilized in these studies evaluate symptoms of generalized anxiety, specific phobias, somatic symptoms, and worry. As mentioned previously, because worry is considered the core feature of GAD, and is a distinct construct separate from anxiety, outcome studies pointing to the effectiveness of a particular treatment should demonstrate a reduction in this construct. Gould et al. (1997; 2004) did include some studies which used the PSWQ as an outcome measure, but any symptom reduction observed with this scale was diluted by the averaging of the ESs.

If any treatment is to be considered effective for GAD, it should significantly lower the degree to which pathological worry interferes with the patient's day-to-day life. Furthermore, this treatment benefit should be maintained for a significant period of time after therapy has ended. As Westen and Morrison (2001) have cogently argued, treatments should demonstrate their ability to not only affect states, but actual disorders. In other words, in order to demonstrate that CBT can effectively treat GAD, treatment gains should be observed over an extended period of time.

The current meta-analysis, therefore, was conducted to examine the effectiveness of CBT for GAD by using pathological worry as the outcome measure as opposed to overall anxiety. Also, given that (a) Westen and Morrison (2001) have argued against CBT's effectiveness by citing a lack of evidence for long-term follow-up, and that (b) recent outcome studies have provided sufficient follow-up data, this meta-analysis should also help resolve issues with long-term efficacy. Finally, in an attempt to reduce the heterogeneity of treatment protocols and to obtain a "pure" measure of CBT effectiveness for GAD, the present study included only studies whose active treatment consisted of both a cognitive and behavioural component.

Method

A PSYCHINFO literature search (up to 2006) was conducted using a variety of keywords designed to find articles on the outcome literature for CBT with GAD. Also, studies listed in the reference lists of previously published meta-analytic articles were used to identify additional relevant publications. Unpublished manuscripts were not used in this manuscript because the quality of data used in any meta-analysis is extremely important, and therefore only peer-reviewed research was utilized. There were several criteria for inclusion into the meta-analysis. First, the study was required to have included only GAD patients who were diagnosed according

to criteria put forth in either the DSM-III-R or DSM-IV manuals. As previously discussed, the DSM has not been reliable in its definition of GAD, and so excluding earlier studies avoids problems associated with heterogenous diagnostic samples.

Second, and related to the first inclusion criteria, only studies that have used the PSWQ as an outcome measure were included. Although there were studies that assessed worry in other ways, such as having clients rate the "percent of the day spent worrying," these types of outcome measures lack adequate construct validity. Given that it is *pathological* worry rather than worry per se that comprises the core feature of GAD, measures of general worry were excluded as these indices may not validly represent true symptom change. The PSWQ is a reliable, and well validated clinical measure of pathological worry (Molina & Borkovec, 1994). Third, each study was required to have the appropriate statistics presented in order to conduct meta-analyses. Also, articles that used subsamples from larger studies to be used in the meta-analysis were not included, so as to avoid data being analyzed twice.

The final inclusion criterion involved defining CBT itself, in order to decide which treatment groups to examine. A review of the outcome literature reveals that many different types of cognitive and behavioural therapies have been used to treat GAD (e.g., cognitive restructing; multiple forms of exposure; relaxation training; anxiety management; problem-solving, etc.). In their meta-analytic review, Gould et al. (1997) considered any treatment that used cognitive and/ or behavioural techniques to be CBT. However, we decided to use studies that included both components of treatment, which was the criterion adopted by Borkovec and Ruscio (2001). There were essentially two reasons for this decision. First, there is both evidence for and against the idea that CBT produces differential outcome effects relative to cognitive and behavioural components (Borkovec et al., 2002; Gould et al., 1997). As such, including the

singular components of CBT to represent CBT itself could introduce unwanted heterogeneity in the ESs. A second reason to limit the definition of CBT is that the majority of clinical outcome trials reviewed in the past 10 years used both components (e.g., cognitive restructuring and exposure). Indeed, it appears quite standard to use both componenets to some extent. Therefore, the findings presented here are best generalized to therapies that are currently being used in clinical trials and presumably in clinical settings. Similar to Gould et al. (1997), control groups were defined as any group that did not receive treatment, or who received a psychological placebo (e.g., nondirective and supportive therapies). This provides an understanding of the relative effects of CBT over and above any nonspecific factors (Gould et al., 1997).

