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ORIGINAL ARTICLE

A meta-analytic review of the effects of psychotherapy control conditions for anxiety disorders

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Background. Little is known about the magnitude of improvement associated with psychotherapy control conditions for adult anxiety disorders. This information is important for the design of psychosocial treatment efficacy studies.

Method. We performed a computerized search of treatment outcome studies of anxiety disorders conducted between the first available year and 1 March 2007. In addition, we examined the reference lists from identified articles and asked international experts to identify eligible studies. We included studies that randomly assigned adult patients suffering from anxiety disorders to either cognitive–behavioral treatment or psychotherapy control condition. For each study, the two authors independently selected psychometrically sound measures of anxiety disorder severity. In addition, we collected data on attrition and treatment response.

Results. Of the 1165 studies that were initially identified, 19 studies (454 patients) met inclusion criteria and were included in the analyses. The random effects analysis yielded a pre- to post-treatment Hedges' g effect size of 0.45 (95% confidence interval 0.35–0.46, $z = 8.50$, $p < 0.001$). The mean weighted response and attrition rates were 25.0% and 14.2%, respectively. There was no evidence for publication bias, nor was there a significant relationship between the effect size and diagnostic group, study year or number of treatment sessions.

Conclusions. Psychotherapy control conditions are associated with significant improvements when administered to adults suffering from anxiety disorders. In addition, they are associated with a relatively low attrition rate. These findings can inform the design of future psychotherapy outcome studies.

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Key words: Anxiety disorders, meta-analysis, placebo, psychotherapy, treatment outcome.

Introduction

Randomized placebo-controlled designs are the standard in pharmacotherapy efficacy trials, but are less common in research evaluating psychosocial interventions. Several investigators have strongly argued in favor of including psychotherapy placebos in clinical trials that examine psychosocial treatments, because placebos provide a way to calibrate the placebo response (Klein, 1996; Quitkin, 1999; Quitkin *et al*. 2000). Indeed, without knowing the placebo response rate, it is difficult to determine the specificity of the intervention under investigation (e.g. Klein, 1996).

There is considerable controversy with regards to the magnitude of the placebo effect. Beecher's influential (1955) article entitled 'The powerful placebo' suggested that placebo accounts for significant improvement in approximately 35% of the cases. This estimate for the placebo response rate was widely accepted until Hrobjartsson & Gotsche (2001) reported the results of a meta-analytic review of clinical trials in which patients were randomized to either a placebo intervention or no treatment. The results indicated that placebo and no-treatment conditions yielded comparable rates of improvement on binary outcome measures (e.g. treatment response, remission). For continuous outcome measures (e.g. severity, number of symptoms) there was an advantage of placebo over no treatment, but the difference decreased with increasing sample size, suggesting a bias related to the effects of small trials. The difference between placebo and no treatment was significant for the trials with subjective outcomes, but it was not significant for those with objective outcomes. In fact, the placebo only showed a significant effect for the treatment of pain. No significant differences were observed between psychotherapy, pharmacological, and physical placebos.

Despite its rigorous methodology, this meta-analysis has been criticized for various methodological reasons (e.g. Bailar, 2001; Wampold *et al*. 2005) and

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continues to be debated in the literature (Hrobjartsson & Gotsche, 2007; Wampold *et al*. 2007). Criticisms include the considerable heterogeneity in both the effect sizes and the methodological quality of the studies (Bailar, 2001), but also the fact that the number of trials for some of the Axis-I disorders was very small. For example, only six anxiety trials with continuous outcome measures, and not a single anxiety trial with binary outcome measures, were included in the analysis. In addition to these methodological weaknesses, it may be argued that the term placebo is inaccurate for psychotherapy control conditions. Indeed, unlike pill placebos, psychotherapy placebos typically involve several active components, including therapist contact, support, and education. Moreover, like the active treatment, psychotherapy placebos are presented to patients with a rationale for their efficacy. Accordingly, instead of psychotherapy placebo, we will use the term psychotherapy control condition in this article.

In sum, surprisingly little is known about the effects of psychotherapy control conditions in clinical trials for psychiatric disorders. Important issues that need to be clarified include the magnitude of the psychotherapy control condition effect and the heterogeneity of the effect across disorders. The literature on cognitive behavioral treatments (CBTs) for anxiety disorders is particularly well suited to clarify these issues, because psychotherapy control conditions have been frequently employed in CBT trials for anxiety disorders. These trials have consistently demonstrated the efficacy of CBTs as compared with placebo (for a review, see Hofmann & Smits, 2008). The objective of this study was to conduct a meta-analytic review of the psychotherapy control condition effect in randomized controlled CBT trials of adult anxiety disorders. The goal was to estimate the effect of the psychotherapy control condition for the various anxiety disorders in order to aid investigators in the design of future psychotherapy efficacy studies. In addition, we explored the potential moderator effects of clinical characteristics (e.g. number of treatment sessions, diagnostic group) and study features [e.g. study year, assessment type (clinician-rated *v*. self-report)].

