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Effects of psychotherapy for anxiety in children and adolescents: A meta-analytic review

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ABSTRACT

This paper provides a comprehensive quantitative review of high quality randomized controlled trials of psychological therapies for anxiety disorders in children and young people. Using a systematic search for randomized controlled trials which included a control condition and reported data suitable for meta-analysis, 55 studies were included. Eligible studies were rated for methodological quality and outcome data were extracted and analyzed using standard methods. Trial quality was variable, many studies were underpowered and adverse effects were rarely assessed; however, quality ratings were higher for more recently published studies. Most trials evaluated cognitive behavior therapy or behavior therapy and most recruited both children and adolescents. Psychological therapy for anxiety in children and young people was moderately effective overall, but effect sizes were small to medium when psychological therapy was compared to an active control condition. The effect size for non-CBT interventions was not significant. Parental involvement in therapy was not associated with differential effectiveness. Treatment targeted at specific anxiety disorders, individual psychotherapy, and psychotherapy with older children and adolescents had effect sizes which were larger than effect sizes for treatments targeting a range of anxiety disorders, group psychotherapy, and psychotherapy with younger children. Few studies included an effective follow-up. Future studies should follow CONSORT reporting standards, be adequately powered, and assess follow-up. Research trials are unlikely to address all important clinical questions around treatment delivery. Thus, careful assessment and formulation will remain an essential part of successful psychological treatment for anxiety in children and young people.

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1. Introduction

The cumulative prevalence of anxiety disorders in children is around 10% by the age of 16 years (Costello, Mustillo, Erkanli, Keeler, & Angold, 2003). For a large proportion of children anxiety problems are long lasting and interfere with their development and functioning (Langley, Bergman, McCracken, & Piacentini, 2004). Thus, significant attention has been given to the development and evaluation of psychological and pharmacological therapies. Currently the dominant psychological treatment is cognitive behavior therapy (CBT), and in recent years there have been a number of systematic reviews and meta-analyses of CBT for anxiety in children and adolescents (e.g. Cartwright-Hatton, Roberts, Chitsabesan, Fothergill, & Harrington, 2004; Compton et al., 2004; Davis, May, & Whiting, 2011; In-Albon & Schnieder, 2006; Ishikawa, Okajima, Matsuoka, & Sakano, 2007; James, Soler, & Weatherall, 2005; Silverman, Pina, & Viswesvaran, 2008). These reviews have concluded that effect sizes are moderate. For example, James et al. (2005) calculated effect sizes of −.55 to −.58 depending on the outcome measure used.

The field has continued to develop rapidly, both in terms of numbers of trials and in the quality of reporting, and to date no meta-analysis has included all childhood anxiety disorders and all psychological therapies. For example, many of the meta-analyses above were restricted to certain anxiety disorders, with many excluding OCD and PTSD and several excluding specific phobias. However, there are strong arguments to suggest that all anxiety disorders should be included. Firstly, selective exclusion does not allow us to fully explore whether psychotherapy is effective for anxiety disorders in children and adolescents. Secondly, there is a great deal of co-morbidity among anxiety disorders (Costello, Egger, & Angold, 2005; Storch et al., 2008). Thirdly, having wider inclusion criteria means that fewer trials must be excluded (e.g. because they had some children with OCD or PTSD in the study). Finally, there are many similarities in underlying theories of these anxiety disorders. For example, the perseveration seen in OCD can also be seen in pathological worry; the panic response in specific phobias can be seen in social anxiety and separation anxiety.

CBT for children and adults has developed in parallel (Benjamin et al., 2011). Unlike CBT for adults with anxiety disorders, where there has been a proliferation of specific treatment models for different anxiety disorders, treatment of child anxiety includes programs which are aimed at a range of anxiety disorders as well as disorder specific treatment. For example, the most widely disseminated treatment protocol 'Coping Cat' (Kendall, 1990; Kendall & Hedtke, 2006) is a structured CBT program which uses the same anxiety treatment strategies with children who have a range of disorders including separation anxiety, social anxiety, specific phobias, OCD, and GAD, and who typically present with a number of co-morbid anxiety problems.

Disorder-specific CBT protocols for children and young people have been developed for OCD (Derisley, Heyman, Robinson, & Turner, 2008; March & Mulle, 1998), PTSD, (Cohen, Berliner, & Mannarino, 2000; Smith et al., 2007), social phobia (Fisher, Masia-Warner, & Klein, 2004) and specific phobias (Davis, Ollendick, & Ost, 2009). There are some reviews of specific anxiety disorder treatments (e.g. OCD; Watson & Rees, 2008); however, it is unclear if these disorder-specific treatments are more effective than generic treatment for anxiety in children and young people. Thus one aim of this meta-analysis is to calculate effect sizes obtained from trials which have used general or 'omnibus' treatments of anxiety, and effect sizes from trials which have examined focused treatments for specific anxiety disorders.

Although CBT is emerging as the dominant treatment method for anxiety disorders in children and adolescents, other models of psychotherapy have been developed and evaluated in formal randomized trials. Previous meta-analyses have either specifically excluded non-CBT trials (Ishikawa et al., 2007; James et al., 2005), or have failed to identify any non-CBT trials (In-Albon & Schneider, 2006). Given that other models of psychotherapy have the potential to influence clinical practice and service development a key aim of this review is to provide an overview of any psychological treatments for which evidence is available. The combination of including all anxiety disorders and including all psychotherapies allows this analysis.

In addition to direct questions of effectiveness of treatments for child and adolescent anxiety disorders we also wish to address a number of supplementary questions relating to predictors or moderators of treatment outcome. Some of these questions relate to basic questions about methods of treatment delivery and have implications for service development; for example, what is the effect size for individual treatment and what is the effect size for group treatment? Similarly, is the number of treatment sessions associated with outcome from psychological therapy?

Other questions have broader and more theoretically interesting implications which are specifically related to the fact that treatments for children and adults have significant points of differences which are, in part, related to the specific developmental needs of children and young people. The most obvious point of difference relates to the fact that children and adolescents are less cognitively mature than adults. This has several consequences. First there is an ongoing debate about the extent to which cognitive maturity is required for successful engagement in cognitive behavioral treatment (e.g. Cartwright-Hatton et al., 2004; Grave & Blissett, 2004). Some clinicians and researchers argue that cognitively based interventions are not accessible to children and young people because they lack the cognitive maturity to engage adequately (e.g. Barrett, 2000). A typical response to this concern has been to target interventions on behavioral rather than cognitive components of treatment (Stallard, 2002). Other clinicians and researchers have argued that children's cognitive development is more flexible and variable, and that with adequate adaptations and support many young children can demonstrate the ability to engage in the cognitive elements of cognitive behavior therapy (Quakley, Reynolds, & Coker, 2004) and can benefit from cognitive behavioral treatment (Monga, Young, & Owens, 2009). However, there is limited treatment effectiveness research with younger children (Cartwright-Hatton et al., 2004), and the question has not been resolved. Therefore one aim of this review will be to compare effect sizes associated with cognitive behavioral treatment of anxiety for older and younger children.