        This search resulted in a total of 10 research articles. Many of the studies were published in the *Journal of Consulting and Clinical Psychology*, which is a top-tiered journal with a high impact factor (each article included in the meta-analysis is indicated in the reference list with an asterisk). Seven of these studies provide an opportunity to calculate a comparison between CBT effectiveness and control group change. Although Wetherall et al. (2003) employed two nonspecific control groups, only the wait-list control group were used as a comparion. The second group was a Discussion Group requiring patients to list and discuss topics that were a common source of worry, and to keep journals on these issues outside of therapy sessions. We believe this approach is somewhat similar to cognitive exposure and perhaps even awareness training, typically used in CBT outcome studies (e.g., Ladouceur et al., 2000). Because the generalizability of the current findings are very important, this comparison group was eliminated from analyses because of its potential to be a "specific" factor in therapy outcome. A total of 8 studies were used to calculate within-groups analyses of follow-up data. Although Borkovec and Costello (1993) provide follow-up data, we excluded this study from the follow-up analyses

because some participants received additional psychotherapy following CBT, which raises

concerns regarding the contamination of their longterm outcomes. Of the studies that were used,

some used a group format (Dugas et al., 2003), whereas others involved individual sessions (e.g.,

Ladouceur et al., 2000). Of course, differences in treatment modality can affect differences in

outcome, which we discuss.

      The methodological qualities of the studies included in the meta-analysis can be seen in

Table 1. Overall, the quality of the studies is quite good, as the majority of studies assessed both

the reliability of their intake diagnoses, as well as the degree to which they maintained treatment

protocol. The majority of patients are female, which is not surprising given the gender difference

in diagnosis (APA, 2000).

Data Analysis

      Consistent with previous meta-analyses (e.g., Borkovec & Ruscio, 2001; Westen &

Morrison) two types of ESs were calculated for meta-analytic calculations. First, a between-

groups ES was calculated as follows: between groups ES = CBT mean – comparison group)/

control group standard deviation. This is an ES estimate that is commonly used in meta-analyses,

and can be interpreted as representing the standardized difference between a client receiving

CBT and a client receiving either supportive or no therapy (Dobson, 1989). In accordance with

recommendations by Hedges and Olkin (1985), this value was corrected in order reduce biases

stemming from small samples' ESs. Furthermore, a mean ES was calculated by weighting the

ESs by the inverse of their variance[1]. This procedure provides greater weight to studies with

smaller variances, which are presumed to be more precise in their estimation of effects.

---

[1] Readers interested in knowing the technical aspects of all meta-analytic statistics used in this study are encouraged to examine the Technical Information section of an online manual written by Gene Glass and colleagues (Rudner, Glass, Evartt, & Emery, 2002). The manual and meta-analysis software are available online at: http://www.edres.org/meta/metaman.htm

Calculation of within groups ES is more complicated than between groups ES because it is a repeated measures design, meaning the groups being compared are correlated. Researchers wishing to examine the pre-post ESs must account for this correlation; otherwise, the calculated ES will be an overestimate of the magnitude of the actual effect (Dunlap, Cortina, Vaslow, & Burke, 1996; Morris & DesShon, 2002). This is akin to a dependent t-test controlling for the correlation between groups. However, previous meta-analyses on GAD have not controlled for this correlation when computing the within groups ES, thereby overestimating the actual effects. Although researchers have suggested formulas to correctly estmate ES for a within groups design (e.g., Dunlap et al., 1996), this requires studies to use values of dependent t-tests and the retest correlation of the outcome measure. As this information was not available in most of the studies selected for the current analysis, we calculated the within group ES similar to prior researchers' calculations: within groups effect = CBT follow-up mean – posttreatment mean)/ posttreatment standard deviation. Similar to the between groups analysis, an unbiased estimate of ES was computed by weighting the ESs by the sample size of the study. The primary difference between the current study and previous meta-analyses is that we were only interested in using the within group estimate of ES for follow-up outcome data. There were two reasons for this decision. First, as mentioned, the within group estimates are likely biased and therefore should be limited in their use and interpreted with this bias in mind. Second, the between groups analysis provides adequate information regarding the immediate effectiveness of CBT, and therefore a within groups analysis is somewhat redundant. Indeed, the within groups analysis was only used to gain an understanding of whether CBT's effectiveness is maintained across time.

