Disclosure of researcher allegiance in meta-analyses and randomised controlled trials of psychotherapy: a systematic appraisal

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ABSTRACT

Objective: Psychotherapy research may suffer from factors such as a researcher’s own therapy allegiance. The aim of this study was to evaluate if researcher allegiance (RA) was reported in meta-analyses and randomised controlled trials (RCTs) of psychotherapeutic treatments.

Design: Systematic approach using meta-analyses of different types of psychotherapies.

Data sources: Medline, PsycINFO and Cochrane Database of Systematic Reviews.

Methods: We evaluated meta-analyses of RCTs regarding various types of psychotherapies. Meta-analyses were eligible if they included at least one RCT with RA and they were published in journals in Medline, PsycINFO and Cochrane Database of Systematic Reviews with an impact factor larger than 5.

Results: We identified 146 eligible meta-analyses that synthesised data from a total of 1198 unique RCTs. Only 25 of the meta-analyses (17.2%) reported allegiance and only 6 (4.1%) used a proper method to control its effect. Of the 1198 eligible primary RCTs, 793 (66.3%) were allegiance. Authors in 25 of these 793 RCTs (3.2%) reported their allegiance while only one study (0.2%) controlled for its effect.

Conclusions: The majority among a group of published meta-analyses and RCTs of psychotherapeutic treatments seldom reported and evaluated the allegiance effect. The results of the present study highlight a major lack of this information in meta-analyses and their included studies, though meta-analyses perform slightly better than RCTs. Stringent guidelines should be adopted by journals in order to improve reporting and attenuate possible effects of RA in future research.

INTRODUCTION

The researcher allegiance (RA) effect is of special concern in studies that are designed to evaluate the treatment effectiveness of different forms of psychotherapy, 1-8 as the investigator may portray allegiances in particular therapies which are correlated with the pattern of the results. 9-10 RA has been defined as a researcher’s ‘belief in the superiority of a treatment and in the superior validity of the theory of change that is associated with the treatment’ (p55). 3 Psychotherapy research was probably one of the very first fields that conceptualised potential allegiance effects for clinical interventions. 11-13 Luborsky et al. 12, 13 have shown that RA accounted for two-thirds of the variance in treatment effect in favour of the preferred treatment. Similar potential personal expectations and financial relationships favouring positive results have also been found to affect biomedical research. 14, 15

The contamination of RA in the psychotherapy era is a long-standing debate. Meta-analyses have found larger effect estimates in psychotherapy studies when RA is observed. 16-18 These effects are attenuated when appropriate statistical methods for controlling for RA are performed. 1, 4, 6, 12-15, 16-22 The aforementioned findings led some researchers to support the existence of allegiance bias, 1, 12, 13, 15, 18, 21, 25 which overestimates the effect and threatens the validity of the clinical trial. 1, 21, 25 On the other hand, other
researchers argue that RA should be viewed as a reflection of the true differences among psychotherapies boosted by the clinical and research expertise, and cannot be considered as existence of bias per se. Statistical correction for the presence of allegiance is therefore pointless and may introduce bias. This is supported by additional meta-analyses which have shown that RA did not divert the relative treatment effect, concluding that RA was not an important source of bias.

Allegiance is an essential topic and—bias or not—related researchers seem at least to agree that it should be taken into account effectively. Several sources of allegiance have been provided in order to clarify how allegiance could affect the outcome in randomised controlled trials (RCTs). These could include poor training of therapists, the enthusiasm of the researcher for a particular treatment and the ‘file drawer phenomenon’. Furthermore, the nature of psychotherapy, in contradiction to pharmacotherapy, is very difficult to study. Methodological weakness such as wait-list control groups, single group designs, small samples and subjective measurement of clinical improvement may allow RA to interfere. Along with the fact that, in the field of psychotherapy, double-blind studies cannot be applied, RA may influence a researcher’s actions and its reporting in the conducted studies which could be considered as a potential non-financial conflict of interest. However, this type of allegiance bias is not easily detectable. Recently, a new mechanism has suggested that the RA effect may occur partly whenever researchers select biased therapists in study designs. It is also a fact that RA could affect the outcome whenever researchers select study therapists who share the RA according to the true efficacy hypothesis. Similar mechanisms could occur regarding meta-analyses and studies selection. Meta-analysis reflects the potential methodological deficits of the primary studies due to the presence of RA. Thus, meta-analyses could display the same methodological deficits as the primary studies in meta-analysis design, data analysis and interpretation of results because of RA by the authors of the meta-analysis. The developers of some specific psychological treatments may show more interest in the evidence-based practice of their own therapies than in others. The RA of authors of a meta-analysis is found to correlate with the outcomes of the meta-analysis.

Although the authors of meta-analyses are required to evaluate all potential biases by the broadly used guidelines, there are no specific guidelines in psychotherapy meta-analyses about clearly addressing the problem of RA. RA is an important factor in showing the benefits of a preferred treatment and therefore attention should be given when interpreting the results of RCTs (eg, therapist allegiance). Moreover, without reporting RA in meta-analyses, the evaluation of the evidence derived may be limited. It is reasonable to assume that neglecting to report RA could be considered as a methodological issue.

In this study we aim to investigate systematically the extent of reporting RA in meta-analyses of RCTs of psychotherapy treatments as well as in the primary RCTs included in these meta-analyses. We searched journals with a relative high impact factor (IF) and enhanced our sample size by including studies from the Cochrane Database of Systematic Reviews (CDSR). Our hypothesis is that RA is not reported in both meta-analyses and their included RCTs. We also hypothesised that the allegiance effect is assessed in only a few meta-analyses and RCTs.

**METHODS**

**Selection of meta-analyses**

We conducted a comprehensive literature search of meta-analyses in the psychotherapy field published from January 1977 to December 2012. We searched PubMed, PsycINFO and the CDSR using the following search algorithm: (meta-analysis OR systematic review) AND (psychotherapy OR psychoanalysis OR psychological interventions). Both Medical Subject Headings (MeSH) terms and text words were used. From CDSR we selected the most recent version of previously published psychotherapy reviews. The last update was performed in December 2012. To increase the yield of our electronic search, reference lists of all eligible studies and relevant review articles were examined until a comprehensive list was obtained. This systematic review was performed in accordance with the Preferred Reporting Items for Systematic Review and Meta-analyses (PRISMA) statement (on line supplement 1; PRISMA 2009 Checklist).

**Eligibility criteria**

We considered published meta-analyses of RCTs of psychotherapeutic treatments in journals with a 2012 IF of ≥5 based on Journal Citation Report (JCR, 2012). We selected high impact journals of published meta-analyses to reflect current reporting practices because they have higher reporting standards. The selection criterion of IF has previously been applied to studies of reporting. Meta-analyses of RCTs with at least one study with RA were eligible. We based our decision in order to have a strict criterion since the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement requires authors of meta-analyses to report both potential source of bias and conflicts of interest (COIs) of a meta-analysis, but does not address the reporting of such biases from included RCTs. A study was defined as showing RA when one or more of the co-authors had (1) developed the intervention; (2) developed both the therapy and trained the therapists; (3) developed both the intervention and supervised the therapists; (4) supervised and/or trained the therapists alone; or (5) advocated the therapy. The highest level of allegiance was coded as 5 if the psychotherapy treatment was developed by the
author(s) and if they supervised or trained the therapists; 4 if the treatment was developed by the authors but they did not train or supervise the therapists; 5 if the treatment was advocated by one of the authors and they also supervised/trained the therapists; 2 if the treatment was advocated by the authors but they did not train or supervise therapists or in cases where the author showed no advocacy for the psychotherapy but provided better trained or more experienced therapists for one treatment over another; 1 if the treatment was more fully explained in the introduction and/or methods section than the alternative; and 0 if there was no apparent advocacy of one treatment over another. When sufficient information on RA was not given in the full text, we additionally checked the References section in order to identify if a reference was given to previous published research by the same principal investigators showing the efficacy of the treatment relative to no treatment or showing superiority of the treatment compared with other treatment. This procedure has been proposed as a criterion that gives information of moderate to strong allegiance.31 We employed these methods because they allow measurement of direct (e.g., developed the therapy) and indirect (e.g., author published supporting evidence for the treatment) levels of allegiance in meta-analyses and primary studies.

Meta-analyses should also fulfil the following criteria: (1) evaluate any form of psychotherapy (e.g., psychodynamic, interpersonal psychotherapy, cognitive behavioural therapy (CBT), marital therapy, behavioural therapy); (2) assess the direct comparison of (a) different forms of psychotherapy, (b) psychotherapy versus placebo (treatment as usual, waiting list, no treatment), (c) psychotherapy versus medication, (d) group therapy versus individual or group therapy versus group therapy, (e) computer-based psychotherapies versus face-to-face treatments; (3) provide a clear description of the definition of the main outcome or the class of outcomes regarding both mental and medical disorders. Meta-analyses that evaluated a combination of psychotherapies and other alternative treatments (e.g., medication) as well as non-bona fide techniques were also included. Meta-analyses with studies pertaining to study designs other than RCTs were excluded.

We excluded meta-analyses which reviewed only the effects of treatments without having a clear verbal component (e.g., psychoactive medication, physical exercise) or those concerning non-specific treatments without being compared with a type of psychotherapy (e.g., dietary advice, primary care, recreation). We also excluded narrative reviews and systematic reviews without quantitative synthesis of data.