Psychological therapies with children and young people also vary in the extent to which they are intended to work with or through parents. Some individual trials comparing individual child CBT with CBT which involves family members suggest that parental involvement is beneficial (e.g. Wood, Piacentini, Southam-Gerow, Chu, & Sigman, 2006), and other studies show that parental involvement is not helpful (e.g. Bodden et al., 2008). Recent meta-analyses of CBT for child anxiety have found no differences in effect sizes in trials which included and excluded parents from treatment (In-Albon & Schneider, 2006; Ishikawa et al., 2007; James et al., 2005; Silverman et al., 2008), and Barmish and Kendall (2005) concluded that further research is required before this question can be answered.

In contrast, a general meta-analysis of the involvement of parents in child psychotherapy more generally (Dowell & Ogles, 2010) concluded

that parent participation was beneficial. However, they found that the added benefit of involving parents was smaller in therapies that were cognitive–behavioral in orientation. Dowell and Ogles (2010) included psychotherapy for all disorders, and the finding cannot be specifically generalized to the treatment of anxiety disorders in children and young people. In the absence of conclusive evidence it is sometimes assumed that treating children with the close involvement of their parents is beneficial to treatment outcome (e.g. OCD treatment guidelines, National Institute for Health and Clinical Excellence, 2005). In this meta-analysis we will examine effect sizes for treatment which involves parents and effect sizes for treatments which focus primarily or exclusively on working with the child or young person without their parent involved.

This meta-analysis therefore has four main aims. The first is to provide an up to date and comprehensive meta-analytic review of high quality randomized controlled trials of psychological treatments for a range of anxiety disorders in children and adolescents. Within this we will examine the effect size of cognitive behavioral treatments and other psychological treatments. Second, we will compare the effectiveness of generic anxiety treatments with disorder-specific treatments for anxiety disorders. Third, we will examine the effect of child age on effectiveness of treatment. Finally, we will assess the effect of treatment delivery (group vs. individual, individual vs. family, number of sessions) on outcome.

2. Method

For the purposes of this meta-analysis we defined psychotherapy for anxiety as an intervention designed to alleviate the symptoms of diagnosed anxiety disorders or elevated anxiety levels. A psychological intervention could take the form of a structured or unstructured interaction with a trained professional or a specially designed treatment program. Parent administered treatment programs were also included in the analysis when parents were given appropriate clinical supervision.

Published meta-analyses have used different methods of selecting studies. For example, the quality criteria used are variable, with some studies using high thresholds for inclusion (e.g. formal diagnosis of anxiety disorder required; In-Albon & Schneider, 2007, 2006; James et al., 2005; minimum number of sessions required; James et al., 2005), and others including non randomized treatments and open trials (Silverman et al., 2008). We have adopted quality criteria used by the Cochrane collaboration to identify and select studies. We have included a wide range of trials including those in community and mental health settings. As our review is explicitly on psychotherapy for anxiety disorders we have also searched specifically for treatment trials which did not include CBT.

2.1. Literature search

A systematic search for relevant studies was carried out based on guidelines by the Cochrane Depression, Anxiety, and Neurosis group (James et al., 2005). Studies for inclusion in the meta-analysis were located through a variety of methods; a) computer searches on PsychINFO and MEDLINE (January 1990–December 2010) using keywords and names of key researchers in the area; b) reference lists in relevant reviews and papers; c) hand searching journals from 1990 to December 2010 in which one or more studies had been identified; d) emails to authors of published trials to elicit 'in press' publications. Keywords used were *anxiety*, *anxious*, *phobia/s*, *school refusal*, *worry*, *OCD*, *obsessions*, *PTSD*, *trauma*, *panic*, *separation* with child/*ren*/*hood*, *adoles**, *youth/s*, *young*, with *treatment*, *therapy*, *psychotherapy*, *CBT*, *behavior*/*behavior therapy*, *IPT*, and *attachment*. Searches were not restricted to methodological key words to prevent studies from being omitted due to poor indexing. We limited studies to those published in English and in peer review journals.

3. Criteria for study inclusion, and resulting pool of studies

For inclusion in the meta-analysis all studies had to meet the following criteria:

a) participants selected because of elevated anxiety levels, or a formal diagnosis of any anxiety disorder (including PTSD, OCD, social anxiety);
b) randomized allocation of participants into a minimum of one treatment condition and one control condition.
c) all participants in the study were less than 19 years old;
d) treatment interventions were specifically designed to reduce symptoms of anxiety;
e) means and standard deviations of outcome measures were reported or could be deduced from data reported in the paper.

The final sample consisted of 55 studies. These are identified in the reference list and summary information concerning individual studies is presented in Table 1.

3.1. Study coding procedures

We developed two coding schemes; one for data extraction and one for quality rating, and data were entered using a standard form for each. Each study was coded by two independent judges (JA and either SR, or CW). For data extraction we identified variables relating to the participants, the study design and methods, and the results. Where discrepancies in judgment occurred the study was jointly reviewed by both judges and a unanimous score was given. All data were entered by a single reviewer (JA).

3.2. Data extraction variables

3.2.1. Participants

3.2.1.1. Age range of participants. The mean age and standard deviation of the sample were recorded for each experimental group. Where the information was not provided separately by group we used the overall mean and standard deviation. In line with previous meta-analyses (e.g., Weisz, McCarty, & Valeri, 2006; Weisz, Weiss, Han, Granger, & Morton, 1995) we classified studies as child, adolescent, or mixed. Studies where participants were 13 and under were classified as 'child', studies where all participants were over 13 were classified as 'adolescent', and studies which included participants below and over 13 years were classified as 'mixed'.

3.2.1.2. Gender of participants. Where possible (i.e. where data were provided) we coded the proportion of females in each arm of the trial; where this was not provided we coded the overall proportion of females across all arms of the trial.

3.2.1.3. Type of anxiety diagnosis. We coded participants for type of anxiety disorder according to the diagnosis made for the trial (almost always on the basis of the ADIS, e.g. Brown, Di Nardo, & Barlow, 1994). Many studies included mixed anxiety disorders and co-morbid anxiety disorders were the norm rather than the exception. We also included studies where there was a single diagnostic category (i.e. specific or social phobia, OCD, or PTSD) and recorded co-morbid diagnoses.