Results

Between Groups Analysis

As previously outlined, a control group was defined as any comparison group that

provided a nonspecific treatment (e.g., supportive therapy) or individuals on a wait-list and

currently not receiving any treatment. Unbiased effect sizes can be seen in Table 2 for each of

the studies used in the between groups analysis. When CBT was compared to a control group,

the average ES was found to be quite large (-1.15). Tests of significance were performed using

Fischer's Z test, and yielded a significant value (-3.74, p<.05), indicating the mean ES of CBT is

significantly greater than 0. Of course, these results do not take into account the potential bias of

published studies, also known as the "file drawer" effect (Rosenthal, 1984). To account for this

possibility, Rosenthal (1984) developed a formula to calculate the number of studies with an

average ES required to lower the results of a meta-analysis to nonsignificance (called Fail Safe

N). Utilization of Fail Safe N shows that there would have to be 18 studies with a null effect for

the current mean ES to become nonsignificant.

Hedges test of Homogeneity (Q) was used to test for possible presence of moderator

variables. Hedges Q was significant (19.99, p < .05) which indicates significant variability in the

distribution of ESs. A scatterplot of the data suggested that the variable "age" might be

moderating the ESs. Consequently, the data were reanalyzed by examining studies separately for

younger (*M* age = 38.89) and older (*M* age = 68.05) adults. Analyses revealed that the average

weighted ES became larger (-1.69) for the young adult group and smaller (-.82) for older adults,

indicating CBT for GAD is not as effective for older adults. However, this is not to say that CBT

for GAD is ineffective, as Fischer's Z was significant (p <.05) for both mean ESs. Finally,

although Hedges test for homogeneity was nonsignificant (p >1) for both analyses, this may have

been due to low power. In fact, the standard deviations for the younger (SD = .36) and older (SD =.43) adult populations remained relatively high, again indicating there may be a moderator variable present. Visual inspection of a scatterplot revealed an outlier in both groups that appeared to explain the large standard deviations. For the young adult group, Ladouceur et al.'s (2000) ES was considerably higher than the other two, whereas the ES calculated from Stanley, Beck and Glassco (1996) was remarkably lower than the other studies in the older adult group. Potential explanations of these extreme values are addressed in the discussion.

Within Groups Analysis

Based on the between groups analysis, which revealed age as a moderating variable of CBT's effectiveness for reducing pathological worry, mean within-group ESs were calculated separately for studies using primarily younger and older adults. Recall that within group ESs were only calculated to examine the durability of CBT's effectiveness over time, following the end of treatment (see Table 3). At 6 months follow-up, the mean ES for the young adult group was -.009 (SD =.26) and the mean ES for the older adult group was -.12 (SD = .22). At 12 months, the mean ES for the young adult group was -.027 (SD = .37) and the mean ES for the older adult group was -.23 (SD = .12) (see Table 3). As can be seen, the follow-up ESs are quite small, indicating that whatever gains made by clients following therapy were largely maintained for up to 1 year follow-up. As with the between-groups analysis, younger adults appeared to do slightly better than the older group in maintaining treatment gains across time.

Modality Analysis

In order to assess whether there were differences in effectiveness for modalities across all age groups, unbiased ESs were calculated for studies using individual and group CBT separately. The between groups ES was much larger (-1.72) for the individual therapy sessions than for the

group sessions (-.91). For the follow-up data, group therapy actually demonstrated a continued

reduction in worry at 6 (-.25) and 12 months (-.43), whereas individual therapy showed very

little change from posttreatment (6 months = .12; 12 months = .07).