Method

Selection of studies

Our selection criteria were set to limit the sample to high-quality studies involving the evaluation of behavioral and cognitive protocols for adult anxiety disorders. Accordingly, we employed the following inclusion criteria: (*a*) patients had to be between the ages of 18 and 65 years; (*b*) patients had to meet the diagnostic criteria of DSM-III-R or DSM-IV for an anxiety disorder; (*c*) patients had to be randomly assigned to either CBT or psychotherapy control condition; (*d*) the clinical severity of the anxiety disorder had to be assessed by clinician-rated or self-report measures with sound psychometric properties; (*e*) the articles had to provide sufficient information to compute effect sizes (i.e. means and standard deviations, *t* or *F* values, change scores, frequencies, or probability levels).

Using Medline, PsycINFO, PubMed, SCOPUS, the Institute of Scientific Information, and Dissertation Abstracts International, we entered a combination of the following terms to identify eligible studies: *random**, *cognitive behavior* therap**, *cognitive therap**, or *behavior*therap**, *panic disorder*, *agoraphobia*, *GAD*, *generalized anxiety disorder*, *generalised anxiety disorder*, *OCD*, *obsessive compulsive disorder*, *social phobia*, *social anxiety disorder*, *specific phobia*, *simple phobia*, *PTSD*, *post-traumatic stress disorder*, and *acute stress disorder*. In addition, we asked experts in the field for relevant studies published in their respective languages. Finally, we conducted manual searches in the lists of references from empirical studies, meta-analyses and review articles.

Data extraction

For each study, the authors independently identified valid and reliable continuous measures for the assessment of clinical severity of the anxiety disorder (i.e. symptom severity, symptom frequency, and quality of life). If binary outcomes were reported, the authors selected the measure that reflected the most conservative indicator of treatment response. When the authors disagreed, they reached consensus through discussion. The numerical data were independently extracted by two research assistants.

Statistical methods

Effect size estimation

We computed the Hedges' *g* effect size and its 95% confidence interval (CI) for the pre- to post-treatment changes on each anxiety severity measure. This effect size is a variation on Cohen's *d* that corrects for biases due to small sample sizes (Hedges & Olkin, 1985). The formula for computing *d* is as follows:

$$d = \left(\frac{\overline{Y}_1 - \overline{Y}_2}{S_{\text{difference}}}\right)\sqrt{2(1-r)},$$

where $\overline{Y}_1$ is the pretreatment sample mean, $\overline{Y}_2$ is the post-treatment sample mean, $S_{\text{difference}}$ is the standard deviation of the difference, and *r* is the correlation between pretreatment and post-treatment scores.

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Hedges' g can be computed by multiplying d by correction factor $J(df)$ as follows:

$$J(df) = 1 - \frac{3}{4df - 1},$$

where df is the degrees of freedom to estimate the within-group standard deviation. The magnitude of the Hedges' g effect size may be interpreted using Cohen's (1988) convention as small (0.2), medium (0.5) and large (0.8).

For studies with multiple outcomes, the effect sizes across measures were averaged to yield a single Hedges' g estimate for each study. Because our aim was to generalize beyond the observed studies, we adopted random-effects models instead of fixed models to obtain a summary statistic (Hedges & Vevea, 1998). For binary outcomes (e.g. attrition, treatment response), we calculated overall means weighted by sample size.

Publication bias

Also known as the 'file drawer problem' (Rosenthal, 1979), meta-analyses may overestimate the overall effect size because studies with non-significant findings are often not published. In order to address this issue, we calculated the fail-safe N, which is the number of unretrieved studies required to reduce the overall effect size to a non-significant level (Cooper & Hedges, 1994). Rosenthal (1991) has proposed that effect sizes can be considered robust if the fail-safe N is greater than $5k + 10$, where k reflects the number of studies included in the meta-analysis. We opted to employ this method because it has become a standard for estimating publication bias, but acknowledge that it may underestimate the publication bias (i.e. if most unpublished studies report negative rather than non-significant findings).

Moderator analyses

We fitted two mixed-effects models to the effect size data to examine whether effect sizes varied significantly as a function of diagnostic group and type of outcome measure (clinician-rated *v.* self-report). Differences across diagnostic groups with respect to binary outcome measures (e.g. response, attrition) were examined using generalized linear models with follow-up pairwise comparisons. To explore the potential impact of study year and treatment dose (defined by number of sessions) on the magnitude of the effect of psychotherapy control conditions, we completed two separate regression analyses. These analyses were conducted using the program Comprehensive Meta-Analysis, version 2 (Biostat, Inc., Englewood, NJ, USA; Borenstein *et al*. 2005).

