

## RESEARCH ARTICLE

# Associations between socioeconomic status and psychological therapy outcomes: A systematic review and meta-analysis

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**Background:** Socioeconomic deprivation is associated with higher prevalence of mental health problems; however, the influence of socioeconomic status (SES) on psychological therapy outcomes is as yet unclear.

**Aim:** To review published evidence on the association between indicators of SES (income, education, employment, neighborhood deprivation, social position) and the outcomes of psychological interventions for depression and anxiety.

**Methods:** Systematic review and meta-analysis of outcomes research studies published in the last 10 years.

**Results:** Seventeen studies including 165,574 patients measured at least one indicator of SES and its relationship with psychological therapy outcomes. Twelve of these studies found significant relationships between SES measures and mental health outcomes. Six studies focusing on employment status offered sufficient quantitative information to conduct meta-analysis. The overall effect of employment was not significant ( $-0.66$ , confidence of interval (CI)  $-1.33, 0.02$ ). A sensitivity analysis ( $k = 5$ ) showed a small effect ( $-0.22$ , CI  $-0.36, -0.09$ ) of employment on treatment outcomes.

**Conclusions:** There is some evidence to indicate that socioeconomic deprivation is associated with poorer treatment outcomes, although limitations of the available data warrant treating this as a preliminary conclusion.

## KEYWORDS

anxiety, clinical trials, depression, employment status, patient-reported outcome measures, primary care, socioeconomic status, treatment

## 1 | INTRODUCTION

Socioeconomic status (SES) refers to an individual's level of resource or prestige in relation to others and is traditionally measured via factors such as wealth (e.g., income), place on a social hierarchy (e.g., class system), and level of education or occupation. SES may be assessed at the individual or area level (e.g., neighborhood; Adler & Snibbe, 2003). For the purposes of this review, low SES can be understood as indicative of material or social deprivation. Inequalities in SES are known to be associated with a variety of social and health problems (Wilkinson & Pickett 2007). Several reviews have also indicated that SES is associated with psychiatric morbidity. For example, Fryers, Melzer, and Jenkins (2003) demonstrated that the prevalence of anxiety and depression problems is higher in socially disadvantaged populations. Wilkinson and Pickett (2007) reported a strong correlation between inequality of

income and mental illness rates across developed countries worldwide. A more recent review by Silva, Loureiro, and Cardoso (2016) again suggests that lower SES is associated with higher prevalence of common mental health problems. Although it is generally accepted that SES is associated with psychiatric morbidity, it is less clear if SES influences the extent to which people benefit from psychological treatment for mental health problems. Some studies in recent years have indicated that patients living in highly deprived areas have a lower probability of accessing psychological treatment (e.g., Saxon et al., 2007), and when they do so, they have a lower likelihood of improving (Delgadillo, Asaria, Ali, & Gilbody, 2016). In view of this emerging evidence in recent years, the current paper seeks to synthesize what is known about the association between measures of SES and psychological therapy outcomes for people with depression and anxiety-related problems. A further aim is to explore the strength and direction of this

**TABLE 1** Inclusion criteria

Review Question	Is Socioeconomic Status (SES) Associated With Psychological Treatment Outcomes?
Population	Adult patients over 18 years of age; who received a form of psychotherapy for a common mental health problem (unipolar depression, anxiety disorders).
Intervention	Any form of psychotherapy or psychological intervention delivered in any modality (individual, group, computerized) for the purpose of treating depression or anxiety.
Comparator	The primary analysis included a within-group comparison, assessing variability in treatment outcomes between patients grouped in different categories/levels of a relevant measure of SES.
Outcomes	Primary outcomes: standardized clinical outcome measures for anxiety, depression, and/or psychological distress. Data from these measures collected for at least two-time points. Secondary outcomes: measures of SES with variability across categories/levels. Individual- and area-level markers of SES were considered.
Setting	Any usual setting where psychological interventions are delivered to adults in any country.
Study design	Randomized controlled trials, longitudinal studies, prospective and retrospective cohort studies.

relationship. To meet these aims, we conducted a systematic review and meta-analysis of the psychological treatment outcomes literature in the last 10 years.