3.2.2. Study design and methods

3.2.2.1. Type of control group. Studies used different types of control groups. We coded control groups into active controls and passive controls (e.g. wait-list and no treatment control groups). We defined active control conditions as those where participants received a plausible

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

Authors	Type of sample	Age range	N	Type of anxiety	% girls	Experimental treatment	Control group	Outcome	Treatment standardized ES
Ahmad, Larsson, and Sundelin-Wahlsten (2007)	Clinical	6–16	33	PTSD	60.6	Indiv EMDR	Wait list	PTSS-C	EMDR 0.07
Baer and Garland (2005)	Clinical	13–18	12	Social phobia	58.3	Group CBT	Wait list	SPAI	CBT −1.12
Barrett (1998)	Mixed	7–14	60	Mixed anxiety disorders	46.7	Group CBT Group CBT + family	Wait list	FSSC-R	Group CBT −1.56; Group CBT + family 2.42
Barrett, Dadds, and Rapee (1996)	Mixed	7–14	79	Mixed anxiety disorders	43.4	Indiv CBT Indiv CBT + family	Wait list	RCMAS	CBT −0.40; CBT family 0.92
Barrett, Sonderegger, and Sonderegger (2001)	Community screened	7–19	204	Raised anxiety levels	47.4	Group CBT	Wait list	RCMAS	Group CBT −0.65
Barrett, Healy-Farrell, and March (2004)	Health service screened	7–17	77	OCD	49.4	Group CBT Indiv CBT	Wait list	CYBOCS	Group CBT −2.54; Indiv CBT −2.73
Beidel, Turner, and Morris (2000)	Clinical	8–12	67	Social phobia	61.5	Group CBT	Non-specific (Testbusters)	SPAI	CBT −.89
Berger and Gelkopf (2009)	School sample	9–15	182	PTSD	43.4	CBT group (ERASE)	Wait list	UCLA PTSD index	CBT group −1.27
Bolton and Perrin (2008)	Clinical	8–17	20	OCD	30.0	Individual ERP	Wait list	CYBOCS	ERP −1.46
Celano, Hazzard, Webb, and McCall (1996)	Clinical	8–13	32	PTSD	100.0	Psychotherapy with parent (RAP)	Treatment as usual	CITES Children's Impact of Traumatic Events Scale	RAP 0.20
Chalfant, Rapee, and Carroll (2007)	Clinical	8–13	47	Mixed anxiety disorders with ASD	25.5	Group family CBT	Wait list	RCMAS	CBT −3.29
Chemtob, Nakashima, and Carlson (2002)	Clinical	6–12	32	PTSD	68.8	Indiv EMDR	Wait list	Child Reaction Index	EMDR −0.36
Cohen, Deblinger, Mannarino, and Steer (2004)	Clinical	8–14	229	PTSD	79.0	Individual TF CBT with parent	Child centered therapy	K-SADS PTSD Scale — Re-experiencing	CBT −0.49
Cohen and Mannarino (1996)	Clinical	3–6	67	PTSD	58.0	Individual TF CBT with parent	Nondirective supportive therapy	Child Sexual Behavior Inventory	CBT −0.58
Cohen and Mannarino (1998)	Clinical	7–14	49	PTSD	69.0	Individual TF CBT with parent	Nondirective supportive therapy	Child Sexual Behavior Inventory	CBT −0.23
Dadds, Spence, Holland, Barrett, and Laurens (1997)	Community screened	7–14	128	Mixed anxiety disorders	72.7	Group CBT with parent	Monitoring group	RCMAS	CBT 0.01
Deblinger, Stauffer, and Steer (2001)	Clinical	2–8	44	PTSD	61.0	Group CBT with parent	Supportive therapy	K-SADS PTSD Scale — Re-experiencing	CBT 0.06
Flannery-Schroeder and Kendall (2000)	Community screened	8–14	37	Mixed anxiety disorders	48.3	Individual CBT Group CBT	Wait list	RCMAS	Individual CBT −1.05; Group l CBT −0.80
Freeman et al. (2008)	Mixed	5–8	42	OCD	57.0	Family CBT	Relaxation training	CYBOCS	CBT −0.66
Gallagher, Rabian, and McCloskey (2004)	Community screened	8–11	23	Social phobia	52.2	Group CBT	Wait list	SPAI	CBT −0.71
Gelkopf and Berger (2009)	School sample	12–14	114	PTSD	0.0	Group CBT	Wait list	UCLA PTSD index	CBT −0.69
Ginsburg and Drake (2002)	Community screened	14–17	12	Mixed anxiety disorders	83.3	Group CBT	Group attention-support	SCARED	CBT −0.24
Hayward et al. (2000)	Community advert	14–17	70	Social phobia	100.0	Group CBT	Untreated	SPAI	CBT −0.28
Hudson et al. (2009)	Mixed methods	7–16	112	Mixed anxiety disorders	44.2	Group CBT	Group support	SCAS	CBT 0.63
Jordans et al. (2010)	School sample	11–14	325	PTSD	48.6	Psychosocial group intervention	Wait list	SCARED-5	Psychosocial group intervention 0.09
Kemp, Drummond, and McDermott (2009)	Clinical	6–12	27	PTSD	44.4	Individual EMDR	Wait list	PTS-RI	EMDR −1.18
Kendall (1994)	Community screened	9–13	47	Mixed anxiety disorders	44.0	Individual CBT	Wait list	RCMAS	CBT −0.86
Kendall et al. (1997)	Mixed	9–13	94	Mixed anxiety disorders	38.0	Individual CBT	Wait list	RCMAS	CBT −0.58
		7–14	107		44.0			MASC	