To prevent duplicates of the same studies, if an RCT appeared more than once it was evaluated only in the context of the first publication that described it. We included primary studies only in the English language and in full text format. Two investigators (ED and EE) independently screened both the title and abstract of identified articles as well as full text meta-analyses for eligibility. The decision about the eligibility of a meta-analysis was made independently by the two reviewers and disagreements were reached by consensus.

Data extraction

Eligible meta-analyses, including their primary studies, were reviewed by the first investigator (ED) including disclosure statements, full texts and tables, author’s affiliation, acknowledgments, contributors and references, and all online journal supplements. During this review the investigator searched for the presence of RA in each selected meta-analysis, searched for the presence of RA in the RCTs included in each meta-analysis and determined whether or not RA was reported in the meta-analyses and their RCTs. The investigator also established whether any statistical procedure of RA was performed in the meta-analyses and, if so, which method was used according to the definition provided by the authors.

For eligible meta-analyses we extracted the following information: first author, year, journal, IF, supplement issue (Y/N), Cochrane review (Y/N), number of RCTs of psychotherapy treatments included in the meta-analysis, number of articles retrieved and reviewed, RA (Y/N), study population, control/comparison arms, meta-analysis primary outcome reviewed (e.g., efficacy, prevention, both efficacy and prevention, effectiveness, harm), type of psychotherapy, meta-analysis authors conducted an allegiance study that was included in the review or advocated the therapy (Y/N) and their number, total number of meta-analysis authors, meta-analysis author allegiance reported (Y/N), meta-analysis author any COI reported (Y/N), meta-analysis author funding sources reported (Y/N), meta-analysis reports on allegiance of included RCTs (Y/N), quality assessment of included RCTs in the meta-analysis (Y/N), and the allegiance assessment method or meta-analytical strategy for allegiance of included RCTs in the meta-analysis (Y/N) (e.g., risk of bias, balanced allegiance, subgroup analysis or meta-regression). We employed the actual definition of each meta-analysis in order to categorise the form of psychotherapy treatments (e.g., cognitive behavioural therapy, psychoanalytic/psychodynamic informed psychotherapies, family systems therapy). We also used the definition of the meta-analysis author in terms of meta-analysis outcome (e.g., effectiveness, efficacy).

From the primary included studies we additionally extracted the following information: first author, year, journal, supplement issue (Y/N), overlapping study (Y/N), RA in primary RCT (Y/N), number of authors with allegiance, total number of included authors in RCTs, RCT authors reported RA (Y/N), RCT authors provided clear data of their allegiances (Y/N), RCT authors reported any COI (Y/N), funding sources of included RCTs reported (Y/N) and, finally, whether the RCT authors used any method of controlling for allegiance according to the definition provided by the authors (e.g., balanced allegiance).
One investigator (ED) extracted all the data and another investigator (EE) independently confirmed the extracted data. Disagreements about the above ratings were discussed until a consensus was reached for each meta-analysis. If controversial ratings remained, the data were reassessed by a third party.

Coding of allegiance
Meta-analyses and included RCTs in each eligible meta-analysis were reviewed in order to identify sufficient information to code the potential RA, blind to the results. We used a two-step approach. We first rated evidence of various indicators of RA according to a 6-point scale (from 0 to 5) proposed by Wampold et al, as mentioned above. We then assigned an absolute allegiance rating of 'yes' (for RA=1–5) and 'no' (for RA=0) for each psychotherapy treatment. This procedure has the advantage of including all possible indicators of allegiance from strong to weak in both dichotomous and continuous variables. Any ambiguities about coding of allegiance were solved by discussion until consensus was reached.

Statistical analysis
We report frequencies, medians and IQR. All comparisons were performed using the Fisher exact test and exact test for probabilities. Analysis was performed with Stata 12.0 (STATA Corp, College Station, Texas, USA) and two-sided p values are reported.

RESULTS
Search results
The electronic database search yielded 3347 unique articles of which 146 meta-analyses were eligible (see online supplementary figure S1). Of the 146 meta-analyses, 86 were published in 23 scientific journals (68 specialty psychiatric/psychological journals and 18 general medical journals) and 60 in CDSR (online supplementary references A1–86 and B1–60). The IF of the journals ranged from 5.8 to 14.46 in specialty journals and from 6.4 to 38.8 in general journals. The IF of the Cochrane Database was 5.7.

The 146 selected meta-analyses evaluated a broad spectrum of psychotherapeutic treatments: 25% CBT alone, 50% mixed various psychotherapy treatments in addition to CBT, and 25% all other available forms of psychotherapy alone or in combination. They included 65 studies on treatment effectiveness, 52 on treatment efficacy, 5 on efficacy and effectiveness, 20 on efficacy and prevention and adverse events, 1 on harm and 3 on prevention. Each study included a median of 10 all­egiant trials (IQR 7–15) and the median number of participants per meta-analysis was 1202 (IQR 675–2334). Detailed characteristics of selected meta-analyses are presented in online supplementary table S1. The inter-rater agreement was $\kappa=0.94$ in meta-analyses and $\kappa=0.91$ in RCTs.

### Table 1 Evidence and reporting of allegiance in 146 eligible meta-analyses

| Database of published m-a | Total number of m-a | Evidence of at least one allegiant study conducted by m-a authors | Evidence of at least one allegiant study in included RCTs in m-a | Number of m-a with at least one allegiant study | Reporting of allegiance both in main text and in COI section | Reporting of allegiance in main text | Reporting of allegiance in COI section | Reporting of funding sources |
|---------------------------|---------------------|---------------------------------------------------------------|---------------------------------------------------------------|------------------------------------------------|--------------------------------------------------|-----------------------------|------------------------------|-----------------------------|
| PubMed and PsycINFO     | 68                  | 28                                                            | 68                                                           | 26                                               | 0                                                | 9                           | 9                            | 33                          |
| Specialty and general medicine journals | 18                  | 8                                                             | 18                                                           | 8                                                | 0                                                | 0                           | 2                            | 13                          |
| CDSR                     | 60                  | 20                                                            | 60                                                           | 12                                               | 2                                                | 2                           | 2                            | 14                          |
| Total                    | 146                 | 56                                                            | 146                                                          | 56                                               | 20                                               | 17                          | 10                           | 60                          |

CDSR, Cochrane Database of Systematic Reviews; COI, conflicts of interest; m-a, meta-analyses; RCT, randomised controlled trial.

Dragioti E, et al. BMJ Open 2015;5:e007206. doi:10.1136/bmjopen-2014-007206

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Evidence, reporting and assessment of RA in meta-analyses

Evidence of RA in the meta-analysis was present in 56 of 146 (38.4%) eligible meta-analyses. Moreover, 50 of the 56 (89.3%) had at least one author who was a co-author in an included RCT that was allegiant in this specific study (table 1).

In total, only 25 of the 146 meta-analyses (17.2%) discussed or reported RA either in the meta-analysis or in the included RCTs. The level of allegiance was high in 13 meta-analyses and in 12 the level of allegiance was moderate to weak (eg, advocate the treatment). Thirteen of the 146 meta-analyses (8.9%) reported allegiance of the included RCTs in the text. Ten (6.8%) reported some kind of evidence of RA by the author(s) of the meta-analysis in the section on COI, even though all journals required a declaration of competing interests. Finally, two meta-analyses (1.4%) reported allegiance in both the main text and in the section on COI (table 1). The characteristics of the total meta-analyses with COI statements about allegiances are presented in online supplementary table S2. These percentages differ significantly from the 107 of the 146 selected meta-analyses (73.3%) that disclosed potential COI other than allegiance (Fisher exact=92.964, p=1.2×10^{-29}) and the 108 of 146 (74.0%) that reported the funding sources (Fisher exact=95.124, p=3.0×10^{-19}). Additionally, only 6 of the 146 meta-analyses (4.1%) evaluated the presence of allegiance. Details per journal as well as the total number of meta-analyses are shown in tables 2 and 3.

Of the 25 meta-analyses that reported allegiance, 9 were published in specialty journals, 2 were published in general medical journals and 14 were published in CDSR (p=0.26), while the assessment of RA was performed only in specialty journals and in CDSR. Specifically, RA was assessed by different methods (table 4). Finally, 10 of the 25 meta-analyses that reported allegiance were published between 2010 and 2012 while 4 of the 6 studies that used a meta-analytic strategy for its effect were published between 2011 and 2012.

Evidence, reporting and assessment of RA in included RCTs

The 146 selected meta-analyses synthesised data from a total of 2727 RCTs. Finally, 1198 RCTs were eligible for inclusion in the study. Reasons for exclusion are described in online supplementary figure S2. The median number of authors per RCT was 5 (IQR 3–27). From the 1198 included RCTs, 793 (66.3%) were allegiant studies, 142 (11.8%) were non-allegiant and 263 (21.9%) were defined as unclear, taking into account the absence of clear existence of sufficient information to code RA. In the 793 allegiant RCTs, evidence of author’s allegiance through the text was provided in 405 (51.0%) studies while the remaining 388 (49.0%) provided information of allegiance through a cited reference by the same principal investigators to their previous research.
The median number of authors with allegiance was 5 (range 3–7 per RCT). With regard to the indicators of allegiance, in 74 (9.3%) of the 793 included allegiant studies the treatment was developed and the therapists were trained or supervised by the allegiant authors (indicator of allegiance=5), while in 458 (57.8%) the treatment was developed by the allegiant authors (indicator of allegiance=4). In another 85 (10.7%) of the 793 included allegiant studies the treatment was advocated by one of the authors and they also supervised/trained the therapists (indicator of allegiance=3), while in 88 (11.1%) of the 793 allegiant studies the treatment was advocated by the authors but they did not train or supervise the therapists and the author showed no advocacy for the treatment, but provided better trained or more experienced therapists for one treatment over another (indicator of allegiance=2). Finally, in 88 (11.1%) of the 793 allegiant studies the treatment was more fully explained in the introduction and/or methods section than the alternative (indicator of allegiance=1).