## 2 | METHODS

### 2.1 | Protocol and registration

The study protocol was prospectively registered in the PROSPERO database ([www.crd.york.ac.uk/PROSPERO/display\\_record.asp?ID=CRD42017057999](http://www.crd.york.ac.uk/PROSPERO/display_record.asp?ID=CRD42017057999)).

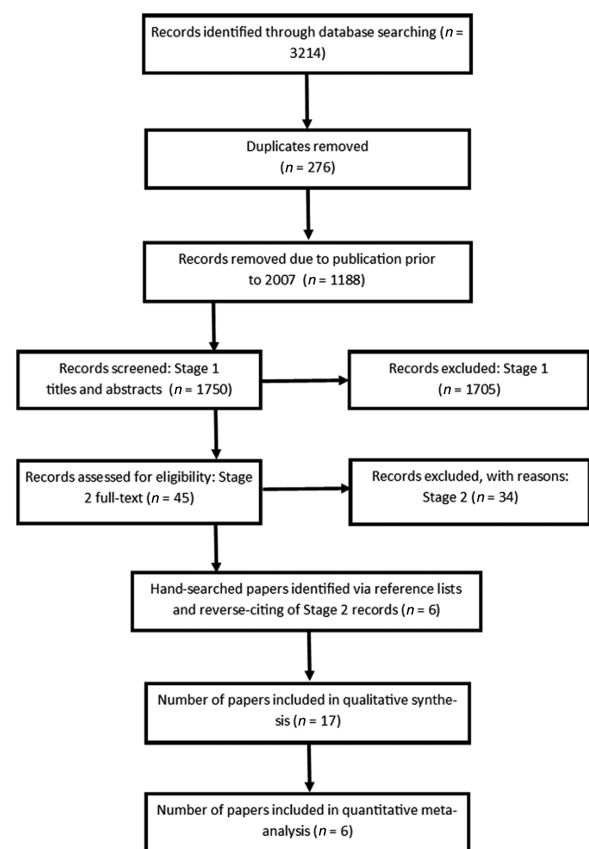
### 2.2 | Search strategy and study selection

Table 1 details the key components and inclusion criteria of the research question that guided this review.

Three databases were searched with a predetermined key-term strategy (Appendix A) on February 20, 2017: Web of Science, PsychINFO, and SCOPUS. The search was limited to published articles from the past decade of research (2007–2017), written in English or Spanish. Titles and abstracts were screened (Stage 1), followed by full-text eligibility review (Stage 2). Of the eligible papers identified, reference list searching and reverse-citing were carried out by hand to identify any further relevant papers not identified through database searching. Hand searching further identified six papers that were subjected to the same screening and selection process.

Exclusion criteria were: (a) sample included children/adolescents, (b) psychological interventions were for severe mental disorders (e.g., bipolar disorder, psychosis), (c) studies where the primary outcome measures were taken at only one time-point, (d) the socioeconomic measure did not enable comparisons (e.g., full sample identified as “low income”). A list of papers excluded at Stage 2 can be found in Appendix B with individual reasons for exclusion.

Seventeen papers were identified as eligible and assessed independently by two reviewers. Both assessors were in full agreement that the papers met the eligibility criteria for the current review, without a need to involve a third reviewer to reach consensus. Figure 1 details the full systematic study selection process.

**FIGURE 1** PRISMA flow diagram of the study selection process

### 2.3 | Quality and risk of bias assessment

Two reviewers independently assessed the quality and risk of bias in each of the included studies using a tool from the Cochrane Collaboration (Higgins, Altman & Sterne, 2011) for randomized control trials, and a relevant tool for cohort studies (adapted from National Institutes of Health, 2014). See Appendix C for quality assessment summary table.

### 2.4 | Data analysis

A narrative synthesis was conducted. A quantitative meta-analysis for each of the indices of SES was planned but, due to the variability in

measures and operationalization of SES, only a subset of six studies met the requirements to enable this. Meta-analysis was conducted using Meta-Analysis via Shiny (MAVIS; Hamilton, 2011) and Microsoft Excel. Heterogeneity was examined using Cochrane's  $Q$  and  $I^2$  statistics.