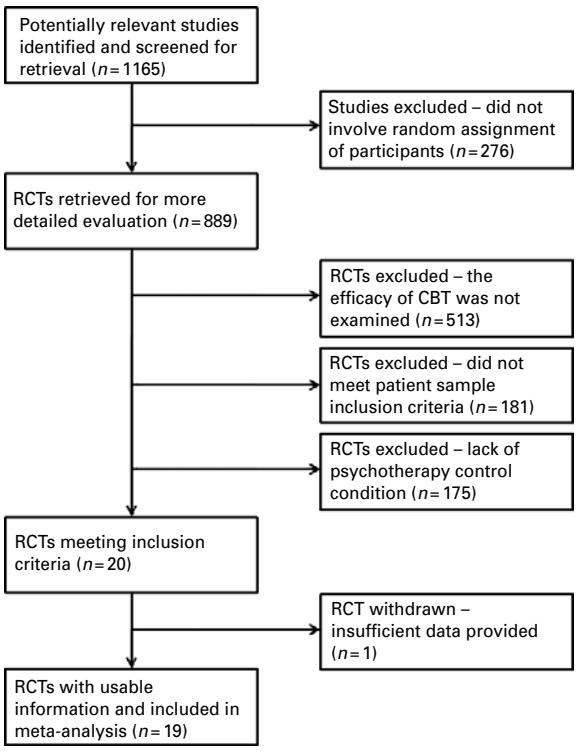

Fig. 1. Flow diagram of study selection process. RCT, Randomized controlled trial.

Results

Study selection

As can be seen in Fig. 1, of the 1165 studies that were initially identified, 19 (454 patients) met all inclusion criteria and were included in the meta-analysis. The most common disorder was post-traumatic stress disorder (PTSD; six trials), followed by acute stress disorder (ASD; four trials) and social anxiety disorder (SAD; four trials), obsessive–compulsive disorder (OCD; three trials), generalized anxiety disorder (GAD; two trials) and panic disorder (PD; one trial). We did not identify any studies involving the randomization of patients suffering from specific phobia. Tables 1 and 2 list the characteristics for each of the studies included in the meta-analysis.

Only two studies (Bryant *et al*. 2005; McDonagh *et al*. 2005) provided data that were corrected for attrition, i.e. intent-to-treat (ITT) analyses. Unfortunately, we were unable to obtain ITT data from authors who did not include these in the original reports. Accordingly, the subsequent analyses are limited to completer data [19 studies (387 patients) for attrition rates and continuous measures of anxiety disorder severity; 15 studies (317 patients) for measures of response; see Table 1].

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Table 1. *Characteristics of studies included in the meta-analysis*

Study	Target disorder	Psychotherapy control condition	Sample size	No. of sessions	Home-work	Jadad *et al.* (1996) score
Bryant *et al.* (1998)	ASD	Supportive counseling	13	5	Yes	1
Bryant *et al.* (1999)	ASD	Supportive counseling	19	6	Yes	2
Bryant *et al.* (2003*b*)	ASD	Supportive counseling	13	5	Yes	3
Bryant *et al.* (2005)	ASD	Supportive counseling	24	6	Yes	3
Borkovec & Costello (1993)	GAD	Non-directive therapy	22	12	Yes	2
Wetherell *et al.* (2003)	GAD	Discussion group	26	12	Yes	2
Greist *et al.* (2002)	OCD	Systematic relaxation	84	10	Yes	1
Lindsay *et al.* (1997)	OCD	Anxiety management	10	15	Yes	1
Craske *et al.* (1995)	PD	Non-directive supportive therapy	14	4	No	2
Blanchard *et al.* (2003)	PTSD	Supportive counseling	36	12	No	2
Bryant *et al.* (2003*a*)	PTSD	Supportive counseling	18	8	Yes	3
Foa *et al.* (1991)	PTSD	Supportive counseling	14	9	Yes	2
Marks *et al.* (1998)	PTSD	Relaxation	23	10	Yes	2
McDonagh *et al.* (2005)	PTSD	Problem-solving therapy	22	14	Yes	2
Neuner *et al.* (2004)	PTSD	Supportive counseling	14	4	No	2
Cottraux *et al.* (2000)	SAD	Supportive therapy	32	8	No	3
Heimberg *et al.* (1998)	SAD	Educational supportive group therapy	33	12	Yes	3
Lucas (1994)	SAD	Educational supportive group therapy	22	12	Yes	2
Smits *et al.* (2006)	SAD	DAV.ID.	15	3	No	2

ASD, Acute stress disorder; GAD, generalized anxiety disorder; OCD, obsessive–compulsive disorder; PD, panic disorder; PTSD, post-traumatic stress disorder; SAD, social anxiety disorder; DAV.ID, digital audio visual integration device.