Kendall, Hudson, Gosch, Flannery-Schroeder, and Suveg (2008)	Community screened			Mixed anxiety disorders		Individual CBT Individual CBT + family	Family based education/ support attention		CBT −0.13; CBT + family −0.10
King et al. (1998)	Mixed	5–15	34	School refusal	47.1	Individual CBT + parent/teacher behavior management	Wait list	RCMAS	CBT −0.46
King et al. (2000)	Clinical	5–17	36	PTSD	69.4	Individual CBT Individual CBT + family	Wait list	ADIS PTSD	CBT −1.09; CBT + family −1.19
Last, Hansen, and Franco (1998)	Mixed	6–17	56	School refusal	37.0	Individual CBT	Attention placebo	RCMAS	CBT −0.58
Layne et al. (2008)	Community screened	13–18	127	PTSD	61.6	Group integrated psychotherapy	Psycho-education	PTSD Reaction Index	Psychotherapy −0.22
Lyneham and Rapee (2006)	Clinical	6–12	100	Mixed anxiety disorders	49.0	CBT bib + telephone CBT bib + email	Wait list CBT bibliotherapy	RCMAS	CBT bib + phone −1.02 CBT bib + email −0.71
March, Spence, and Donovan (2009)	Community advert (schools)	7–12	73	Mixed anxiety disorders	54.8	Internet CBT	Wait list	SCAS	Internet CBT −0.18
Masia-Warner et al. (2005)	Community screened	13–17	35	Social phobia	74.2	Group CBT	Wait list	SPAI	CBT −0.59
Masia-Warner et al.(2007)	Community screened	14–16	36	Social phobia	83.3	Group CBT	Attention placebo	SPAI	CBT-5.62
Mendlowitz et al. (1999)	Clinical	7–12	62	Mixed anxiety disorders	57.4	Group CBT child Group CBT Parent Group CBT child + parent	Wait list	RCMAS	CBT child −0.18; CBT parent −0.18; CBT child + parent −0.35
Mifsud and Rapee (2005)	Community screened	8–11	91	Raised anxiety levels	59.0	Group CBT	Wait list	SCAS	CBT −0.35
Muris, Meesters, and van Melick (2002)	Community screened	9–12	30	Mixed anxiety disorders	66.7	Group CBT	Psychological placebo No treatment	STAI	CBT −1.0
Ollendick et al. (2009)	Mixed	7–16	196	Specific phobia	54.6	Behavior therapy (one session therapy)	Wait list Education support	FSSC-R	BT 0.01
Ost, Svensson, Hellstrom, and Lindwall (2001)	Clinical	7–17	60	Specific phobia	33.3	Individual BT (OST) Individual BT + parent	Wait list	RCMAS	BT 0.06; BT + parent −0.24
POTS (2004)	Clinical	7–17	112	OCD	50.0	Individual CBT	Placebo medication	CYBOCS	CBT −0.96
Rapee, Abbott, et al. (2006),	Not stated	6–12	267	Mixed anxiety disorders	39.6	Group CBT	Wait list Bibliotherapy CBT	SCAS	CBT 0.14;
Ruf et al. (2010)	Clinical	7–16	26	PTSD	46.2	Narrative exposure therapy	Wait list	UCLA PTSD index	Narrative exposure therapy −1.0
Shortt, Barrett, and Fox (2001)	Community advert	6–10	71	Mixed anxiety disorders	61.0	Group CBT	Wait list	RCMAS	CBT −0.92
Silverman, Kurtines, Ginsburg, Weems, Lumpkin, et al. (1999)	Mixed	6–16	41	Mixed anxiety disorders	36.0	Group CBT	Wait list	RCMAS	CBT −0.57
Silverman, Kurtines, Ginsburg, Weems, Rabian, et al. (1999)	Clinical	6–16	81	Specific phobia	46.7	Individual CBT Individual BT	Education support	RCMAS	CBT −0.71; BT −0.18
Smith et al. (2007)	Clinical	8–18	24	PTSD	39.5	Individual CBT	Wait list	CPSS	CBT −2.39
Spence, Donovan, and Brechman-Toussaint (2000)	Clinical	7–14	50	Social phobia	38.6	Individual CBT Individual CBT + parent	Wait list	RCMAS	CBT −0.45; CBT + parent −0.44
Spence, Holmes, March, and Lipp (2006)	Clinical	7–14	72	Mixed anxiety disorders	41.7	Group CBTInternet CBT	Waitlist	RCMAS	CBT −0.71; Internet CBT −0.27
Stein et al. (2003)	Community screened	10–11	126	PTSD	56.0	Group CBT	Wait list	RCMAS	CBT −0.82
Walkup et al. (2008)	Clinical	7–17	215	Mixed anxiety disorders	50.7	Individual CBT	Placebo medication	Pediatric Anxiety Rating Scale	CBT −0.30
Williams et al. (2009)	Clinical	9–18	21	OCD	38.1	Individual CBT	Wait list	CYBOCS	CBT −3.38
Wood et al. (2009)	Clinical	7–11	40	Anxiety disorders with ASD	32.5	Family CBT	Waitlist	MASC	CBT 0.03

Notes:

Type of disorder: PTSD — Post traumatic stress disorder, OCD — Obsessive compulsive disorder, ASD — Autistic spectrum disorder.

Experimental treatment: EMDR — Eye Movement Desensitization and Reprocessing; CBT — Cognitive Behavior Therapy, ERP — Exposure and response prevention; ERASE; RAP; TF CBT — Trauma focused CBT; Outcome: PTSS-C — Posttraumatic Stress Symptom Scale for Children; SPAI-C — Social Phobia and Anxiety Inventory for children, FSSC-R — Fear Survey Schedule Revised; RCMAS — Revised Children's Manifest Anxiety Scale; CYBOCS — Children's Yale–Brown Obsessive Compulsive Scale: CITES = Children's Impact of Traumatic Events Scale, K-SADS, SCARED-5 — Screen for Child Anxiety Related Emotional Disorders; SCAS — Spence Children's Anxiety Scale; PTS-RI — Post Traumatic Stress-Reaction Index, MASC — Multidimensional Anxiety Scale for Children, ADIS-C — Anxiety Disorder Interview Schedule for Children; CPSS — Child PTSD Symptom Scale, STAI — State-Trait Anxiety Inventory for Children.

intervention which fell short of a formal psychological therapy (e.g. supportive counseling, drug placebo, relaxation, bibliotherapy), or was explicitly identified by the authors as a 'control' treatment, or was implicitly identified as the control condition e.g. by a directional hypothesis. The two studies that included a pure bibliotherapy condition (Lyneham & Rapee, 2006; Rapee, Abbott, & Lyneham, 2006) were classified as active control conditions as there was no therapist input for either parent or child. Studies which explicitly compared two or more active treatments where both were presented as equivalent (e.g. two psychotherapy treatments or medication vs. CBT) and where neither was identified explicitly or implicitly as the control condition, were excluded on the basis that they could not provide data for calculating effect sizes for the active treatment condition(s). The calculation of effect sizes requires that the treatment of interest is compared to a control treatment. Trials with multiple arms including an active or passive control group (e.g. medication, and psychotherapy, and active and/or passive control conditions) were included because the control group data provided the basis for estimating the effect size of psychotherapy.

3.2.2.2. Outcome measures. Our primary outcome measure is the child's or adolescent's self report of anxiety symptoms. This is for two reasons. First, we consider that if a reliable and valid measure is chosen, children and adolescents are best placed to report on their own internal experiences. Second, this approach allows a broad evaluation of psychotherapy for anxious children and adolescents as it excludes fewer trials. However, using child self report may lead to more conservative estimates: reviews that have compared treatment effects reported by child self report and parent report have found that child self report leads to smaller effect sizes (Ishikawa et al., 2007; Silverman et al., 2008).

Many studies used more than one measure of self reported anxiety symptoms and reported data on all of them with no clear or explicit primary outcome. The use of different outcome measures can lead to difficulties in interpretation (Hutton & Williamson, 2000). To standardize our analysis we made an a priori decision to choose one outcome measure in each study. For trials focusing on a specific anxiety disorder we used disorder specific outcome measures. All treatment trials of OCD used the CYBOCS (Children's Yale–Brown Obsessive Compulsive Scale; Scahill et al., 1997) as an outcome measures so we used this as the outcome for all OCD trials. Six of the seven trials for social phobia used the SPAI (Social Phobia and Anxiety Inventory for Children; Beidel, Turner, & Morris, 1995) so this was used when available for trials of social phobia. For treatment trials of PTSD there was a wide range of measures (9 primary outcome measures over 16 treatment trials for trauma and PTSD). For PTSD studies therefore we chose the measure which targeted PTSD symptoms specifically.

For all other trials the choice of outcome measure was based on the frequency with which each measure was used across all the trials in the meta-analysis. Seven general measures of anxiety were identified, with some measures being used frequently and others rarely. The RCMAS (Revised Child Manifest Anxiety Scale; Reynolds & Richmond, 1979) was the most frequently used (19 trials). Therefore we used the RCMAS as the outcome measure when it was available. When the RCMAS was not available we used data from the next most frequently used measure, the SCAS (Spence Children's Anxiety Scale, Spence, 1998), used in 8 trials, followed by the SCARED (Bermaher et al., 1997), and the FSSC-R (Ollendick, 1983) (see Table 1 for details) (N.B. many trials used more than one measure and some trials of specific anxiety disorders also measured general anxiety symptoms).