Assessing Effectiveness Through Comparisons With Normative Data

In order to better judge the effectiveness of CBT for GAD, posttreatment mean PSWQ

scores were calculated and compared with a normative mean. Molina and Borkovec (1994)

compiled data on the PSWQ from a variety of populations, including individuals representing a

normative sample (M = 47.65; SD =12.99) and those diagnosed as having GAD (M = 67.66; SD

= 8.86). Prior to treatment, the average PSWQ score of all 10 studies used in the current study

was 63.59, placing them within the clinical range and over 1 SD outside of the normative range.

At posttreatment, the PSWQ mean had fallen into the normal range (M = 48.95) and over 1 SD

outside the clinical range (see Table 4). This finding held true for both the younger and older

groups analyzed separately at posttreatment. Impressively, these trends continued at 6 and 12

month follow-up, showing that younger and older adults were within the normative range and

outside the clinical range, demonstrating the impressive effectiveness of CBT.

Discussion

Findings from the current meta-analysis show that CBT for GAD can be a highly

effective treatment for reducing pathological worry. However, CBT's effectiveness appears to be

moderated by the age of GAD patients being treated. Younger adults responded much more

favorably to treatment at both posttreatment and follow-up relative to older adults. Nevertheless,

when compared to control groups, the mean ES of CBT for geriatric patients was still

impressive, both at posttreatment and follow-up. In fact, mean PSWQ scores at posttreatment

and follow-up show that patients were within the normative range and outside the clinical range of pathological worry.

These findings add to existing literature on CBT's effectiveness for GAD. However, unlike previous meta-analyses, the current study shows that the cardinal symptom of GAD is greatly reduced following treatment. Also, the ESs reported here are greater than those reported in the previous meta-analyses. There are several reasons for this discrepancy: (1) pathological worry demonstrates greater overall change relative to the composite anxiety variables used in previous studies, (2) differences in criteria for selecting studies may have resulted in different samples used in the analyses, and (3) related to the second possibility, the current study included very recent treatment studies, and these studies may represent the CBT packages that have evolved as a consequence of new conceptual models and research. With regard to this latter possibility, we found interesting differences in ESs between studies, suggesting that some CBT packages may be more effective than others. Specifically, outcome studies using the CBT protocol outlined by Dugas, Ladouceur and colleagues demonstrated the largest overall between-groups ES (-2.47), the largest group therapy ES (-1.54), and excellent outcomes for CBT with older adults (Ladouceur et al., 2004). However, it is difficult to make definitive conclusions regarding which treatment protocols are superior, given the relatively small number of studies used, and the presence of moderator variables that add complexity to the interpretation of outcomes (e.g., age and treatment modality). It would be very interesting to compare various CBT packages directly to explore potential differences in outcomes, and perhaps identify different mediators of treatment change.

There are a few possible explanations for the differences in CBT effectiveness for younger versus older adults. First, Stanley, Beck et al. (2003) postulated that older GAD clients

may simply be more resistant to treatment, possibly because the disorder is more engrained among the elderly. For example, Stanley et al. (1996) report that the mean duration of illness among older patients in their sample was 35.5 years. This is significantly longer than the average length of illness among the studies using younger adults (13.54). Thus, the chronicity of the disorder might play an important role in CBT's ability to effect change.

A second potential reason for age differences in responsiveness to CBT could be due to the use of group versus individual modes of therapy (Stanley, Beck et al., 2003; Stanley et al., 1996). It seems that most of the CBT outcome studies for older patients with GAD used a group format, and group CBT for GAD may be less effective than its counterpart. This explanation is commensurate with other research (Fisher & Durham, 1999), and with the current results, which found that individual therapy was superior to group therapy at posttreatment assessment. There is no definitive reason for this discrepancy in outcome, although there are a few possibilities. For example, greater one-on-one attention received in an individual format may provide heightened training of particular skills (e.g., monitoring and challenging thoughts; worry exposure; problem-solving). Likewise, conveying key CBT principles, answering patients' questions and troubleshooting patient problems may be more efficiently conducted via individual sessions. This latter point may be particularly true for older adults who may have trouble understanding some of the abstract concepts outlined in therapy.