Evaluation of study quality

The quality of each study was evaluated according to the following modified Jadad criteria (Jadad *et al.* 1996): (*a*) the study was described as randomized; (*b*) participants were adequately randomized (e.g. adequate randomization procedure; the study reported withdrawals and drop-outs); (*c*) participants and evaluators were blinded to treatment condition (i.e. participants and evaluators were not aware whether they received active treatment or placebo intervention); (*d*) the evaluators were blinded to treatment conditions (i.e. evaluators were not aware which treatment condition participants had received; (*e*) the description of drop-outs was provided. Independently, the two authors rated each study across the five criteria. By assigning 1 point for each criterion met, total scores could range between 0 and 5. As can be seen in Table 1, the total scores for the study sample ranged from 1 to 3 with a median of 2 (mean = 2.11, S.D. = 0.66). There was high inter-rater agreement ($\kappa = 1$).

Description of psychotherapy control conditions

The most commonly employed psychotherapy control condition was supportive therapy (15 studies). Generally, this protocol required therapists to provide a safe environment for self-reflection and be unconditionally supportive, while avoiding techniques specific to CBT (e.g. exposure, cognitive restructuring). Three identified studies included a relaxation protocol and one study used a problem-solving protocol as the psychotherapy control condition. Similar to the supportive therapy placebo, these psychotherapy control conditions provided patients with regular therapist contact and a supportive environment, but also a component with no proven efficacy for the treatment of anxiety disorder under investigation (e.g. relaxation for OCD, PTSD, or SAD; problem-solving for PTSD). Akin to CBT, most of the psychotherapy control protocols (14 studies) included the prescription of homework (e.g. self-monitoring, relaxation practice). The number of sessions ranged from three to 15 with a median of nine (mean = 8.79, S.D. = 3.69).

Pooled analyses

Fig. 2 depicts the effect sizes for each of the studies included in the meta-analysis and averaged by anxiety disorder. The random effects meta-analysis yielded

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a mean effect size of 0.45 (95% CI 0.35–0.46, $z=8.50$, $p<0.001$) across anxiety disorders. Following Cohen's (1988) guidelines, this effect size falls in the small to medium range. Use of a random over fixed-effects model was supported by a significant Q statistic [$Q(18)=42.78$, $p=0.001$], indicating that the distribution of effect sizes was not homogeneous. The mean weighted response and attrition rates were 25.0% and 14.2%, respectively.

Publication bias

The effect size of 0.45 corresponds to a z value of 12.99 ($p<0.001$). Accordingly, it would require 816 failed trials for the two-tailed p value to exceed 0.05. This finding suggests that the effect size observed in the present study is probably robust (Rosenthal, 1991).

Moderator analyses

Comparison between diagnostic groups

As can be seen in Fig. 2, the effect sizes varied somewhat as a function of diagnostic group. Specifically, the effect size was largest for GAD (Hedges' $g=0.62$, 95% CI 0.08–1.16, $z=2.26$, $p<0.05$) followed by PTSD (Hedges' $g=0.50$, 95% CI 0.33–0.68, $z=5.68$, $p<0.001$), SAD (Hedges' $g=0.47$, 95% CI 0.24–0.71, $z=3.90$, $p<0.001$), ASD (Hedges' $g=0.46$, 95% CI 0.18–0.74, $z=3.21$, $p<0.01$), OCD (Hedges' $g=0.26$, 95% CI 0.13–0.40, $z=3.80$, $p<0.001$), and PD (Hedges' $g=0.22$, 95% CI -0.11 to -0.54, $z=1.29$, $p=0.20$). However, this difference in effect sizes did not reach statistical significance [$Q(5)=7.51$, $p=0.19$].

Weighted response rates were 29, 22, 15, 34 and 22% for ASD, GAD, OCD, PTSD and SAD, respectively. No response rates were reported in the PD study (Craske *et al*. 1995). Generalized linear models with follow-up pairwise comparisons showed that the difference between OCD and PTSD was statistically significant ($p=0.009$). Finally, attrition rates were largest for GAD (25%), followed by PTSD (16%), SAD (16%), OCD (11%), ASD (10%) and PD (7%). Generalized linear models with follow-up pairwise comparisons revealed that the attrition observed for GAD was greater compared with all other disorders (all $p<0.02$), except for PTSD ($p=0.06$) and SAD ($p=0.05$).

Comparison between clinician-rated and self-report measures

Effect sizes observed for clinician-rated measures (Hedges' $g=0.52$, 95% CI 0.38–0.66, $z=7.23$, $p<0.001$) were not significantly different from those observed for self-report measures [Hedges' $g=0.39$, 95% CI 0.33–0.46, $z=12.05$, $p<0.001$; $Q(1)=2.66$, $p=0.10$].

Effect size as a function of treatment dose and study year

The effect size for the improvement on anxiety severity measures tended to be greater for early studies compared with those conducted in more recent years, although the relationship was not statistically significant ($b=-0.014$, $z=-1.54$, $p=0.12$). The magnitude of the psychotherapy control condition effect was also not significantly related to the number of treatment sessions ($b=0.008$, $z=0.81$, $p=0.42$).