Only 25 of the 793 RCTs (3.2%) clearly stated the term ‘allegiance’ and its derivatives, while only one (0.2%) reported allegiance as a potential COI in the relevant section and only one (0.2%) assessed the potential effects of allegiance in their analysis. Sixteen of the 25 primary studies that reported allegiance were studies in which the allegiant authors ranked with the highest level of potential COI (of the 19df). The comparison between strong allegiant RCTs (16/25) and weak allegiant RCTs (9/25) revealed statistical significance in terms of declaration of allegiance (p=0.003); that is, the stronger allegiant RCTs reported allegiance more often than the weaker allegiant RCTs. In addition, 8 of the 25 primary studies that reported allegiance were published between 2005 and 2009 while the rest were published before 2005. Furthermore, 16 (14.5%) of the 112 allegiant RCTs (10.7%) revealed statistical significance in terms of potential COI (of the 19df). The comparison between strong allegiant RCTs (16/25) and weak allegiant RCTs (9/25) revealed statistical significance in terms of declaration of allegiance (p=0.003); that is, the stronger allegiant RCTs reported allegiance more often than the weaker allegiant RCTs. Finally, in 88 (11.1%) of the 793 allegiant RCTs (9.2%) the treatment was more fully explained in the introduction and/or methods section than the alternative (indicator of allegiance=1).

Table 3  Characteristics of selected meta-analyses in general medicine journals and the Cochrane Database of Systematic Reviews (CDSR)

| General medicine journals and CDSR (publication date range) | No of published m-a | No of included RCTs | M-a authors included their studies | M-a authors reporting allegiance of included RCTs | Declaration of interest statement | Reporting of funding sources | Allegiance assessment of included RCTs | Quality assessment of included RCTs |
|---------------------------------------------------------------|--------------------|---------------------|----------------------------------|-----------------------------------------------|-------------------------------|-------------------------------|----------------------------------|----------------------------------|
| AIDS (2008)                                                   | 1                  | 38                  | 1/1                              | 0/1                                           | 1/1                           | 0/1                           | 1/1                              | 1/1                              |
| Am J Epidemiol (2009)                                         | 1                  | 51                  | 0/1                              | 0/1                                           | 1/1                           | 0/1                           | 0/1                              | 0/1                              |
| Arch Intern Med (1996)                                        | 1                  | 23                  | 1/1                              | 0/1                                           | 0/1                           | 1/1                           | 0/1                              | 1/1                              |
| Arthritis Rheum (2002)                                        | 1                  | 25                  | 0/1                              | 0/1                                           | 0/1                           | 0/1                           | 1/1                              | 1/1                              |
| BMC Med (2009–2010)                                           | 2                  | 39                  | 1/2                              | 0/2                                           | 2/2                           | 2/2                           | 2/2                              | 2/2                              |
| BMJ (1998–2006)                                               | 4                  | 57                  | 2/4                              | 0/4                                           | 4/4                           | 4/4                           | 4/4                              | 4/4                              |
| Eur Heart J (2007–2009)                                       | 2                  | 73                  | 0/2                              | 0/2                                           | 2/2                           | 2/2                           | 0/2                              | 1/2                              |
| Gut (2009)                                                    | 1                  | 19                  | 1/1                              | 0/1                                           | 1/1                           | 0/1                           | 0/1                              | 0/1                              |
| Lancet (2004)                                                 | 1                  | 25                  | 0/1                              | 0/1                                           | 1/1                           | 0/1                           | 0/1                              | 0/1                              |
| Obes Rev (2011)                                               | 1                  | 12                  | 0/1                              | 0/1                                           | 0/1                           | 0/1                           | 0/1                              | 0/1                              |
| Pain (1999–2010)                                              | 3                  | 68                  | 1/3                              | 2/3                                           | 2/3                           | 2/3                           | 0/3                              | 3/3                              |
| CDSR (2001–2012)                                              | 60                 | 995                 | 17/60                            | 14/60                                         | 60/60                         | 60/60                         | 1/60                             | 1/60                             |
| Total 1996–2012                                               | 78                 | 1425                | 24/78                            | 16/78                                         | 73/78                         | 75/78                         | 17/78                            | 75/78                            |
| Sum total (1994–2012)                                         | 146                | 2727                | 50/146 (38.4%)                   | 25/146 (17.2%)                               | 107/146 (73.3%)               | 108/146 (74.0%)                | 6/146 (4.1%)                     | 119/146 (81.5%)                  |

m-a, meta-analyses; RCT, randomised controlled trial.

DISCUSSION

To our knowledge, this is the first systematic appraisal of the reporting of allegiance in RCTs and meta-analyses. We systematically reviewed a large sample size of meta-analyses of RCTs of psychotherapeutic interventions published in high impact scientific journals and their included RCTs. We found that fewer than 20% of meta-analyses reported allegiance and fewer than 10% of RCTs reported allegiance. This is concerning because allegiance can have substantial effects on the results of RCTs and meta-analyses. In addition, the reporting of allegiance is often not transparent and may lead to conflicts of interest.

The median number of authors with allegiance was 5 (range 3–7 per RCT). With regard to the indicators of allegiance, in 74 (9.3%) of the 793 included allegiant studies the treatment was developed and the therapists were trained or supervised by the allegiant authors (indicator of allegiance=5), while in 458 (57.8%) the treatment was developed by the allegiant authors (indicator of allegiance=4). In another 85 (10.7%) of the 793 included allegiant studies the treatment was advocated by one of the authors and they also supervised/trained the therapists (indicator of allegiance=3), while in 88 (11.1%) of the 793 allegiant studies the treatment was advocated by the authors but they did not train or supervise the therapists and the author showed no advocacy for the treatment, but provided better trained or more experienced therapists for one treatment over another (indicator of allegiance=2). Finally, in 88 (11.1%) of the 793 allegiant studies the treatment was more fully explained in the introduction and/or methods section than the alternative (indicator of allegiance=1).
| Meta-analysis ID | Author(s) | Year | Journal | Treatment of interest | Age group | Clinical population | Section in text where allegiance of included RCTs reported | Met analytical strategy for allegiance | Statistical method | Positive to allegiance bias hypothesis |
|-----------------|-----------|------|---------|-----------------------|-----------|---------------------|----------------------------------------------------------|----------------------------------------|-------------------|--------------------------------------|
| 22466509        | Cuijpers et al | 2012 | Clin Psychol Rev | NDST | Adults | Depression | Abstract, methods and discussion | Yes | Subset analysis (moderator variable) | Yes |
| 21996291        | Wampold et al | 2011 | Clin Psychol Rev | Mixed ESTs | Any age | Anxiety and depression | Introduction, methods, results, discussion | Yes | Studies quality (moderator variable) | Yes |
| 20547435        | Tolin et al | 2010 | Clin Psychol Rev | CBT | Any age | Various mental disorders | Discussion | Yes | Meta-regression (moderator variable) | No |
| 18466666        | Smits and Hofmann | 2009 | Psychol Med | CBT | Adults | Anxiety disorders | Methods and discussion | No | None | None |
| 18055080        | Benish et al | 2008 | Clin Psychol Rev | Mixed | Adults | PTSD | Discussion | No | None | None |
| 18049290        | Klein et al | 2007 | J Am Acad Child Adolesc Psychiatry | CBT | Adolescents | Depression | Methods, results and discussion | No | None | None |
| 16480801        | Malouff et al | 2007 | Clin Psychol Rev | PST | Any age | Mental and physical problems | Results and discussion | Yes | Meta-regression (moderator variable) | Yes |
| 17032068        | Weisz et al | 2006 | Am Psychol | Mixed | Children and adolescents | Various youth problems | Discussion | Yes | ANOVA (moderator variable) | No |
| 15583112        | Leichsenring et al | 2004 | Arch Gen Psychiatry | STTP | Adults | Specific psychiatric disorders | Methods and discussion | No | None | None |
| 12227193        | Eccleston et al | 2002 | Pain | Children and adolescents | Chronic pain | Results | None | None | None |
| 10204712        | Morley et al | 1999 | Pain | CBT/BT | Adults | Borderline personality disorder | Results | No | None | Risk of bias |
|                 | Stoffers et al | 2012 | CDSR | Mixed | Adults | Chronic fatigue syndrome | Tables | | None | None |
|                 | Gibbon et al | 2010 | CDSR | Mixed | Adults | Antisocial personality disorder | Tables | | None | None |
|                 | Price et al | 2008 | CDSR | CBT | Adults | Chronic fatigue syndrome | Results | No | None | None |
|                 | Little et al | 2005 | CDSR | MST | Adults | Social, emotional, and/or behavioural problems | Tables | | None | None |
|                 | Smith et al | 2011 | CDSR | Relaxation techniques | Adults (only women) | Pain management | COI section | No | None | None |
|                 | Mössler et al | 2011 | CDSR | Music therapy | Any age | Schizophrenia | COI section | No | None | None |
|                 | Whalley et al | 2011 | CDSR | Mixed | Adults | Coronary heart disease | COI section | No | None | None |
|                 | Herschke et al | 2011 | CDSR | CBT/BT | Adults | Chronic low back pain | COI section | No | None | None |
|                 | Roberts et al | 2011 | CDSR | Mixed | Any age | Acute traumatic stress symptoms | COI section | No | None | None |
|                 | Ruddy and Dent-Brown | 2007 | CDSR | Drama therapy | Adults | Schizophrenia | COI section | No | None | None |
|                 | Abbass et al | 2006 | CDSR | STTP | Adults | Common mental disorders | COI section | No | None | None |
|                 | Crawford-Walker et al | 2005 | CDSR | Distraction techniques | Any age | Schizophrenia | COI section | No | None | None |
|                 | Dennis and Creedy | 2004 | CDSR | Mixed | Adults (only women) | Postpartum depression | COI section | No | None | None |
|                 | Jones et al | 2004 | CDSR | CBT | Adults | Schizophrenia | COI section | No | None | None |