3.2.2.3. Therapy delivery method. Treatment delivery was categorized as either group or individual. Treatments in which one or more family members (typically parents) were involved in sessions with their individual child/adolescent were coded as 'individual'. Some treatment protocols included group sessions for parents and parallel group sessions for children and these were classified as 'group' treatments. Where there was a mixture of individual family sessions and group family sessions the predominant mode of treatment, meaning the mode which took up most sessions, was used as the basis of the classification.

3.2.2.4. Treatment duration. Because the mean number of treatment sessions attended was not always reported we coded the number of hours spent in therapy as specified in the treatment protocol.

3.2.2.5. Follow-up. Follow-up assessments were coded for each study, where data were available, for both control and experimental arms of the trial. For most studies it was not possible to code the follow up data because those participants who had been included in, for example, a waitlist control group, were offered treatment at the end of the active phase of treatment for the experimental group. Therefore control conditions typically ended soon after the end of treatment data had been collected.

3.2.2.6. Parental involvement. The extent of parental involvement in treatment was coded into 4 categories on the basis of the information given in the paper. 'Significant involvement' was coded where parents were routinely involved in all or the majority of treatment sessions. There were also some treatments where parents attended parallel therapy groups to their child and where these were equal in number to the sessions delivered to the children. These were also coded as 'significant involvement'. 'Some involvement' was coded where parents were involved routinely in selected sessions but were not expected to attend every sessions or where there were parallel parental therapy sessions which were fewer in number than those for children. 'Minimal involvement' was coded when parents were involved in a small number of sessions (e.g. for psychoeducation only) or were invited to join a short part of their child's therapy session to share information with the therapist and 'check in' on progress. Some treatment studies specified that parents were not involved in treatment and some did not mention the role of parents at all; in these instances parental involvement was coded as 'no parental involvement'.

3.3. Quality coding

Each paper was independently rated by two people (CW and SR) using a modified version of the 23 item Moncrieff, Churchill, Drummond, and McGuire (2001) quality coding system which was designed specifically to assess interventions for depression and 'neurosis'. The scale reflects specific methodological issues associated with mental health treatment studies, and each item is rated on the basis of information provided in the published paper. Moncrieff et al. (2001) suggest that assessing the quality of treatment trials in mental health requires specific instruments which capture some of the specific challenges in this area (e.g. reliability and validity of assessment instruments, complexity of interventions). Items are typically rated as 0 (absent), 1 (partial), or 2 (fully present). Ratings of 0 (absent) and 2 (present) are used for dichotomous variables (e.g. ITT analysis). Items cover basic elements of study design (e.g. randomization method, sample selection, sample size), data analysis (e.g. intent to treat analyses), length of follow-up, and presentation of results. Higher total scores reflect better quality studies. Moncrieff et al. (2001) reported mean quality scores of 30 treatment trials in mental health. Across 3 raters the mean rating was between 16.3 (SD, 6.3) and 20.9 (SD, 9.0), and overall inter-rater reliability was $r = 0.75$ to 0.86.

We made some minor modifications to the coding scheme to reflect that fact that we were assessing psychotherapy studies. Specifically, we did not code the item relating to blinding participants to treatment allocation as this is not possible in studies of psychotherapy. In addition we added two new items to indicate if therapy was manualized (1 — yes, 0 — not manualized) and if therapy integrity was tested (1 — yes, 0 — no assessment of treatment integrity).

In the current study inter-rater reliability of quality was good (r = .78) and similar to Moncrieff et al. (2001). We examined the relationship between quality of studies and effect sizes by correlating the overall total score for each study with the effect size for each study, and by comparing funnel plots for all 55 studies and for all studies which scored over 30 on the quality rating system.

3.4. Data synthesis

We calculated effect sizes using continuous data relating to symptom severity on the key outcome measure. Means and SDs of outcome variables at baseline, end of treatment, and (where available) at follow-up, were extracted. Meta-analysis was performed with REVMAN software (version 4.2.10; The Cochrane collaboration, Oxford, UK). Negative values indicated that participants in the treatment group reported greater reduction in anxiety than those in the control group; positive values indicated that participants in the control group reported greater reduction in anxiety than those in the treatment group. Because we examined effect sizes for a range of different sub-groups the results are presented in summary tables (Tables 2 and 3). Funnel plots were used to assess for evidence of bias. Cochrane's test for heterogeneity was used to determine whether the studies in the meta-analysis were evaluating the same underlying sizes of effect. The decision was made to use random effects analysis due to the large and diverse population included in the meta-analysis. Due to the various study designs, outcome measures, sample sizes and treatment durations, homogeneity could be rejected, therefore negating the possibility of using a fixed effect analysis.

4. Results

We identified 55 randomized controlled trials in which children and/or adolescents with anxiety were treated using a psychological therapy (see Table 1). Across all studies 2434 children and young people were included in the treatment group, and 1824 children and young people were included in the control group. The majority of studies (n = 33) recruited children and young people with a specific anxiety disorder (16 PTSD, 7 social phobia, 5 OCD, 3 specific phobias and 2 school anxiety), with the rest recruiting children with a variety of anxiety disorders. Co-morbidity of anxiety disorders was typical. Two studies recruited participants with autistic spectrum disorders and co-morbid anxiety disorders and adapted CBT specifically for the population. Anxiety disorders are often co-morbid in this population. Forty five studies evaluated CBT as either the only active psychological therapy (n = 31) or as a comparison with another active psychological therapy (n = 17), with three studies including both active and passive control conditions. Because of the small number of behavioral therapy studies (n = 3) we collapsed these studies with studies of cognitive behavior therapy into a single category which we referred to as CBT. The remaining seven studies evaluated EMDR (n = 3), a psychosocial intervention (n = 1), narrative therapy (n = 1), and trauma specific psychotherapy (n = 2). Most studies (54%) used a group therapy format, with 4 studies (7%) comparing a group intervention to an individual intervention.

Quality ratings of the studies ranged from 19.5 to 43 (mean = 29.9, SD = 5.19). All of the studies included in this meta-analysis met minimum methodological quality criteria (e.g. used randomization to experimental and control groups). To examine the extent to which methodological quality has changed over time we correlated the year of publication for each trial with the quality rating of each trial; this was significant, r = .44, p = .002, which suggests that methodological quality of randomized trials of psychological therapy for child anxiety has improved over time. Improvements noted in more recently published studies included adherence to CONSORT standards of reporting, the use of concealed randomization, reporting of study attrition and drop out, and the use of intent to treat (ITT) analyses, often alongside completer analysis. A minority of studies stated that they used an ITT analysis and in many studies it was not clear if a completer or ITT analysis was used. Some aspects of methodological quality were widely ignored; for example, only one study specifically addressed and reported possible adverse effects of psychological treatment (Walkup et al., 2008).

Funnel plots were examined of all studies (n = 55) and of 27 studies which scored above the median for quality. There was no evidence of publication bias on the basis of the funnel plots.

4.1. What is the overall effectiveness of psychological therapy for children and young people with anxiety?

First we examined the effect size for all 55 randomized trials of psychotherapy for children and/or adolescents with anxiety. This analysis thus includes CBT and other psychological treatments and a mixture of disorder-specific treatments and generic anxiety treatments. Table 2 shows the results of the meta-analysis in relation to overall effectiveness of psychotherapy for anxiety disorders. Across the 55 studies the overall effect size of psychotherapy for anxiety was moderate and significant compared to the effect size in the control groups. We next examined the effect size in the 39 studies which had used a passive control condition (i.e. a waitlist control group) and the 19 studies which used an active control condition (for example supportive counseling or psycho-education) (NB: This does not add to 55 because three studies used a passive and an active control group).