Discussion

Psychotherapy control conditions are interventions designed to control for the effect of non-specific factors. These control conditions, therefore, include components that are common to all forms of psychotherapy (e.g. regular contact with a therapist, a supportive environment, instilling belief in the rationale for treatment and in the treatment itself), and lack ingredients that are specific to the intervention under investigation (i.e. exposure and cognitive restructuring for CBT). Accordingly, it can be argued that the inclusion of a psychotherapy control condition (*versus* waitlist control or pill placebo) in trials aimed at evaluating a psychosocial intervention allows the investigator to isolate the effects of the specific ingredients of that intervention (e.g. Klein, 1996)†.

Some have estimated that the placebo response rate may be as high as 65% (Quitkin, 1999). In contrast, an influential meta-analysis raised questions about the general efficacy of placebo interventions (Hrobjartsson & Gotsche, 2001). However, this study only included six anxiety trials with continuous outcome measures, and there were insufficient data available to study the magnitude of the psychotherapy placebo effect for anxiety disorders. In order to fill this gap in the literature, we meta-analytically reviewed the effects of psychotherapy control conditions included in randomized CBT trials for adult anxiety disorders. Our results indicate that psychotherapy control conditions are associated with medium-sized and statistically significant reductions in anxiety severity among patients suffering from the range of anxiety disorders. Interestingly, one out of four patients

† One of the reviewers pointed out that ideally psychotherapy trials should also include medication and pill placebo, as was the case in the Barlow *et al*. (2000) multi-site PD trial. This study reported the best long-term treatment effects of patients who received a combination of CBT and pill placebo. Interestingly, the study further showed equivalence between CBT and imipramine using an overall improvement rating, although the medication was slightly superior on some measures. This latter finding suggests that differences between conditions may vary as a function of outcome measure.

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Table 2. *Characteristics of measures for each study included in the meta-analysis*

Study	Target disorder	Measure of response	Measures of anxiety severity			
			Name	Type	Baseline mean (S.D.)	Hedges' *g* (S.E.)
Bryant *et al*. (1998)	ASD	CIDI = no PTSD diagnosis	IES – avoidance	Self-report	28.67 (7.08)	0.52 (0.18)
			IES – intrusion	Self-report	25.08 (5.56)	1.52 (0.26)
Bryant *et al*. (1999)	ASD	CAPS-2 = no PTSD diagnosis	IES – avoidance	Self-report	22.73 (5.57)	0.22 (0.15)
			IES – intrusion	Self-report	26.47 (4.69)	0.36 (0.16)
Bryant *et al*. (2003*b*)	ASD	CAPS-2 = no PTSD diagnosis	IES – avoidance	Self-report	16.25 (7.42)	0.05 (0.17)
			IES – intrusion	Self-report	24.50 (8.20)	0.62 (0.19)
Bryant *et al*. (2005)	ASD	CAPS-2 = no PTSD diagnosis	IES – avoidance	Self-report	19.55 (10.09)	0.13 (0.13)
			IES – intrusion	Self-report	24.45 (8.57)	0.53 (0.14)
Borkovec & Costello (1993)	GAD	Six outcome measures >20% improvement	HAMA	Clinician-rated	19.70 (4.30)	1.59 (0.22)
			ADIS-R – severity	Clinician-rated	4.70 (0.60)	1.28 (0.20)
			STAI-T	Self-report	57.9 (9.80)	0.81 (0.17)
			ZSRA	Self-report	40.90 (6.10)	1.07 (0.18)
			PSWQ	Self-report	65.50 (8.20)	0.42 (0.15)
Wetherell *et al*. (2003)	GAD	Three outcome measures >20% improvement	ADIS-IV – % worry per day	Clinician-rated	35.60 (25.30)	0.01 (0.14)
			HAMA	Clinician-rated	16.60 (6.80)	0.45 (0.15)
			PSWQ	Self-report	65.60 (7.70)	0.62 (0.16)
			BAI	Self-report	13.60 (8.20)	0.06 (0.14)
Greist *et al*. (2002)	OCD	CGI-I <3	YBOCS	Clinician-rated	25.80 (5.10)	0.26 (0.07)
			WSAS	Self-report	21.80 (7.60)	0.25 (0.07)
Lindsay *et al*. (1997)	OCD		YBOCS	Clinician-rated	24.44 (6.98)	0.20 (0.19)
			PADUA	Clinician-rated	95.78 (39.44)	0.35 (0.20)
			MOCI: Interference Rating Scale	Self-report	6.40 (0.88)	0.10 (0.19)
Craske *et al*. (1995)	PD		ADIS-R – agoraphobia	Clinician-rated	5.90 (5.70)	0.00 (0.16)
			ADIS-R – worry about panic	Clinician-rated	6.30 (2.10)	0.07 (0.16)
			ASI	Self-report	39.40 (14.20)	0.27 (0.17)
			FQ	Self-report	19.30 (9.40)	0.14 (0.17)
			FDAS	Self-report	104.80 (33.00)	0.48 (0.17)
			Subjective Symptoms Scale	Self-report	24.10 (9.50)	0.38 (0.17)
Blanchard *et al*. (2003)	PTSD	CAPS-2 = no PTSD diagnosis	CAPS-2	Clinician-rated	65.00 (25.90)	0.94 (0.14)
			BSI	Self-report	73.20 (6.40)	0.63 (0.13)
			IES	Self-report	38.70 (20.90)	0.54 (0.13)
			LIFE – major role functioning	Clinician-rated	3.20 (1.40)	0.21 (0.12)
			LIFE – relations with family	Clinician-rated	2.40 (0.90)	0.22 (0.12)
			PCL	Self-report	55.00 (14.70)	0.74 (0.13)
Bryant *et al*. (2003*a*)	PTSD	CAPS-2 = no PTSD diagnosis	CAPS-2 – F	Clinician-rated	38.33 (9.64)	0.99 (0.19)
			CAPS-2 – I	Clinician-rated	31.87 (7.49)	0.59 (0.17)
			IES – avoidance	Self-report	23.87 (7.80)	0.14 (0.16)
			IES – intrusion	Self-report	27.53 (6.85)	0.00 (0.15)
			CCQ	Self-report	64.67 (17.18)	0.02 (0.15)
Foa *et al*. (1991)	PTSD	PTSD Symptom Scale = CSC	PTSD Symptom Scale	Clinician-rated	24.39 (6.62)	0.84 (0.21)