Other possible reasons for age as a moderator variable include higher attrition rates among older GAD participants (Stanley, Beck et al., 2003; Wetherell et al., 2003) and potential differences in the actual expression of clinical symptoms among older adults (Stanley et al., 1996). Interactive or synergistic effects of these various factors are likely explanations. It is

obvious that additional research is needed to ascertain how these factors impact psychological treatment of GAD among the elderly.

Although the current data suggest individual treatment produces greater outcomes than group treatment, it is certainly worth noting that the treatment benefits of group therapy were well maintained over time. In fact, scores on the PSWQ tended to be lower at 6 and 12 month follow-up, relative to posttreatment, indicating that individuals continued to show improvement following treatment. This is a rather surprising finding considering treatment effects tend to reduce somewhat following termination of therapy. While initial gains from group CBT may not compare as favorably with individual treatment, individuals in the group format certainly benefit over time, as their worry is reduced considerably. Overall, this meta-analysis supports the use of group CBT for GAD, which can be a very practical treatment option when individual therapy is perhaps not feasible.

In terms of limitations with the current meta-analysis, the main problem is a relatively small number of studies analyzed. Although a total of 10 studies were used, which is in between the previous meta-analyses (5 and 13), the results are weakened to some degree. Given the presence of a moderator variable, subsequent analyses were conducted separately for only 4 studies per age group. With such a small number of studies, there is an increased risk for sampling error to confound the current conclusions. Thus, the current review should be considered a preliminary analysis, that should be followed up over time. However, this does not mean that the current findings are necessarily unreliable and invalid especially given the relative high-quality of the studies included and the corrections made to account for smaller samples. Moreover, a strength of this study is that the sampling error biases were controlled statistically.

In sum, the current meta-analysis found that CBT for both younger and older GAD clients tends to be very effective in treating pathological worry, both in the short term, as well as over time. In fact, findings indicate that CBT is effective in maintaining treatment gains for up to a year. Younger adults appear to benefit more from CBT than do older clients, possibly because of greater chronicity of disorder in the latter group, and the tendency to use group formats with older patients. Future research is needed to test potentially important differences between group and individual formats among both younger and older GAD clients. Also, future research should examine whether there are differences among various CBT treatments for GAD, including an examination of specific components that make one approach more effective. Although the current review is somewhat limited by the number of studies included, the findings likely represent true population values, and argue for the long-term benefits of CBT as way to treat pathological worry.

References

Aikens, D.E., Hazlett-Stevens, H., & Craske, M.G. (2001). Issues of measurement and mechanism in meta-analyses: Comment on Westen and Morrison (2001). *Journal of Consulting and Clinical Psychology, 69*, 904-907.

American Psychiatric Association. (2000). *Diagnostic and Statistical Manual of Mental Disorders* (4th ed. Text Revision). Washington, DC: Author.

Barlow, D.H. (2002). *Anxiety and its disorders: The nature and treatment of anxiety and panic (2nd Ed)*. New York: Guilford Press.

*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., Newman, M.G., Pincus, A.L., & Lytle, R. (2002). A component analysis of cognitive-behavioral therapy for generalized anxiety disorder and the role of interpersonal problems. *Journal of Consulting and Clinical Psychology, 70*, 288-298.

Borkovec, T.D., Ray, W.J., & Stober, J. (1998). Worry: A cognitive phenomenon intimately linked to affective, physiological, and interpersonal behavioral processes. *Cognitive Therapy and Research, 22*, 561-576.

Borkovec, T.D., & Roemer, L. (1995). Perceived functions of worry among generalized anxiety disorder subjects: Distraction from more emotionally distressing topics? *Journal of Behavior Therapy and Experimental Psychiatry, 26*, 25-30.