Across the 39 studies with a passive control condition 1617 children were allocated to psychotherapy for anxiety and 1170 to a passive control condition. The overall weighted effect size of psychological therapy compared to a passive control suggested that psychological treatment for anxiety was effective when compared with passive control conditions, and that the effect size was moderate to large. In the 19 studies which compared psychological therapy for anxiety with an active control condition 997 children received psychological therapy and 741 were randomized to the active control. For these studies the standardized effect size of psychological therapy was small and statistically significant.

In the majority of the studies we reviewed CBT was either the only psychological therapy evaluated or it was one of a number of arms within a trial. We therefore calculated the effect size of the seven studies which did not include CBT, all of which were for PTSD. These seven studies included 305 children and young people in the treatment conditions and 297 children and young people in the control conditions. The effect size for psychological therapy which was not a variant of CBT was not significant (see Table 2).

Forty-eight studies compared participants who received CBT (N = 2145) to participants who received either a passive or active

Table 2
Effect sizes associated with type of treatment for anxiety disorders.

Treatment group	N of studies	Effect size	95% CI
All studies	55	−0.65	−0.82, −0.48
Passive control	39	−0.76	−0.97, −0.55
Active control	19	−0.35	−0.59, −0.11
Follow up < 6 months	6	−0.68	−1.26, −0.10
Follow up = 6 months	4	−0.19	−0.52, 0.14
Follow up 9–12 months	3	−0.02	−0.38, 0.33
Not CBT	7	−0.25	−0.57, 0.08
All CBT	48	−0.66	−0.84, −0.48
CBT passive control	34	−0.77	−1.00, −0.55
CBT active control	14	−0.39	−0.64, −0.15
Generic CBT	22	−0.53	−0.75, −0.30
Disorder specific CBT	27	−0.77	−1.03, −0.51
PTSD	9	−0.68	−0.99, −0.37
OCD	5	−1.68	−2.55, −0.81
Social phobia	9	−0.79	−1.39, −0.19

control (N = 1595). The overall effect size for CBT for anxiety was similar to the overall effect size for all psychotherapy studies. Similarly the effect size for the 34 CBT studies which used a passive control group was very close to the overall psychotherapy effect size (i.e. moderate to large). The effect size for the 17 CBT studies with an active control was small but statistically significant.

In the majority of studies participants in the control group were offered access to psychological therapy after a pre-determined period of time, which was usually equivalent to the length of time for which participants in the experimental group received therapy. Almost all studies included a follow up period but data at that point could not be compared to a no-treatment control group because the original control group had received treatment. Therefore true follow up comparisons where the control group remained untreated were relatively rare. We identified 12 studies where the control group and treatment group were followed up after treatment had ended and in which participants in the control group remained untreated. Follow up durations ranged from 3 months to 12 months. One study reported follow up data at 3 months, 6 months, and 12 months (Silverman et al., 1999). Six studies reported follow up data before 6 months (Deblinger et al., 2001; Gallagher et al., 2004; King et al., 2000; Mifsud & Rapee, 2005; Silverman, Kurtines, Ginsburg, Weems, Lumpkin, et al., 1999; Silverman, Kurtines, Ginsburg, Weems, Rabian, et al., 1999; Williams et al., 2009). For follow up at less than 6 months the effect size was moderate (see Table 2). Four studies reported follow-up data at 6 months (Dadds et al., 1997; Hudson et al., 2009; Ollendick et al., 2009; Silverman, Kurtines, Ginsburg, Weems, Lumpkin, et al., 1999; Silverman, Kurtines, Ginsburg, Weems, Rabian, et al., 1999) and for these the overall effect size of treatment was not significant. Three studies reported follow up data at 9 to 12 months (Hayward et al., 2000; Kendall et al., 2008; Silverman, Kurtines, Ginsburg, Weems, Lumpkin, et al., 1999; Silverman, Kurtines, Ginsburg, Weems, Rabian, et al., 1999); the effect size for treatment at 9 to 12 month follow up was not significant.

4.2. What is the effectiveness of generic CBT compared with disorder-specific CBT for anxiety in children and young people?

We identified 22 studies which examined generic treatments for anxiety in children and/or young people. Two of these studies recruited children with elevated levels of anxiety on generic anxiety measures (Barrett et al., 2001; Mifsud & Rapee, 2005). Four of the studies recruited children with any anxiety disorder including OCD and PTSD (Hudson et al., 2009; Lyneham & Rapee, 2006; Rapee, Abbott, et al., 2006; Wood et al., 2009). The other 16 trials mainly recruited children with separation anxiety disorder (SAD), social phobia, and generalized anxiety disorder (GAD; or over-anxious disorder or avoidant disorder), with some explicitly excluding children with OCD, PTSD, and specific phobias, and others recruiting children with all anxiety disorders, but only finding those with SAD, social phobia, and GAD. Twenty seven trials recruited children and young people who met diagnostic criteria for a specific anxiety disorder (PTSD = 9, social phobia = 9, OCD = 5, specific phobias = 3, school refusal/anxiety = 2).

We calculated effect sizes for CBT which was generic and for CBT which was targeted at a specific anxiety disorder (Table 2). The overall effect size for generic CBT treatment of anxiety disorders in children and/or young people was moderate. The overall effect size of disorder specific CBT for children and adolescents with anxiety was medium to large. We next calculated effect sizes for treatment of different diagnostic categories. There were 9 randomized controlled trials of CBT for PTSD in children and young people. The trials for PTSD were highly variable. Some studies identified groups of children exposed to the same or closely related chronic stressors (e.g. war and conflict, sexual abuse) or to a specific environmental stressor (e.g. tsunami or earthquake). Other trials recruited children and young people where PTSD had been diagnosed following a wide range of different traumatic events. Studies of PTSD treatments also used various methods of randomization, including cluster randomization, and a very wide range of outcome measures. The overall effect size for CBT for PTSD was moderate.

We identified five RCTs of CBT for OCD in children and young people. OCD trials were generally of high quality, used clear diagnostic criteria to identify OCD (invariably the ADIS), treated highly co-morbid participants, and all used the same well-validated and standardized measures of symptoms (the CY-BOCS). The overall effect size for OCD was very large and markedly larger than effect sizes for CBT in general or psychotherapy for anxiety overall. This result is similar to that reported by Hofmann and Smits (2008) in their meta-analysis of CBT for adults with anxiety disorders.

There were nine trials which evaluated CBT for social phobia in children and young people. All of these trials were of group CBT for social phobia. The mean effect size for the treatment of social phobia was moderate to large. There were insufficient number of trials which focused on other specific anxiety disorders to warrant separate analysis (3 trials reported on specific phobias and 2 on school anxiety).

4.3. What is the effect of child age on effectiveness of psychological treatment for anxiety in children and adolescents?