*Whether a developer of PST conducted the study under investigation (no term allegiance). BT, behavioural therapy; CBT, cognitive behavioural therapy; CDSR, Cochrane Database of Systematic Reviews; COI, conflict of interest; EST, empirically supported therapy; MST, multisystemic therapy; NDST, non-directive supportive therapy; PST, problem-solving therapy; PTSD, post traumatic stress disorder; RCT, randomised controlled trial; STTP, short-term psychodynamic psychotherapy.

| CD000524        | Ruddy and Dent-Brown | 2004 | CDSR | Mixed | Adults (only women) | Schizophrenia | COI section | No | None | None |

*CD000524 Smith et al.

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<references>Dragioti E, et al. BMJ Open 2015;5:e007206. doi:10.1136/bmjopen-2014-007206</references>
included a statement about the allegiance author(s) in the meta-analyses in the text or as a disclosure statement elsewhere. Although allegiance was present in two-thirds of the eligible included RCTs, fewer than 5% reported allegiance in the text or as a disclosure statement.

The results of the present study highlight a major gap, given that there is agreement in the literature on the necessity of a more targeted approach on the allegiance effect among researchers and readers.1–13 According to Staines and Cleland,29 “RA represents a major overestimation bias, is a frequent phenomenon applied directly to both primary studies and meta-analyses and additionally meta-analysts, like primary investigators, can exhibit allegiance to a hypothesis being tested”. Poor reporting in meta-analyses and RCTs is crucial because both designs are considered to be the gold standard in evidence-based practice.34 This could imply that many researchers ignore—or, at best, are unaware of—the effect of this phenomenon regardless of the way it influences the results of the studies.1–13

Even in psychotherapy research where allegiance effects have been discussed and conceptualised very early,7 11–13 14–18 24 25 28 there is a lack of sensitivity for such potential biases. We found that RA was coded and analysed in a trivial number of meta-analyses. Two plausible explanations can be provided. First, the state of RA is still debatable in terms of possible bias and, although it may be universal in practice settings, its nature effects vary considerably in the literature.2 5 6 23–25 31 It is a fact that RA stretches back to the famous Dodo verdict10 and also challenges in terms of a better performance in delivery of treatment.1 5 24 25 Very often RA is used as a moderator variable to look at differences between studies.2 5 6 19–23 27 Second, information on allegiance is not typically reported by the term ‘allegation’ in original reports. Moreover, the definition of allegiance differs from study to study. Even if some authors of meta-analyses are familiar with this factor and are willing to investigate RA effects, they have to rely on non-standardised measuring methods3 like reprint analysis (ie, analysis of the publication for the presence of attributes that may hint at allegiance) based on the limited information available in the published articles.12 4 17 21 31 36 However, it is important to point out that reprint analysis as well as other such procedures including interviews with colleagues of the researchers of interest and interviews with the researchers themselves17 or examinations of previous publications authored by the same work groups31 are generally problematic and therefore might lead to erroneous conclusions.3

This study suggests that, without a strict reporting policy, RA is unlikely to be reported in meta-analyses and RCTs. Psychotherapy should move forward, following what is accomplished with pharmaceutical industry trials and sponsorship biases.13 32 35 37 Similar statements to the PRISMA statement could be adopted or extended to require authors of meta-analyses to report RA of both meta-analyses and primary studies or report that RA was not disclosed. Meta-analysis authors should report that they have evaluated all potentially relevant sources of bias. Developers of treatments might be encouraged to collaborate with other independent researchers when conducting meta-analyses of their own treatments and any potential personal or financial gain should be disclosed. It is also possible that some researchers may have a financial interest in the treatment—that is, they were involved in training and workshops related to the treatment. However, even if the authors do not have such involvement, they might still benefit from characterisation of their preferred treatment as evidence-based.

Other approaches in meta-analyses such as balanced allegiance, subgroup analysis or reporting results by levels of allegiance32 could be adopted as a sensitivity analysis. The investigators of RCTs should have to report their methods (eg, outcome of interest or data analytical methods) before implementation of a clinical trial. Furthermore, the researchers should control for RA by balancing it, at least, when two different psychotherapeutic treatments are compared in a clinical trial. They should also employ another set of researchers to make interpretations of the findings and perhaps, by this method of selecting blind assessors, the RA effects could be minimised. It is important for the psychotherapy field to offer the best reliable guide to policy makers, clinicians and readers, endeavouring to evaluate the relative costs and benefits of choosing a particular therapy over others.

There are some caveats in our study. Our investigation is limited to high impact journals only and therefore we may have not captured meta-analyses and RCTs from other clinically impactful journals on psychotherapy research. However, our collection of journals includes a wide range of journals including several specialised in psychotherapy research such as Clinical Psychology Review, Psychotherapy and Psychosomatics, Psychological Bulletin and Psychological Medicine. Also, this rule applies only to the eligible meta-analyses and not to their included RCTs, ensuring an unbiased sample. Our approach assessed only RCTs included in the eligible meta-analyses and therefore other RCTs in the literature have not been appraised. Nevertheless, there is no evidence that this additional information would be significantly different from our collection of RCTs, and the large number of included studies gives us statistical power to derive solid inferences. A formal comparison of reporting in meta-analyses and RCTs would be of interest. However, the RCTs included here have been published in journals with significantly lower IFs and any possible differences could reflect differences in the reporting practices between high impact and lower impact journals, and not the actual difference between the two designs. Another limitation is the coding of allegiance, since to date there is no unique accepted assessment of RA. However, we tried to measure all possible direct and indirect indicators of allegiance. Other studies in the field have used similar approaches.2 17 31 36 Moreover, it has been found that the type of measurement did not alter the strong
association between allegiance and treatment effect. Finally, although we found that the majority of allegiance authors of the primary studies had strong allegiance with the preferred treatment (eg, developed it or developed it and supervised/trained the therapist), we have not explored the role of funding sources as an indicator of the existence of allegiance. However, positive effects of treatments were reported by studies without the involvement of the developers or sponsorships. Hence, we have only compared the current reporting of allegiance versus the reporting of any other potential factors that influence a researcher’s actions and the reporting of results in the conducted studies, such as COIs and funding sources.

In conclusion, we found that the vast majority of meta-analyses and primary RCTs of psychotherapeutic treatments published in high-impact journals failed to report RA. Since allegiance exists in psychotherapy research as an influential factor or bias, revised guidelines might be required for the standardised reporting of this information in a more systematic manner. Indeed, the Cochrane handbook mentions that authors may consider that any potential bias related to the influence of possible bias or potential COIs could be evaluated as an optional ‘other sources of bias’ domain using the risk of bias tool. Therefore, coding as well as analysing the effect of RA in every meta-analysis may be the first step in order to clarify the extent of the role of allegiance on psychotherapy outcome research. We believe that a distinct statement of the role of each author’s contribution regarding the psychotherapy treatment under investigation similar to the COI statement could be a proper method of standardising the measurement of RA. Potential sources of allegiance should be thoroughly considered, and potential allegiance effects should be extensively discussed by an expert panel in order to consent on specific recommendations on reporting, as in other fields. Optimal clear reporting of any level of RA in RCTs and meta-analyses would improve the transparency of the studies and facilitate the replication of the results.

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Contributors ED and EE conceived the study and designed the protocol. ED and EE extracted the data and ran the analysis. All authors have seen and approved the submitted version of the article. EE is the guarantor.

Funding This research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Provenance and peer review Not commissioned; externally peer reviewed.

Data sharing statement No additional data are available.