Marks *et al*. (1998)	PTSD		PTSD Symptom Scale	Clinician-rated	32.00 (6.90)	0.75 (0.16)
			IES	Self-report	44.30 (11.70)	0.61 (0.15)
McDonagh *et al*. (2005)	PTSD	CAPS-2 = no PTSD diagnosis	CAPS-2	Clinician-rated	67.50 (15.10)	1.02 (0.17)
			QOLI	Self-report	34.70 (16.30)	0.26 (0.14)
Neuner *et al*. (2004)	PTSD	SRQ-20 > 10	PDS	Self-report	22.00 (8.00)	0.20 (0.17)
			SF-12	Self-report	0.34 (0.11)	0.04 (0.16)
Cottraux *et al*. (2000)	SAD		LSAS – avoidance	Clinician-rated	39.00 (11.84)	0.18 (0.12)
			LSAS – fear	Clinician-rated	44.89 (10.15)	0.23 (0.12)
			QOL	Self-report	17.29 (8.13)	0.17 (0.12)
			FQ – social phobia	Self-report	24.93 (7.16)	0.29 (0.12)
			SISST – negative	Self-report	54.54 (7.76)	0.30 (0.12)
			SISST – positive	Self-report	34.64 (7.56)	0.01 (0.12)
Heimberg *et al*. (1998)	SAD	SPDS-S < 3 and SPDS-C < 3	ADIS-R – severity	Clinician-rated	5.42 (1.25)	0.65 (0.13)
			SPDS-S	Clinician-rated	0.50 (0.87)	0.86 (0.14)
			LSAS – performance fear	Clinician-rated	16.97 (7.05)	0.24 (0.12)
			LSAS – performance avoidance	Clinician-rated	14.69 (7.72)	0.32 (0.12)
			LSAS – interaction fear	Clinician-rated	15.09 (7.95)	0.01 (0.12)
			LSAS – interaction avoidance	Clinician-rated	13.91 (7.86)	0.11 (0.12)
			FNE	Self-report	24.15 (6.15)	0.62 (0.13)
			SADS	Self-report	19.07 (7.31)	0.67 (0.13)
			SPS	Self-report	25.32 (14.73)	0.35 (0.12)
			SCL-90-R-IS	Self-report	7.93 (8.85)	0.50 (0.13)
			SCL-90-R-PA	Self-report	3.04 (4.79)	0.39 (0.13)
			Speech Task – anticipated fear	Self-report	51.85 (26.32)	0.23 (0.12)
			Speech Task – performance fear	Self-report	64.36 (22.42)	0.65 (0.13)
Lucas (1994)	SAD	Two outcome measures = RC	SPAI	Self-report	93.82 (24.07)	0.50 (0.16)
			SIAS	Self-report	44.29 (13.92)	0.65 (0.16)
			SPS	Self-report	28.41 (13.83)	0.54 (0.16)
			SISST	Self-report	47.65 (14.68)	0.32 (0.15)
Smits *et al*. (2006)	SAD	LSAS-SR > 50% improvement	LSAS-SR	Self-report	75.93 (15.08)	0.58 (0.17)
			Speech Task – peak fear	Self-report	81.33 (14.57)	1.17 (0.21)