The majority of studies included both children and adolescents in their samples. We identified 20 studies which included only children (i.e. those 13 and below) and 6 studies which only recruited adolescents with anxiety (i.e. those aged over 13 years). The mean effect size for children was moderate in size and the mean effect size for adolescents was very large, though with very wide confidence intervals. Table 3 shows the effect sizes associated with treatments for children and for adolescents.

We also examined the effect of age by classifying studies according to the mean age of their sample. Two studies examined the effect of psychological treatment for trauma in children aged 4 to 5 years. The mean effect size was small and was not significant; −0.28 (95% CI −0.90, 0.35). Three studies reported that the mean age of participants was 7 to 8 years; the mean effect size of these studies was −0.69 (95% CI −1.11, −0.26). The largest group of studies (N = 19) reported that the mean age of participants was 9 to 10 years. For this group the mean effect size was small; −0.29 (95% CI −0.51, −0.06). Seven studies reported a mean age of participants between 11 and 12 years and the mean effect size was medium to large, −0.77 (95% CI −1.26, −0.29). Four studies with a mean age of 13 to 14 had an

Table 3
Effect sizes associated with child and treatment delivery factors.

	N of studies	Effect size	95% CI
Age			
Child ≤ 13 years	20	−0.63	−0.96, −0.30
Adolescent ≥ 14 years	6	−1.38	−2.65, −0.11
Parental involvement			
None	20	−0.57	−0.83, −0.31
Minimal	11	−0.69	−1.06, −0.32
Some	11	−0.65	−1.03, −0.26
Significant/extensive	18	−0.63	−0.98, −0.27
Delivery mode			
Group	34	−0.57	−0.78, −0.36
Individual	27	−0.75	−1.00, −0.51
Group CBT	26	−0.58	−0.81, −0.36
Individual CBT	23	−0.85	−1.14, −0.56
Duration of treatment (hours)			
1–4	5	−0.02	−0.14, −0.19
5–8	6	−0.35	−0.66, −0.01
9–12	29	−0.77	−1.02, −0.51
13–16	10	−0.75	−1.17, −0.34
17–20	5	−0.65	−0.99, −0.32

overall effect size which was very large and which was significantly greater than zero; −2.13 (95% CI −2.79, −1.48). Finally 5 studies reported a mean age of 15 or older; their overall effect size was large, −1.21 (95% CI −2.35, −0.06). Thus on the basis of dividing the sample into children and adolescents, and by taking the mean age of the sample, the effect size of treatment for adolescents with anxiety was large and the effect size of treatment of children (i.e. under 13 years) was small to medium. The data suggest that treatment of younger children is associated with smaller effect sizes.

4.4. What is the impact of treatment delivery on the effectiveness of psychotherapy for child and adolescent anxiety?

4.4.1. Parental involvement in treatment

We classified parental involvement in treatment as 'none' (20 studies), 'minimal or educational only' (11 studies), 'some involvement' (11 studies), and 'significant/extended involvement' (18 studies). The number of studies does not equal 55 because some trials included arms comparing parental vs. individual treatment. In each category of parental involvement the effect size of psychotherapy was medium and significant (see Table 3). Thus there were minimal differences in the effectiveness of treatment with and without parental involvement suggesting that involving parents closely in their anxious child's treatment is not associated with better outcomes.

4.4.2. Effectiveness of group compared with individual treatment

Psychological therapy for anxiety disorders in children and adolescents can be delivered to individual participants or to groups of participants. We classified treatments as individual or group interventions and examined their effect sizes (Table 3). Three trials compared individual to group interventions (Barrett et al., 2004; Flannery-Schroeder & Kendall, 2000; Spence et al., 2006). Thirty four studies compared group psychotherapy to a control condition. The effect size for group psychotherapy was medium. Twenty seven studies compared individual psychotherapy for anxiety to a control condition and the effect size was large. We then calculated the effect size of group and individual CBT. The effect size of group CBT was medium and the effect size of individual CBT was large (see Table 3).

4.4.3. Number of hours of treatment

We calculated the number of hours associated with each treatment. Typically individual treatment sessions were 1 h in duration. The majority of studies (N = 29) offered between 9 and 12 h of treatment. Five studies had treatment of 1 to 4 h, 6 studies offered 5 to 8 h, 10 studies offered 13 to 16 h, and 5 studies offered between 17 and 20 h. Table 3 shows the effect sizes associated with treatments of varying durations. Treatments with between 1 and 4 h had a non-significant effect size. The effect size for treatments of 5 to 8 h was small and statistically significant. Effect sizes for treatments of more than 9 h were moderate to large. Confidence intervals were above zero in all cases except for treatments lasting between 1 and 4 sessions. The effect sizes therefore suggest that providing 5 or more sessions leads to at least small or moderate treatment effects. Moderate to large treatment effects are associated with 9 or more sessions of treatment.

5. Discussion

This meta-analysis provides an overview of randomized controlled trials of psychological therapies for children and adolescents with anxiety disorders. This is a changing field with new methods of delivery (e.g. internet, bibliotherapy, email) being developed to meet the needs of different populations and client groups (e.g. young people with an autistic spectrum disorder). To our knowledge it is the first quantitative review which includes all anxiety disorders and which includes a range of psychological interventions. There are some elements of psychological therapy which preclude the use of the most stringent trial designs; i.e. psychological therapy cannot be delivered by therapists who are blind to the treatment they are delivering and thus double-blind designs cannot be used. However, the quality assessment of the studies we reviewed suggests that the methodological quality of trials has improved; in particular, recent trials tend to conform to CONSORT reporting requirements, have much greater clarity about how participants are randomized, and include all randomized participants in their analysis and not only those who remain in treatment, and adhere to protocol.

The results of this meta-analysis are broadly in line with those of previous reviews although we have included a significantly larger number of studies. In particular the overall effect size for psychotherapy vs. a control condition was very similar to those reported in previous meta-analyses (In-Albon & Schneider, 2007; James et al., 2005; Silverman et al., 2008). In addition, we compared the effect of psychotherapy when compared to both passive and active control conditions. The results provide strong evidence that psychological treatment of anxiety disorders in children and young people is associated with symptomatic change which is significantly greater than in participants randomized to an active psychological control condition. This is an extremely important finding to have confirmed, especially as studies are more numerous and study designs become more robust. However, the effect size of psychological therapy when compared to an active control condition was small and thus we can state with confidence that treatment development and refinement are highly important if we are to maximize treatment efficacy.

The nature of a meta-analytic review demands that the characteristics of individual studies are subsumed within an over-arching methodology which applies to all included studies. The aim is to identify the broad picture rather than to highlight findings and strengths of individual studies. We imposed some methodological criteria in selecting studies to increase the potential validity of the results. Thus we only included randomized trials and we rated the methodological quality of trials. The exclusion of lower quality studies increases the validity of the meta-analysis. In addition we identified one outcome measure for each study before we extracted the data for meta-analysis. This was always the child or young person's self report of their symptoms. This has some advantages but relies on the subjective accounts of children and young people, presents a relatively limited perspective on outcomes, may not reflect important aspects of functioning, and may give more conservative estimates of change. Therefore the outcome measures used in this meta-analysis do not necessarily represent the outcome measure which trial authors themselves would have selected, and in some cases they may underestimate the treatment effect.