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### Supplementary Tables

**Supplementary Table 1: Characteristics of Eligible Meta-analyses and Cochrane Reviews**

| STUDY ID   | Author          | Year | Journal           | Study population               | M-A Primary outcome | Diagnostic categories | Type of psychotherapy | Reference Type of included RCTS | Language of included RCTS |
|------------|-----------------|------|-------------------|-------------------------------|--------------------|-----------------------|-----------------------|--------------------------------|--------------------------|
| 22585048   | Cheng et al     | 2012 | Psychother Psychosom Clin Psychol Rev | adults                       | efficacy           | insomnia              | CCBT-I                | published                      | English                  |
| 22466510   | Richards et al  | 2012 | Clin Psychol Rev  | adults                       | efficacy and effectiveness | depression          | MIXED                 | published                      | English                  |
| 22466509   | Cuijpers et al  | 2012 | Clin Psychol Rev  | adults                       | efficacy           | depression            | NDST                  | published                      | No language restrictions |
| 22383765   | Huntley et al   | 2012 | Br J Psychiatry   | adults                       | efficacy           | depression            | MIXED                 | published                      | No language restrictions |
| 21996291   | Wampold et al   | 2011 | Clin Psychol Rev  | children and adolescents and adults | efficacy          | anxiety and depression | MIXED ESTs            | N/R                           | N/R                      |
| 22051174   | Jakobsen et al  | 2011 | Psychol Med       | adults                       | effectiveness      | depression            | MIXED                 | published                      | No language restrictions |
| 21871242   | Sprenger et al  | 2011 | Clin Psychol Rev  | children                     | efficacy and effectiveness | Chronic abdominal pain | MIXED                 | N/R                           | English or German           |
| 21802618   | Piet et al      | 2011 | Clin Psychol Rev  | adults                       | effectiveness      | depression            | Mindfulness-based cognitive therapy (MBCT) | published or accepted for publication | English |
| 21692966   | Armstrong et al | 2011 | Obes Rev          | adults                       | effectiveness      | Obesity               | MI                    | published or accepted for publication | N/R                   |

*(continued)*
| 21672297 | Coull et al. | 2011 | Psychol Med | adults | effectiveness | anxiety and depressive disorders. | Cognitive-behavioural therapy (CBT)-based guided self-help (GSH) | published and unpublished | English |
|----------|--------------|------|-------------|--------|---------------|-------------------------------|-------------------------------------------------|---------------------------|---------|
| 21382540 | Cuijpers et al. | 2011 | Clin Psychol Rev | adults | effectiveness | depression | MIXED | published | N/R |
| 21362740 | Cuijpers et al. | 2011 | Am J Psychiatry | adults and adolescents and older adults | efficacy | depression | IPT | published | No language restrictions |
| 21237544 | Hesser et al | 2011 | Clin Psychol Rev | adults | effectiveness | Tinnitus | CBT | published and unpublished | No language restrictions |
| 21130937 | Wittouck et al. | 2011 | Clin Psychol Rev | adults | efficacy and prevention | complicated grief | CBT | published between 1990 and 2007 | N/R |
| 20380784 | Grynszpan et al | 2011 | Psychol Med | adults | efficacy | schizophrenia | computer-assisted cognitive remediation | published | English |
| 20444307 | Guidi et al | 2011 | Psychol Med | adults | efficacy | depression | MIXED | published | N/R |
| 20887977 | Hakamata et al | 2010 | Biol Psychiatry | adults | effectiveness | Anxiety | Attention Bias Modification Treatment | published | English |
| 20619943 | Cuijpers et al | 2010 | Clin Psychol Rev | adults and older | self-reported and clinician-rated scales result in comparable outcomes | depression | MIXED | published | N/R |
| 20592427 | Beltman et al. | 2010 | Br J Psychiatry | adults | effectiveness | depression with somatic disease | problem-solving therapy and cognitive-behavioral therapy | Published | No language restrictions |
| Study ID   | Authors          | Year | Journal/Source                  | Participants | Effectiveness               | Outcome                              | Type         | Status                      | Language Restrictions |
|-----------|------------------|------|---------------------------------|--------------|-----------------------------|--------------------------------------|-------------|-----------------------------|----------------------|
| 20579335  | Cape et al.      | 2010 | BMC Med                         | adults       | effectiveness               | anxiety and depression                | MIXED       | published                  | English              |
| 20547435  | Tolin            | 2010 | Clin Psychol Rev                | child and adolescent and adult adolescents and adults | effectiveness | various mental disorders      | CBT         | published                  | English              |
| 20546985  | Powers et al.    | 2010 | Clin Psychol Rev                | adults       | efficacy                    | PTSD                                  | PE          | published                  | N/R                  |
| 20406528  | Cuijpers et al.  | 2010 | Psyclol Med                     | adults       | effectiveness               | anxiety and depression                | MIXED       | published                  | No language restrictions |
| 19910118  | Palermo et al.   | 2010 | Pain                            | child and adolescent and adult adults | effectiveness | chronic pain                  | MIXED       | published (or electronically pre-published) | English              |
| 19852904  | Szentagotai & David Cuijpers et al | 2010 | J Clin Psychiatry Rev          | adults       | effectiveness               | bipolar disorder                      | CBT         | published                  | English              |
| 19781837  | Cuijpers et al.  | 2010 | Psychol Med                     | adults       | association between study quality and outcome | chronic major depression and dysthymia depression | MIXED       | published                  | No language restrictions |
| 19490745  | Cuijpers et al.  | 2010 | Psychol Med                     | adults       | effectiveness               | schizophrenia, major depression and bipolar disorder early psychosis | CBT         | published                  | No language restrictions |
| 19476688  | Lynch et al.     | 2010 | Psychol Med                     | adults       | effectiveness               | schizophrenia, major depression and bipolar disorder early psychosis | MIXED       | published                  | No language restrictions |
| 21037211  | Bird             | 2010 | Br J Psychiatry                 | adults       | effectiveness               | schizophrenia, major depression and bipolar disorder early psychosis | MIXED       | published                  | English or English abstracts |

"(continued)"
| PMID      | Author(s)          | Year | Journal/Source                  | Population | Type             | Diagnosis/Outcome                                  | Methodology  | Status               | Language  |
|-----------|--------------------|------|---------------------------------|------------|------------------|---------------------------------------------------|--------------|----------------------|-----------|
| 21119148  | Dubicka et al.     | 2010 | Br J Psychiatry Psychoterror Psychosom | adolescents | effectiveness | depression                                       | CBT          | published            | English   |
| 20185970  | Hartmann et al.    | 2010 | BMC Med                         | adults     | effectiveness   | families with chronic physical diseases depression, anxiety or psychological distress. | MIXED        | published and unpublished | N/R       |
| 20015347  | Donker et al.      | 2009 | BMC Med                         | adults and older | effectiveness | passive psychoeducation                           | published    | English               | N/R       |
| 19818243  | Cuijpers et al.    | 2009 | J Clin Psychiatry               | adults and older | effectiveness | depressive disorders                              | MIXED        | published            | N/R       |
| 19624386  | Lam et al.         | 2009 | Bipolar Disord                  | adults     | Prevention or relapse efficacy and prevention | depression “Coping with Depression” course (CWD) | MIXED        | published            | N/R       |
| 19450912  | Cuijpers et al.    | 2009 | Clin Psychol Rev                | adolescents or adults older | efficacy   | coronary heart disease PTSD                        | MIXED        | published and unpublished | N/R       |
| 19258485  | Welton et al.      | 2009 | Am J Epidemiol                  | adults     | effectiveness and prevention | PTSD                  | MIXED        | published            | N/R       |
| 19188285  | Roberts et al.     | 2009 | Am J Psychiatry                 | adults     | effectiveness and prevention | various mental disorders smoking cessation Irritable bowel syndrome (IBS) | ACT          | published            | English   |
| 19142046  | Powers et al.      | 2009 | Psychother Psychosom            | adults     | efficacy        | various mental disorders smoking cessation Irritable bowel syndrome (IBS) | MIXED        | published            | English   |
| 19109354  | Mottillo et al.    | 2009 | Eur Heart J                     | adults     | efficacy        | premenstrual syndrome social anxiety disorder     | MIXED        | published            | N/R       |
| 19001059  | Ford et al.        | 2009 | Gut                             | adults     | efficacy        | premenstrual syndrome social anxiety disorder     | MIXED        | published            | No language restrictions |
| 18852497  | Busse et al.       | 2009 | Psychother Psychosom            | adults     | efficacy        | premenstrual syndrome social anxiety disorder     | MIXED        | published            | No language restrictions |
| 18507874  | Acarturk et al.    | 2009 | Psychother Psychosom            | adults     | effectiveness   | premenstrual syndrome social anxiety disorder     | MIXED        | published            | No language restrictions |

"(continued)"
| Study ID   | Authors                  | Year | Journal                          | Population | Focus                      | Treatment | Publication Status | Language Restrictions |
|-----------|--------------------------|------|----------------------------------|-------------|-----------------------------|-----------|--------------------|----------------------|
| 18466666  | Smits & Hofmann          | 2009 | Psychol Med                      | adults      | effectiveness              | anxiety disorders | CBT                  | published            |
| 18945396  | Cuijpers et al           | 2008 | J Clin Psychiatry                | adults      | effectiveness              | depressive disorders | MIXED                | published            |
| 18765483  | Cuijpers et al           | 2008 | Am J Psychiatry                  | adolescents or adults and older adults | Prevention | depressive disorders | MIXED                | published            |
| 18525264  | Darbes et al             | 2008 | AIDS                             | adolescents or adults | efficacy and prevention | efficacy | HIV Risk behaviours specific phobia | MIXED | published and unpublished | N/R |
| 18410984  | Wolitzky-Taylor et al    | 2008 | Clin Psychol Rev.                | adults      | efficacy                  | alcohol and drug use disorders | BCT | published | English |
| 18374464  | Powers et al             | 2008 | Clin Psychol Rev.                | adults      | efficacy                  | anxiety disorders | CBT | published | No language restrictions |
| 18363421  | Hofmann & Smits          | 2008 | J Clin Psychiatry                | adults      | efficacy                  | substance use disorders | CBT | published | No language restrictions |
| 18198270  | Dutra et al              | 2008 | Am J Psychiatry                  | adults      | efficacy                  | substance use disorders | contingency management and CBT | MIXED | published | English |
| 18068284  | Van der Oord et al       | 2008 | Clin Psychol Rev.                | children    | efficacy                  | ADHD      | MIXED | published | English |
| 18060672  | Malouff et al            | 2008 | Clin Psychol Rev.                | adults      | efficacy                  | Chronic fatigue syndrome (CFS) | CBT | published and unpublished | N/R |