Borkovec, T.D., & Ruscio, A.M. (2001). Psychotherapy for generalized anxiety disorder. *Journal of Clinical Psychiatry, 62,* 37-42.

Brown, T.A., O'Leary, T.A., & Barlow, D.H. Generalized anxiety disorder. In D.H. Barlow (Ed.) *Clinical handbook of psychological disorders: A step-by-step treatment manual (3rd ed.) (pp. 154-208).* New York: Guilford Press.

Dobson, K.S. (1989). A meta-analysis of the efficacy of cognitive therapy for depression. *Journal of Consulting and Clincial Psychology, 57*, 414-419.

Dugas, M.J. (2006, September). *Biased cognitive processing of uncertainty-inducing information in generalized anxiety disorder: Implications for treatment.* Paper presented at the 36th annual meeting of the European Association of Behavioural and Cognitive Therapies, Paris, France.

*Dugas, M.J., & Ladouceur, R. (2000). Targeting intolerance of uncertainty in two types of worry. *Behavior Modification, 24,* 635-657.

Dugas, M.J., Gagnon, F., Ladouceur, R., & Freeston, M.H. (1998). Generalized anxiety disorder: A preliminary test of a conceptual model. *Behaviour Research and Therapy, 36*, 215-226.

*Dugas, M.J., Ladouceur, R., Leger, E., Freeston, M.H., Langlois, F., Provencher, M.D., & Boisver, J.M. (2003). Group cognitive-behavioral therapy for generalized anxiety disorder: Treatment outcome and long-term follow-up. *Journal of Consulting and Clinical Psychology, 71*, 821-825.

Dunlap, W.P., Cortina, J.M., Vaslow, J.B., & Burke, M.J. (1996). Meta-analysis of experiments with matched groups or repeated measures designs. *Psychological Methods, 1,* 170-177.

Fisher, P.L. & Durham, R.C. (1999). Recovery rates in generalized anxiety disorder following psychological therapy: an analysis of clinically significant change in the STAI-T across outcome studies since 1990. *Psychological Medicine, 29*, 1425-1234.

Gould, R.A., Otto, M.W., Pollack, M.H., & Yap, L. Cognitive-behavioral and pharmacological treatment of generalized anxiety disorder: A preliminary meta analysis. *Behavior Therapy, 28*, 285-305.

Gould, R.A., Safren, S.A., Washington, D.O., & Otto, M.W. (2004). A meta-analytic review of cognitive-behavioral treatments. In R.G. Heimberg, C.A. Turk, & D.S. Mennin (Eds.) *Generalized Anxiety Disorder: Advances in Research and Practice*. New York: Guilford Press.

Hedges, L.V., & Olkin, I. (1985). *Statistical methods for meta-analysis*. New York: Academic Press.

Hamilton, M. (1959). The measurement of anxiety states by rating. *British Journal of Medical Psychology, 32*, 50-55.

*Ladouceur, R., Leger, E., Dugas, M., & Freeston, M.H. (2004). Cognitive-behavioural treatment of Generalized Anxiety Disorder (GAD) for older adults. *International Psychogeriatrics,* 16, 195-207.

*Ladouceur, R., Dugas, M.J., Freeston, M.H., Leger, E., Gagnon, F., & Thibodeau, N. (2000). Efficacy of a cognitive-behavioral treatment for generalized anxiety disorder: Evaluation in a controlled trial. *Journal of Consulting and Clinical Psychology, 68*, 957-964.

Molina, S., & Borkovec, T.D. (1994). The Penn State Worry Questionnaire: Psychometric properties and associated characteristics. In G.C.L. Davey and F. Tallis (Eds.) Worrying: Perspectives on Theory, Assessment, and Treatment (pp. 265-283). Wiley.

Roemer, L. (2001). Measures for anxiety and related constructs. In M. M. Anthony, S. M. Orsillo, & L. Roemer (Eds.), *Practitioners guide to empirically based measures of anxiety* (pp. 49-83). New York: Kluwer Academic/Plenum

Rosenthal, R. (1984). *Meta-analytic procedures for social research*. Beverley Hills: Sage.