The vast majority of trials included in the meta-analysis assessed a variant of cognitive behavior therapy for anxiety. Thus, the results of the meta-analysis are almost all attributed to the effects of CBT for anxiety. Our data suggest that CBT for children and adolescents with anxiety is effective when compared to a passive (no treatment group) or an active control group. CBT has clearly demonstrated that it is effective as a method of treating anxiety disorders and the positive effects of CBT may make it increasingly difficult to attract scarce research funding to evaluate other therapy methods. Within CBT there remain many areas of uncertainty. For example, our data suggest that disorder-specific CBT has a larger effect size than generic CBT. However, few studies of generic CBT include children with OCD or PTSD (n = 4), and relatively few include children with specific phobias (n = 6). Thus the only disorder that is seen both specifically and generically is social phobia. Furthermore there are no specific treatment trials for GAD (or OAD or avoidant disorder), or for SAD. Thus there is a confound between the specificity of treatment and the anxiety disorder being treated.

In our meta-analysis we also compared the effectiveness of different methods of delivering treatment. The range of studies reviewed included a wide range of treatment delivery methods and this partly

reflects the desire of clinical researchers to adapt treatments to best suit children and young people, to reach the maximum number of children with anxiety disorders, as well as the heterogeneous nature of anxiety disorders in children and young people. Thus we compared effect sizes associated with group and individual treatment, degree of involvement of parents in treatment, generic anxiety treatment and disorder specific treatments, different treatment length, and different age bands of children and young people. There are some problems with multiple testing in this way so we consider our sub-group results to be indicative. However, with that caveat, the data suggest that individual treatment for anxiety is associated with a larger effect size than group treatment for anxiety, that disorder specific treatment is associated with a larger effect size than generic treatment for anxiety, that parental involvement is not associated with increased effectiveness of treatment, that longer durations of treatment tended to have larger effect sizes than shorter durations, and that older children and adolescents reported larger treatment effects than young children. Ishikawa et al. (2007) found that treatments of more than 11 sessions were more effective than shorter treatment.

The results of this meta-analysis suggest that there is a potential trade-off between the effect size of treatment and the resources required to deliver treatment; longer and individual treatments achieved larger effect sizes than shorter or group based treatments. In addition, the very small number of studies which incorporated a true follow up condition (i.e. where the treated group was compared to an untreated group at follow-up) makes it very difficult to assess the longevity of changes following treatment. This is a serious ethical and practical problem for which it is hard to find a solution but which may be partly ameliorated by the use of an active control condition (as opposed to a waitlist control condition).

We found no evidence that parental involvement in therapy enhances treatment outcome and this is consistent with previous reviews (In-Albon & Schneider, 2007; Ishikawa et al., 2007; James et al., 2005; Silverman et al., 2008). However, as most of the treatments were CBT it is possible that parental involvement adds benefit to non-CBT interventions for child anxiety (Dowell & Ogles, 2010), or that there are certain types of anxiety for which parental involvement is particularly important (e.g. school refusal; Heyne et al., 2002). It is also possible that parental involvement is more important for young children than for older children and adolescents or that it is most important for children whose parents are also anxious (see Kendall et al., 2008). It certainly appears that the role of parental involvement is complex and may need to change over time and be sensitive to the needs and presentations of both children and their parents (Cobham, Dadds, Spence, & McDermott, 2010). The limitation of any generic meta-analysis is that these fine grained distinctions cannot be explored but these areas provide important questions for future treatment trials.

The issue of parental involvement in treatment for child anxiety overlaps with questions around the extent to which children of different ages benefit differentially from therapy. The data we extracted suggest that degree of symptom change reported by younger children was smaller than that reported by older children. This may be because older children and teenagers are better able to engage in psychological therapy in general, or because they have the cognitive and interpersonal skills to engage in CBT specifically. Alternatively, or perhaps as well as, older children and teenagers may be better able to self report their symptoms of anxiety.

These sub-group findings provide many diverse directions for future research in the treatment of anxiety disorders in children and young people and suggest other important questions. The current standards of design, scope, and reporting of RCTs favor large scale, multi-site trials which are expensive and complex. One the other hand the field is still developing rapidly and there is a need for smaller trials to establish if new treatments and new methods of delivering treatment are acceptable, feasible, safe, and potentially effective, in advance of any definitive trials and meta-analyses. For example, there are a range of methods of delivering therapy through harnessing technology (internet and email) and via different professionals (e.g. teachers) as well as parents. It is not clear how effective these methods are compared to delivery by trained and expert therapists. At present the number of studies in each of these areas is too small to allow meaningful comparison but it may become possible to integrate data through systematic reviewing and meta-analysis from studies as they accumulate over time. In some areas, e.g. OCD, there is a consensus about appropriate outcome measures, including primary outcome measures, and also including methods of establishing diagnosis, and the use of multiple informants. Other areas, e.g. PTSD, present a much more heterogeneous picture, with multiple outcome measures, many different methods of treatment, and a wide range of contexts.

Overall we found that the quality of research designs has improved although many rudimentary design errors are still common. In our quality coding we found that studies still tend to be underpowered and fail to identify their primary outcome. Randomization processes may be open to bias and procedures for blinding and assessing the success of blinding are rarely reported. Of particular note was the almost complete absence of reporting the adverse effects of psychological therapy. This is presumably due to the assumption that psychological therapy cannot be harmful to participants but this assumption is questionable and at the least requires confirmation. Our funnel plots suggest that studies which are of a higher methodological quality have the same overall effect sizes and that poor quality is not associated with the effect size of studies.

There are clearly many more questions to address in this research field and probably far too many questions for the available resources. There is therefore a need to prioritize research questions and to try to target human and financial resources. Overall, it would be helpful to identify which questions are sufficiently important to warrant the scale of funding required for a definitive study and which questions can be adequately resolved with smaller, cheaper, local studies of high quality. Researchers are likely to have many different and conflicting views but we see a small number of over-arching issues. First future trials should include cost effectiveness and ITT analysis. Second, the design, execution, and reporting of trials should be congruent with CONSORT reporting standards and in particular should include monitoring and reporting of adverse events of psychological therapy. Third, trials should include an active control condition (rather than a passive waitlist control) and they should, if at all possible, include a follow-up period in which the control group does not receive the target intervention.

6. Conclusions

Anxiety disorders in children can be treated effectively and there is sufficient evidence to recommend psychological therapy, specifically behavioral or cognitive behavioral therapy. The current evidence is adequate to provide broad guidance for service development and service delivery as well as in guiding parents and young people themselves. However the moderate effect sizes derived from treatment studies mean that there is considerable room for improvement in treatment outcomes.

The complexity of the field also means that there are insufficient data to examine many complex questions about treatment planning and delivery, for example possible interactions between the age of the child or young person and the effectiveness of involving their parent in treatment, or using different methods of delivery. In the absence of these fine-grained data clinical decisions about how to treat individual children and young people is best guided by integrating research evidence with clinical judgment and specialist knowledge of systemic and developmental theory, and critically, the preferences of children, adolescents, and their parents.

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