“(continued)”
| Study ID | Authors | Year | Journal | Sample | Type | Design | Language Restrictions | Status | Language |
|----------|---------|------|---------|--------|------|--------|----------------------|--------|----------|
| 18055080 | Benish et al | 2008 | Clin Psychol Rev Psychol Med | adults | efficacy | PTSD | MIXED | published | N/R |
| 17903337 | Ekers et al | 2008 | J Am Acad Child Adolesc Psychiatry | adolescents and adults | effectiveness | depression | Behavioral therapy | published and unpublished | No language restrictions |
| 18056233 | McGurk et al | 2007 | Am J Psychiatry | adults | effectiveness | Schizophrenia | Cognitive remediation | published | English |
| 18049290 | Klein et al | 2007 | J Am Acad Child Adolesc Psychiatry Eur Heart J | adolescents | effectiveness | depression | CBT | published | No language restrictions |
| 17984133 | Linden et al | 2007 | Am J Psychiatry | adults and older | effectiveness | mortality | MIXED | published | No language restrictions |
| 20887977 | Bisson et al | 2007 | Br J Psychiatry | adults | efficacy | PTSD | MIXED | published and unpublished | English |
| 17197651 | Crawford et al | 2007 | Br J Psychiatry | adolescents and adults | efficacy | suicide | MIXED | published and unpublished | N/R |
| 17184887 | Cuijpers et al | 2007 | Clin Psychol Rev Psychother Psychosom Psychol Med | adults | efficacy | depression | activity scheduling | published | No language restrictions |
| 1710560 | In-Albon & Schneider Spek et al | 2007 | Clin Psychol Rev Psychother Psychosom Psychol Med | children | efficacy | anxiety disorders (excl PTSD) depression and anxiety | CBT | published | English or German |
| 17112400 | Spek et al | 2007 | Clin Psychol Rev Psychother Psychosom Psychol Med | adults | effectiveness | internet based CBT | published and unpublished | No language restrictions |
| 16480801 | Malouff et al | 2007 | Clin Psychol Rev Psychother Psychosom Psychol Med | children and adolescents and adults | efficacy | mental and physical problems | problem-solving therapy | published | N/R |
| 17032068 | Weisz et al | 2006 | Am Psychol | children and adolescents | efficacy | various youth problems type 1 diabetes | MIXED | published and unpublished | English |
| 16803942 | Winkley et al | 2006 | BMJ | children and adolescents | effectiveness | type 1 diabetes | MIXED | published and unpublished | N/R |

*(continued)*
| Study ID   | Authors            | Year | Journal/Source | Participants | Study Type | Intervention(s)                                                                 | Outcome(s)                                      | Status | Language Restrictions |
|-----------|--------------------|------|----------------|--------------|------------|--------------------------------------------------------------------------------|------------------------------------------------|--------|------------------------|
| 16740177  | Seidler & Wagner   | 2006 | Psych Med, Br J Psychiatry | adults       | efficacy   | PTSD                                                                             | EMDR and CBT                                    | published | N/R                   |
| 16582055  | Furukawa et al     | 2006 | Br J Psychiatry | adults       | efficacy and harm | panic disorder with or without agoraphobia | behavioural or cognitive–behavioural therapies | published | No language restrictions |
| 16435960  | Weisz et al        | 2006 | Psych Bull BMJ | children and adolescents (only women) | efficacy | depression                                                                        | MIXED                                         | published | N/R                   |
| 15994688  | Dennis             | 2005 | BMJ            | prevention   |           | postnatal depression                                                             | MIXED                                         | published | N/R                   |
| 15677582  | Bradley et al      | 2005 | Am J Psychiatry | adults       | effectiveness | PTSD                                                                             | MIXED                                         | published | English               |
| 15583112  | Leichsenring et al | 2004 | Arch Gen Psychiatry | adults       | efficacy | Specific psychiatric disorders                                                   | STTP                                          | published and unpublished | No language restrictions |
| 15541065  | Scott & Gutierrez  | 2004 | Bipolar Disord | adults       | effectiveness | bipolar disorder                                                                | MIXED                                         | published | N/R                   |
| 15533282  | Eddy et al         | 2004 | Clin Psychol Rev | adults       | efficacy | OCD                                                                              | MIXED                                         | published | English               |
| 15237083  | Pampallona et al   | 2004 | Arch Gen Psychiatry | N/R          | efficacy | depression                                                                        | MIXED                                         | published | N/R                   |
| 15145632  | Ismail et al       | 2004 | Lancet         | adults       | effectiveness | type 2 diabetes                                                                  | MIXED                                         | published and unpublished | No language restrictions |
| 12237193  | Eccleston et al    | 2002 | Pain           | children and adolescents | effectiveness | Chronic pain                                                                     | MIXED                                         | published | N/R                   |
| 12171373  | Pilling et al      | 2002 | Psychol Med    | adults       | efficacy or relapse                                                                | schizophrenia                                  | Social skills training and cognitive remediation | published | N/R                   |

"(continued)"
| Reference | Authors | Year | Journal | Topic | Intervention Type | Language | Language | Status |
|-----------|---------|------|---------|-------|-------------------|----------|----------|--------|
| 12171372  | Pilling et al | 2002 | Psychol Med | adults | efficacy or relapse | schizophrenia | MIXED | published |
| 12115160  | Astin et al | 2002 | Arthritis Rheum Psychol Med | adults | efficacy | rheumatoid arthritis | MIXED | published |
| 11513833  | Townsend et al | 2001 | Psychol Med | children and adolescents and adults and older adults and older | efficacy | deliberate self-harm (DSH) | N/R | published |
| 11288607  | Leichsenring | 2001 | Clin Psychol Rev Pain | adults and older | efficacy | depression | STPP and CBT-BT | published |
| 10204712  | Morley et al | 1999 | Pain | adults | effectiveness | Chronic pain | CBT-BT | published |
| 9703526   | Hawton et al | 1998 | BMJ | adolescents and adults | efficacy | deliberate self-harm (DSH) depression | MIXED | published |
| 9596592   | Harrington et al | 1998 | BMJ | children and adolescents | efficacy | depression | CBT | published |
| 8615707   | Linden et al | 1996 | Arch Intern Med Psychol Med | adults | effectiveness | coronary artery disease | MIXED | published |
| 7991739   | Mari & Streiner | 1994 | Psychol Med | adolescents and adult adults (only men) | efficacy and effectiveness | schizophrenia | Family interventions | published |
| CD007507  | Dennis et al | 2012 | Cochrane Database Syst Rev. | children and adolescents | effectiveness | Sexual offending | MIXED | published and unpublished |
| CD003968  | Eccleston et al | 2012 | Cochrane Database Syst Rev. | adults | effectiveness | Chronic pain | CBT/BT | published |
| CD007407  | Williams et al | 2012 | Cochrane Database Syst Rev. | adults | effectiveness | chronic pain (excluding headache) | CBT/BT | published |