ADIS-IV, Anxiety Disorder Interview Schedule for DSM-IV (DiNardo *et al*. 1994); ADIS-R, Anxiety Disorder Interview Schedule Revised (DiNardo & Barlow, 1988); ASD, acute stress disorder; ASI, Anxiety Sensitivity Index (Reiss *et al*. 1986); BAI, Beck Anxiety Inventory (Beck *et al*. 1988); BSI, Brief Symptom Inventory (Derogatis & Melisaratos, 1983); CAPS-2, Clinician Administered PTSD Scale, version 2 (Blake *et al*. 1995); CCQ, Catastrophic Cognitions Questionnaire (Khawaja & Oei, 1992); CSC, Clinically Significant Change (Jacobson & Truax, 1991); CGI-I, Clinical Global Impressions Scale – improvement (Guy, 1976); CIDI, Composite International Diagnostic Interview (World Health Organization, 1997); FDAS, Four Dimensional Anxiety Scale (Bystritsky, 1990); FNE, Fear of Negative Evaluation Scale (Watson & Friend, 1969); FQ, Fear Questionnaire (Marks & Mathews, 1979); GAD, generalized anxiety disorder; HAMA, Hamilton Anxiety Rating Scale (Hamilton, 1959); IES, Impact of Event Scale (Horowitz *et al*. 1979); LIFE, The LIFE Base (Keller *et al*. 1987); LSAS, Liebowitz Social Anxiety Scale (Liebowitz, 1987); LSAS-SR, Liebowitz Social Anxiety Scale – self-report (Baker *et al*. 2002); MOCI, Maudsley Obsessional–Compulsive Inventory (Hodgson & Rachman, 1977); OCD, obsessive–compulsive disorder; PADUA, The Padua Inventory (Sanavio, 1988); PCL, PTSD Checklist (Weathers *et al*. 1995); PD, panic disorder; PDS, Post-traumatic Stress Diagnostic Scale (Foa, 1995); PSWQ, Penn State Worry Questionnaire (Meyer *et al*. 1990); PTSD, post-traumatic stress disorder; PTSD Symptom Scale, Post-traumatic Stress Disorder Symptom Scale (Foa *et al*. 1993); QOL, Quality of Life Scale (Cottraux *et al*. 2000); QOLI, Quality of Life Index (Frisch *et al*. 1992); RC, reliable change (Jacobson & Truax, 1991); SAD, social anxiety disorder; SADS, Social Avoidance and Distress Scale (Watson & Friend, 1969); SCL-90-R-IS, Symptom Checklist 90 Revised – interpersonal sensitivity (Derogatis, 1977); SCL-90-R-PA, Symptom Checklist 90 Revised – phobic anxiety (Derogatis, 1977); S.D., standard deviation; S.E., standard error; SF-12, 12-item version of the Medical Outcome Study Self-Report Form (Ware *et al*. 1996); SIAS, Social Interaction Anxiety Scale (Mattick & Clarke, 1998); SISST, Social Interaction Self-Statement Test (Glass *et al*. 1982); SPAI, Social Phobia Anxiety Inventory (Turner *et al*. 1989); SPDS-C, Social Phobic Disorder Severity and Change Form – change (Liebowitz *et al*. 1992); SPDS-S, Social Phobic Disorder Severity and Change Form – severity (Liebowitz *et al*. 1992); SPS, Social Phobia Scale (Mattick & Clarke, 1998); SRQ-20, The Self-Reporting Questionnaire 20 (Harding *et al*. 1980); STAI-T, State Trait Anxiety Inventory – trait subscale (Spielberger *et al*. 1970); WSAS, Work and Social Adjustment Scale (Marks *et al*. 1973); YBOCS, Yale-Brown Obsessive Compulsive Scale (Goodman *et al*. 1989); ZSRA, Zung Self-Rating of Anxiety Scale (Zung, 1975).