Rudner, L.M., Glass, G.V., Evartt, D.L., & Emery, P.J. (2002). *A user's guide to the meta-analysis of research studies*. ERIC clearinghouse on assessment and evaluation, University of Maryland, College Park.

Spielberger, C.D., Gorusch, R.L., Lushene, R., Vagg, P.R., & Jacobs, G.A. (1983). *Manual for the State-Trait Anxiety Inventory*. Palo Alto, CA: Consulting Psychologists Press.

*Stanley, M.A., Beck, J.G., & Glassco, J.D. (1996). Treatment of generalized anxiety in older adults: A preliminary comparison of cognitive-behavioral approaches. *Behavior Therapy, 27*, 565-581.

*Stanley, M.A., Beck, J.G., Novy, D.M., Averill, P.M., Swann, A.C., Diefenbach, G.J., & Hopko, D.R. (2003), Cognitive-behavioral treatment of late-life generalized anxiety disorder. *Journal of Consulting and Clinical Psychology, 71*, 309-319.

*Stanley, M.A., Hopko, D.R., Diefenbach, G.J., Bourland, S.L., Rodriguez, H., & Wagener, P. (2003). Cognitive-behavior therapy for late-life generalized anxiety disorder in primary care. *The American Journal of Geriatric Psychiatry, 11*, 92-96.

Wells, A. (1999). A metacognitive model and therapy for generalized anxiety disorder. *Clinical Psychology and Psychotherapy, 6,* 86-95.

Westen, 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.

*Wetherell, J.L., Gatz, M., & Craske, M.G. (2003). Treatment of generalized anxiety disorder in older adults. *Journal of Consulting and Clinical Psychology, 71*, 31-40.

Table 1.

Methodological qualities of studies included in the meta-analysis.

Study Characteristics	Composite Data
Diagnostic Reliability Assessed	Yes = 7
	No = 3
Treatment Integrity Assessed	Yes = 9
	No = 1
Dropout Rate (overall)	15.03%
Dropout Rate (CBT)	15.71%
Mean Age	50.75
Sex (% Female)	72.06
Mean length of GAD	19.58
Mean number of sessions (CBT)	13.46
Medicated Patients Allowed	Yes = 10
	No = 0

Table 2.

Unbiased Effect Sizes Included in the Between Groups Analysis

Study	Effect size
Borkovec & Costello (1993)a	-1.52
Stanley, Beck & Glassco (1996)b	-.06
Ladouceur et al. (2000)a	-2.47
Dugas et al. (2003)b	-1.54
Stanley, Beck et al. (2003)b	-1.08
Stanley, Hopko et al. (2003)a	-1.08
Wetherall, Gatz, & Craske (2003)b	-.66

a = individual therapy
b = group therapy

Table 3.

Unbiased Effect Sizes in the Within Groups Analysis at 6 and 12 month follow-up

Study	ES at 6 months	ES at 12 months
Stanley, Beck & Glassco (1996)b	-.45	--
Dugas & Ladouceur (2000)a	.27	.48
Ladouceur et al. (2000)a	.18	.12
Borkovec et al. (2002)[*]a	-.11	-.19
Dugas et al. (2003)b	-.39	-.53
Stanley, Beck et al. (2003)b	-.14	-.34
Wetherall, Gatz & Craske (2003)b	-.04	--
Ladouceur et al. (2004)a	.14	-.11

* = This study was a component analysis of CBT. Only the group receiving a complete CBT package was included in the analyses.

a = individual therapy
b = group therapy

Table 4.

Overall Mean of CBT groups at Posttreatment, 6 – Months, and 12- Months

Postreatment			6 – Month			12 - Month		
Young	**Old**	**Overall**	**Young**	**Old**	**Overall**	**Young**	**Old**	**Overall**
46.93	51.00	48.95	48.65	50.05	49.35	50.24	45.69	48.73

Acknowledgements