"(continued)"
| CD008381 | Baumeister et al | 2012 | Cochrane Database Syst Rev. | adults | effectiveness | diabetes and depression | MIXED | published and unpublished | No language restrictions |
| CD005652 | Stoffers et al | 2012 | Cochrane Database Syst Rev. | adults | effectiveness | borderline personality disorder depression disorder in children and adolescents | MIXED | published | No language restrictions |
| CD008324 | Cox et al | 2012 | Cochrane Database Syst Rev. | children and adolescents | effectiveness | | MIXED | published | No language restrictions |
| CD008679 | Murphy et al | 2012 | Cochrane Database Syst Rev. | adults (only women) | effectiveness | women after a miscarriage counselling | | published and unpublished | No language restrictions |
| CD004101 | Kisely et al | 2012 | Cochrane Database Syst Rev. | adults | effectiveness | non-specific chest pain in patients with normal coronary anatomy | MIXED | published | No language restrictions |
| CD009660 | Eccleston et al | 2012 | Cochrane Database Syst Rev. | adults (parents) | effectiveness | parents of children and adolescents with a chronic illness | MIXED | published | No language restrictions |
| CD008511 | Reichow et al | 2012 | Cochrane Database Syst Rev. | children and adolescents | effectiveness | autism spectrum disorders social skills groups | | published | No language restrictions |
| CD009514 | Smith et al | 2011 | Cochrane Database Syst Rev. | adults (only women) | effectiveness | pain management in labour Relaxation techniques | | published | No language restrictions |
| CD008223 | Storebø et al | 2011 | Cochrane Database Syst Rev. | children and adolescents (5-18) any age | efficacy | Attention Deficit Hyperactivity Disorder (ADHD) CBT | | published | English |
| CD004025 | Mössler et al | 2011 | Cochrane Database Syst Rev. | | | | | published and unpublished | No language restrictions |"(continued)" |
| CD007559 | Marc et al | 2011 | Cochrane Database Syst Rev. | any age (only pregant women) adults | effectiveness | Anxiety during pregnancy | MIXED | published and unpublished | No language restrictions |
| CD008012 | Baumeister et al | 2011 | Cochrane Database Syst Rev. | children and adolescents | efficacy and effectiveness | CAD patients with comorbid depression Depression | MIXED | published | No language restrictions |
| CD003380 | Merry et al | 2011 | Cochrane Database Syst Rev. | adults | prevention | coronary heart disease (CHD) | MIXED | published and unpublished | No language restrictions |
| CD002902 | Whalley et al | 2011 | Cochrane Database Syst Rev. | adults | effectiveness | tinnitus | CBT | published | English |
| CD005233 | Martinez-Devesa et al | 2010 | Cochrane Database Syst Rev. | adults | effectiveness | chronic low-back pain (CLBP) | CBT/BT | published | English |
| CD002014 | Henschke et al | 2010 | Cochrane Database Syst Rev. | adults | effectiveness | Antisocial personality disorder (AsPD) acute traumatic stress symptoms | MIXED | published | English |
| CD007668 | Gibbon et al | 2010 | Cochrane Database Syst Rev. | adults | effectiveness and adverse events effectiveness | smoking cessation | Motivational interviewing (MI) | published | English |
| CD006936 | Lai et al | 2010 | Cochrane Database Syst Rev. | adults | efficacy | smoking cessation | Motivational interviewing (MI) | published | English |
| CD004780 | Fisher et al | 2010 | Cochrane Database Syst Rev. | any age | efficacy | anorexia nervosa (AN) | family therapy | published and unpublished | No language restrictions |

"(continued)"
| CD005537 | Akechi et al 2010 | Cochrane Database Syst Rev | adults | efficacy | cancer depression | MIXED | published | English |
| CD001008 | Barnes et al 2010 | Cochrane Database Syst Rev | adults | efficacy | smoking cessation | hypnotherapy | published | English |
| CD000562 | Hay et al 2009 | Cochrane Database Syst Rev | adults | efficacy | bulimia nervosa and binging | MIXED | published | English |
| CD006869 | Roberts et al 2009 | Cochrane Database Syst Rev | adults | efficacy and prevention | post traumatic stress disorder (PTSD) | mixed | published | No language restrictions |
| CD005335 | Watanabe et al 2009 | Cochrane Database Syst Rev | any age | efficacy | panic disorder | CBT/BT | published | English |
| CD005332 | Ipser et al 2009 | Cochrane Database Syst Rev | any age | efficacy | Body dysmorphic disorder (BDD) | CBT/BT | published | English |
| CD005031 | Amato et al 2008 | Cochrane Database Syst Rev | adults | effectiveness | opioid detoxification | MIXED | published | English |
| CD003437 | Hackett et al 2008 | Cochrane Database Syst Rev | adults | effectiveness | Stroke depression | MIXED | published | English |
| CD004253 | Edwards et al 2008 | Cochrane Database Syst Rev | adults (only women) | efficacy | metastatic breast cancer | MIXED | published | English |
| CD004853 | Wilson et al 2008 | Cochrane Database Syst Rev | older adults | efficacy | Depression | MIXED | published | English |
| CD001027 | Price et al 2008 | Cochrane Database Syst Rev | adults | effectiveness | Chronic fatigue syndrome | CBT | published and unpublished | No language restrictions |
| CD004935 | Dickinson et al 2008 | Cochrane Database | adults | efficacy | hypertension | CBT | published and unpublished | English |

*(continued)*
| CD001088 | Cleary et al | 2008 | Cochrane Database Syst Rev. | adults | efficacy | severe mental illness and substance misuse | MIXED | published and unpublished | English |
| CD006520 | Thomson & Page | 2007 | Cochrane Database Syst Rev. | adults | effectiveness | Hypochondriasis | MIXED | published | English |
| CD006037 | Terplan & Lui | 2007 | Cochrane Database Syst Rev. | adults (only women) | effectiveness | Illicit drug use in pregnancy | contingency management and MI supportive therapy | published | English |
| CD004716 | Buckley et al | 2007 | Cochrane Database Syst Rev. | adults | efficacy | schizophrenia | MIXED | published | English |
| CD003388 | Bisson & Andrew | 2007 | Cochrane Database Syst Rev. | adults | effectiveness | PTSD | MIXED | published | English |
| CD003023 | Knapp et al | 2007 | Cochrane Database Syst Rev. | adults | efficacy | psychostimulant use disorder | MIXED | published | English |
| CD002248 | Proctor et al | 2007 | Cochrane Database Syst Rev. | women of reproductive age | effectiveness | dysmenorrhoea | BT | published | English |
| CD005333 | Gava et al | 2007 | Cochrane Database Syst Rev. | adults | effectiveness | Obsessive compulsive disorder | MIXED | published | English |
| CD006346 | He & Li | 2007 | Cochrane Database Syst Rev. | adults | effectiveness | schizophrenia | morita therapy | published | No language restrictions |
| CD005378 | Ruddy & Dent-Brown | 2007 | Cochrane Database Syst Rev. | adults | effectiveness | schizophrenia | drama therapy | published | No language restrictions |
| CD004364 | Furukawa et al "(continued)" | 2007 | Cochrane Database Syst Rev. | adults | effectiveness and adverse | Panic disorder +/- agoraphobia | CBT/BT | published and unpublished | No language |
| CD005179  | Uman et al  | 2006 | Syst Rev. Cochrane Database (Syst Rev.) | Children and adolescents | Events | Needle-related pain and distress | CBT | Published and unpublished |
|----------|------------|------|----------------------------------------|--------------------------|--------|-------------------------------|-----|---------------------------|
| CD004687 | Abbass et al | 2006 | Syst Rev. Cochrane Database (Syst Rev.) | Adults | Efficacy | Common mental disorders | STPP | Published and unpublished |
| CD004431 | Thomas et al | 2006 | Syst Rev. Cochrane Database (Syst Rev.) | Young adults | Effectiveness | Multiple sclerosis | MIXED | Published | English |
| CD002982 | Yorke et al | 2006 | Syst Rev. Cochrane Database (Syst Rev.) | Adults | Effectiveness | Asthma | MIXED | Published | No language restrictions |
| CD004797 | Littell et al | 2005 | Syst Rev. Cochrane Database (Syst Rev.) | Youth age 10-17 | Efficacy and adverse events | Social, emotional, and/or behavioral problems | Multisystemic Therapy (MST) | Published and unpublished | English |
| CD004690 | James et al | 2005 | Syst Rev. Cochrane Database (Syst Rev.) | Children and adolescents | Efficacy | Anxiety disorders | CBT | Published | English |
| CD003272 | Yorke et al | 2005 | Syst Rev. Cochrane Database (Syst Rev.) | Children | Efficacy and effectiveness | Asthma | BT | Published | English |
| CD001107 | Stead & Lancaster | 2005 | Syst Rev. Cochrane Database (Syst Rev.) | Any age | Efficacy | Smoking cessation | MIXED | Published and unpublished | No language restrictions |
| CD004717 | Crawford-Walker et al | 2005 | Syst Rev. Cochrane Database (Syst Rev.) | Any age | Effectiveness and adverse events | Schizophrenia | Distraction techniques | Published | English |
| CD001134 | Dennis & Creedy | 2004 | Syst Rev. Cochrane Database (Syst Rev.) | Adults (only women) | Prevention | Postpartum depression | MIXED | Published and unpublished | English |

"(continued)"
| CD000524 | Jones et al | 2004 | Cochrane Database Syst Rev. | any age | effectiveness | schizophrenia | CBT | published | English |
|----------|-------------|------|-----------------------------|--------|---------------|---------------|-----|-----------|---------|
| CD003161 | Montgomery & Dennis | 2003 | Cochrane Database Syst Rev. | older adults | efficacy | sleep problems | CBT | published | English |
| CD002891 | Pratt & Woolfenden | 2002 | Cochrane Database Syst Rev. | children and adolescents | efficacy and prevention | eating disorders | MIXED | published and unpublished | English |
| CD003385 | Bacaltchuk et al | 2001 | Cochrane Database Syst Rev. | any age | effectiveness | bulimia nervosa | MIXED | published and unpublished | English |
**Supplementary Table 2.**
Description of total meta-analyses with conflict of interest statements about allegiances of the meta-analysis authors