Group by disorder	Study name	Outcome	Hedges' *g*	Lower limit	Upper limit	*z*	*p*	Total
ASD	Bryant *et al.* (1998)	Combined	1.02	0.58	1.46	4.55	0.00	12
ASD	Bryant *et al.* (1999)	Combined	0.29	–0.01	0.59	1.90	0.06	16
ASD	Bryant *et al.* (2003*b*)	Combined	0.34	–0.02	0.69	1.87	0.06	12
ASD	Bryant *et al.* (2005)	Combined	0.33	0.06	0.59	2.44	0.01	22
ASD			0.46	0.18	0.74	3.21	0.00	
GAD	Borkovec & Costello (1993)	Combined	0.90	0.56	1.25	5.13	0.00	18
GAD	Wetherell *et al.* (2003)	Combined	0.35	0.05	0.66	2.30	0.02	18
GAD			0.62	0.08	1.16	2.26	0.02	
OCD	Greist *et al.* (2002)	Combined	0.26	0.11	0.40	3.50	0.00	75
OCD	Lindsay *et al.* (1997)	Combined	0.29	–0.09	0.68	1.50	0.13	9
OCD			0.26	0.13	0.40	3.81	0.00	
PD	Craske *et al.* (1995)	Combined	0.22	–0.11	0.54	1.29	0.20	13
PD			0.22	–0.11	0.54	1.29	0.20	
PTSD	Blanchard *et al.* (2003)	Combined	0.56	0.31	0.81	4.32	0.00	27
PTSD	Bryant *et al.* (2003*a*)	Combined	0.35	0.02	0.67	2.10	0.04	15
PTSD	Foa *et al.* (1991)	Combined	0.64	0.25	1.03	3.25	0.00	11
PTSD	Marks *et al.* (1998)	Combined	0.70	0.40	1.00	4.58	0.00	20
PTSD	McDonagh *et al.* (2005)	Combined	0.64	0.33	0.94	4.12	0.00	20
PTSD	Neuner *et al.* (2004)	Combined	0.12	–0.20	0.44	0.73	0.47	13
PTSD			0.50	0.33	0.68	5.68	0.00	
SAD	Cottreaux *et al.* (2000)	Combined	0.23	0.00	0.46	1.97	0.05	28
SAD	Heimberg *et al.* (1998)	Combined	0.42	0.17	0.67	3.28	0.00	26
SAD	Lucas (1994)	Combined	0.49	0.18	0.79	3.12	0.00	17
SAD	Smits *et al.* (2006)	Combined	0.87	0.51	1.24	4.66	0.00	15
SAD			0.47	0.24	0.71	3.90	0.00	

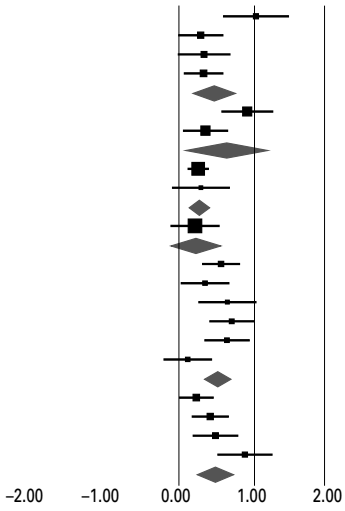

Fig. 2. Pre- to post-treatment effect-size estimates (Hedges' *g*) for psychotherapy control conditions by anxiety disorder. CI, Confidence interval; ASD, acute stress disorder; GAD, generalized anxiety disorder; OCD, obsessive–compulsive disorder; PD, panic disorder; PTSD, post-traumatic stress disorder; SAD, social anxiety disorder.

completing psychotherapy control condition protocols met the criteria for treatment response. These effect sizes and the relatively low attrition rate (14.2%) are parameters that investigators can use for the estimation of the sample size for an adequately powered clinical trial of psychosocial treatments for the anxiety disorders.

Previous work suggests that the response to pill placebo may vary across anxiety disorders (Mavissakalian *et al*. 1990; Piercy *et al*. 1996). Indeed, using data from three large pill placebo-controlled trials, Huppert *et al*. (2004) found that patients with SAD and PD evidenced a greater response to pill placebo compared with patients with OCD. Although the small sample of studies included in the present analyses limits us from testing differences across the anxiety disorders, the pattern of findings do not suggest that response to psychotherapy placebo is significantly weaker among patients suffering from OCD. Similarly, the lack of the statistically significant difference between the effect sizes of clinician-rated instruments and self-report instruments may be attributed to the relatively small number of studies used in the analyses.

Unfortunately, the literature of CBT for anxiety disorders only allowed us to examine the uncontrolled effect size estimate of the psychotherapy control condition effect. Accordingly, we cannot rule out that that the observed changes with psychotherapy control conditions merely reflect an effect of time. It should be noted, however, that anxiety disorders tend to be chronic conditions when left untreated (Bruce *et al*. 2005). Indeed, waitlist control conditions typically show very minimal, if any changes of anxiety symptoms. Finally, the findings provide little insight into the mechanisms underlying the change that occurs during the control therapy. Psychotherapy includes many non-specific (common) factors that are likely to be present in both the 'active' condition and the control condition. These factors are complex and difficult to quantify because they are related to the therapeutic relationship, mastery or control experiences, and attribution of symptom change, among other factors (e.g. Hofmann & Weinberger, 2007). Future studies should attend to mechanisms underlying the improvements observed with psychotherapy control conditions, including, for example, the possible allegiance effect of the investigator (Luborsky *et al*. 1999) and the effect due to the lack of blinding in psychotherapy trials (Quitkin, 2000). As the number of clinical trials that include psychotherapy controls will accumulate over the next years, it will also become feasible to examine possible differences in the effects (and mechanisms) among the different types of psychotherapy control conditions (e.g. relaxation, supportive counseling, anxiety management). Despite these limitations, the data to date, presented in this paper, do provide the necessary information for power calculations of future psychotherapy outcome studies.

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Declaration of Interest

None.

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