| Cochrane ID  | Author                  | Year  | Treatment of interest | Age Group | Clinical Population                      | Reporting Allegiance | Reporting Allegiance in COIs | Description of Statement                                      |
|--------------|-------------------------|-------|-----------------------|-----------|------------------------------------------|----------------------|-------------------------------|--------------------------------------------------------------|
| CD005652     | Stoffers et al          | 2012  | Mixed                 | Adults    | Borderline personality disorder         | Yes                  | Yes                           | Advocated the therapy (CBT)                                  |
| CD009514     | Smith et al             | 2011  | Relaxation techniques | Adults    | Pain management                          | No                   | Yes                           | Advocated the therapy                                        |
| CD004025     | Mössler et al           | 2011  | Music therapy         | Any age   | Schizophrenia                            | No                   | Yes                           | Conducted an included allegiant study                        |
| CD002902     | Whalley et al           | 2011  | Mixed                 | Adults    | Coronary heart disease (CHD)             | No                   | Yes                           | Conducted an included allegiant study                        |
| CD002014     | Henschke et al          | 2010  | CBT/BT                | Adults    | Chronic low-back pain (CLBP)             | No                   | Yes                           | Conducted an included allegiant study                        |
| CD007668     | Gibbon et al            | 2010  | Mixed                 | Adults    | Antisocial personality disorder (AsPD)  | Yes                  | Yes                           | Conducted an included allegiant study                        |
| CD007944     | Roberts et al           | 2010  | Mixed                 | Any age   | Acute traumatic stress symptoms         | No                   | Yes                           | Conducted an included allegiant study                        |
| CD005378     | Ruddy & Dent-Brown      | 2007  | Drama therapy         | Adults    | Schizophrenia                            | No                   | Yes                           | Chair of the research sub-committee of the British association of drama therapists |
| CD004687 | Abbass et al | 2006  | STPP  | Adults | Common mental disorders | No    | Yes  | Advocated and conducted an included allegiant study |
|----------|--------------|-------|-------|--------|-------------------------|-------|------|---------------------------------------------------|
| CD004717 | Crawford-Walker et al | 2005 | Distraction Techniques | Any age | Schizophrenia | No    | Yes  | Expectations of evidence favors to the treatment |
| CD001134 | Dennis & Creedy | 2004  | Mixed | Adults (only women) | Postpartum depression | No    | Yes  | Conducted an included allegiant study |
| CD000524 | Jones et al | 2004  | CBT   | Any age | Schizophrenia | No    | Yes  | Advocated the therapy |

Notes: CBT/BT= Cognitive Behavioural Therapy/ Behavioural Therapy, STPP=Sort Term Psychodynamic Psychotherapy
## Supplementary Table 3
Evidence of Allegiance and Reporting of Allegiance in Specialty Psychiatric- Psychological Journals of Included Randomised Controlled Trials in Published Meta-analyses

| Specialty Psychiatric-Psychological Journals (Publication date range of included) | No of included Randomised Controlled Trials (RCTs) reviewed | No of included RCTs overlapping | No of allegiance RCTs | No of authors that developed a form of therapy | Allegiant included RCTs authors reporting allegiance | Controlling for allegiance | Reporting of funding sources | Declaration of interest statement |
|---|---|---|---|---|---|---|---|---|
| Am J Psychiatry (1973-2010) | 160/168 | 37/160 | 89/123 | 49/622 | 4/89 | 0/89 | 97/123 | 17/123 |
| Am Psychol (1973-2004) | 27/32 | 1/27 | 24/26 | 21/90 | 0/24 | 0/24 | 20/26 | 25/26 |
| Arch Gen Psychiatry (1975-2004) | 27/33 | 19/27 | 6/8 | 5/39 | 0/6 | 0/6 | 5/8 | 1/8 |
| Biol Psychiatry (2002-2010) | 10/10 | 0/10 | 9/10 | 2/36 | 0/9 | 0/9 | 4/10 | 1/10 |
| Bipolar Disord (1984-2006) | 15/18 | 9/15 | 6/6 | 3/34 | 0/6 | 0/6 | 5/6 | 1/6 |
| Br J Psychiatry (1978-2010) | 124/141 | 28/124 | 61/96 | 31/591 | 2/61 | 0/61 | 72/96 | 18/96 |
| Clin Psychol Rev (1967-2011) | 383/416 | 57/383 | 239/326 | 172/1569 | 11/239 | 1/239 | 204/326 | 55/326 |
| J Am Acad Child Adolesc Psychiatry (1986-2007) | 11/11 | 6/11 | 5/5 | 4/30 | 0/5 | 0/5 | 5/5 | 1/5 |
| J Clin Psychiatry (1977-2008) | 81/94 | 48/81 | 23/33 | 19/236 | 4/23 | 0/23 | 26/33 | 12/33 |
| Psychol Bull (1980-2004) | 25/35 | 13/25 | 8/12 | 4/49 | 0/8 | 0/8 | 6/12 | 1/12 |
| Psychol Med (1968-2009) | 206/235 | 71/206 | 95/135 | 56/706 | 3/95 | 0/95 | 90/135 | 20/135 |

*(continued)*
|                         | 92/109 | 0/92 | 57/92 | 40/427 | 3/57 | 0/57 | 52/92 | 4/92 |
|-------------------------|--------|------|-------|--------|------|------|-------|------|
| **Psychother Psychosom**|        |      |       |        |      |      |       |      |
| (1979-2011)             |        |      |       |        |      |      |       |      |
| **Total**               |        |      |       |        |      |      |       |      |
| (1994-2012)             | 1161/1302 | 289/1161 | 627/872 | 406/4429 | 25/627 | 1/627 | 586/872 | 155/872 |
Supplementary Table 4
Evidence of Allegiance and Reporting of Allegiance in General Medicine Journals of Included Randomised Controlled Trials in Published Meta-analyses

| General or Medicine Journals (Publication date range of included studies) | No of included Randomised Controlled Trials (RCTs) reviewed | No of included RCTs overlapping | No of allegiance RCTs | No of authors that developed a form of therapy | Allegiant included RCTs authors reporting allegiance | Controlling for allegiance | Reporting of funding sources | Declaration of interest statement |
|---|---|---|---|---|---|---|---|---|
| AIDS (1991-2005) | 28/38 | 0/28 | 15/28 | 14/161 | 0/15 | 0/15 | 23/28 | 1/28 |
| Am J Epidemiol (1979-2006) | 50/51 | 2/50 | 27/48 | 18/326 | 0/27 | 0/27 | 37/48 | 6/48 |
| Arch Intern Med (1968-1995) | 20/23 | 8/20 | 3/12 | 3/44 | 0/3 | 0/3 | 6/12 | 0/12 |
| Arthritis Rheum (1977-2001) | 22/25 | 4/22 | 7/18 | 4/99 | 0/7 | 0/7 | 15/18 | 2/18 |
| BMC Med (1982-2008) | 36/39 | 6/36 | 21/30 | 18/136 | 0/21 | 0/21 | 18/30 | 3/30 |
| BMJ (1973-2005) | 45/57 | 11/45 | 21/34 | 18/161 | 0/21 | 0/21 | 25/34 | 4/34 |
| Eur Heart J (1974-2009) | 67/73 | 9/67 | 27/58 | 23/296 | 0/27 | 0/27 | 39/58 | 6/58 |
| Gut (1987-2007) | 19/19 | 0/19 | 9/19 | 8/100 | 0/9 | 0/9 | 7/19 | 2/19 |
| Lancet (1983-2004) | 21/25 | 1/21 | 8/20 | 6/95 | 0/8 | 0/8 | 18/20 | 1/20 |
| Obes Rev (1995-2009) | 12/12 | 0/12 | 7/12 | 6/70 | 0/7 | 0/7 | 9/12 | 1/12 |
| Pain (1982-2007) | 67/68 | 20/67 | 21/47 | 18/190 | 0/21 | 0/21 | 27/47 | 0/47 |

*(continued)*
|                  | 387/430 | 61/387 | 166/326 | 154/1678 | 0/166 | 0/166 | 224/326 | 26/326 |
|------------------|---------|--------|---------|----------|-------|-------|---------|--------|
| Total (1996-2012)|         |        |         |          |       |       |         |        |
| SUMTOTAL (N=1198)| 1548/1732 (89.4%) | 350/1548 (22.6%) | 793/1198 (66.3%) | 560/6107 (9.2%) | 25/793 (3.2%) | 1/793 (0.2%) | 810/1198 (67.6%) | 181/1198 (15.1%) |
Supplementary Figure 1
Flow diagram of initial records to final eligible meta-analyses.

**Pubmed and PsycINFO meta-analyses (m-a)**

(1977-2012)

- 3,041 search results
- 2,200 excluded by title and abstract
- 309 after duplicates removed
- 532 search results of m-a on psychological treatments
- 427 reviews excluded after full text assessment
  - 427 journal impact factor < 5
- 105 potentially eligible reviews

**Cochrane Reviews**

(December 2012)

- 306 search results
- 63 excluded by title and abstract
- 243 search results of reviews on psychological treatments
- 129 reviews excluded after full text assessment
  - 104 not only randomized controlled trials (RCTs)
  - 21 protocol stage
  - 4 withdrawn
- 114 potentially eligible reviews

- 19 reviews excluded after the selection of m-a
  - 18 not only RCTs
  - 1 letter to the editor
- 86 eligible reviews

- 54 reviews excluded after the selection of m-a
  - 18 no synthesis of data
  - 6 non allegiance
  - 30 updates
- 60 eligible reviews

146 eligible reviews
(2,727 included RCTs)
Supplementary Figure 2

Selection of reviewed included randomized controlled trials (RCTs) in meta-analyses.

- 2727 Total included RCTs
- 1345 excluded due to appeared in more than one meta-analysis
- 1382 included RCTs reviewed
- 184 excluded for reasons:
  - 18 non-English
  - 46 dissertation/abstract
  - 83 not possible retrieve full-text
  - 37 no psychotherapy
- 1198 final sample of included RCTs