### 3 | RESULTS

#### 3.1 | Study characteristics

Seventeen papers met the criteria for inclusion and are described in Tables 2 and 3. Seven of the papers were secondary analyses of randomized controlled trials (RCTs), and 10 of the papers were cohort studies. The majority of the studies were conducted in the United Kingdom ( $n = 7$ ) and the United States ( $n = 5$ ), whereas four of the studies were conducted in other European countries and one in Australia. In terms of target condition, five of the papers solely investigated depression while three of the papers solely investigated anxiety-related problems. The majority ( $n = 9$ ) included clinical samples with a range of anxiety and depression-related problems. Study sample sizes ranged from 49 to 110,415 participants.

With regard to indicators of SES, nine studies measured level of education, nine used a measure of employment status, six used a measure of income, six linked patients' home postcodes with a neighborhood Index of Multiple Deprivation (IMD; used only in the United Kingdom), and one used a measure of social position that combines education and occupational level (Hollingshead Two-Factor Index of Social Position; ISP). Most of the studies measured more than one indicator of SES. Table 3 describes how SES variables were operationalized in each study. Several validated mental health outcome measures were used across studies, as summarized in Table 2.

All studies included in the review focused on psychological interventions for common mental health problems. Five of the studies used clinical data from cohorts of patients who were treated using a stepped-care model, where low intensity psychoeducational interventions based on cognitive behavioral therapy (CBT) principles were accessed initially, followed by formal psychological therapy (CBT, interpersonal psychotherapy, or counselling) in cases with enduring or more severe symptoms. Four studies involved various types of psychological interventions (e.g., CBT, interpersonal psychotherapy, solution-focused therapy, counselling). In these studies, information about each type of therapy was not always provided, and the different therapy types were not analyzed separately. Four studies specified one type of therapy that was applied in all cases (two used online CBT, one used group psychoeducational CBT, one used face-to-face cognitive therapy). An important point to note is that in four of the studies, psychotherapy and/or pharmacotherapy was offered to participants and data were pooled together in their analyses. For these studies, it was not possible to separate the data by intervention, therefore a proportion of participants may not have received psychotherapy and results from these studies should be treated with caution. Only one out of the 17 studies excluded cases who were concurrently using pharmacotherapy. Therefore, in general, pharmacotherapy (e.g., antidepressant use) was not controlled for in this set of studies.

### 3.2 | Results by SES indicator

#### 3.2.1 | Employment

Employment status was measured in nine of the 17 studies. Six of these studies found significant associations indicating that unemployed patients tended to have poorer treatment outcomes (Cort et al., 2012; Delgadillo, Dawson, Gilbody, & Boehnke, 2017; El Alaoui et al., 2015; Firth, Barkham, Kellett, & Saxon, 2015; Kelly, Jakubovski, & Bloch, 2015; van der Lem, Stamsnieder, van der Wee, van Veen, & Zitman, 2013). However, no significant associations were found in three studies (Delgadillo, Kellett, et al., 2016; Fournier et al., 2009; Joutsenniemi, Laaksonen, Knekt, Haaramo, & Lindfors, 2012).

It should be noted that there are some known differences in how different researchers defined employment status. For instance, El Alaoui et al. (2015) categorized retired participants as unemployed, whereas Firth et al. (2015) included retired participants within the employed category. In both papers, being employed was associated with better posttreatment outcomes, which suggests that the "retired" category did not influence results (it may simply introduce noise). Further, van der Lem et al. (2013) considered two definitions of employment status: Definition 1 classed participants as being either "in paid work" or "no paid work" at baseline, and Definition 2 additionally included those out of work at baseline but in receipt of sickness benefits. van der Lem et al. found that being employed (Definition 1) was associated with better treatment outcomes; employed patients were 1.8 times more likely to respond to treatment (50% reduction in Montgomery Asberg rating scale for depression [MADRS] score) and 1.9 times more likely to achieve remission (score < 10 on the MADRS measure). This association was not significant for the second employment status definition. The remaining papers that found significant associations did not provide specific details about the coding of the employment variable. Cort et al. (2012) found a significant association in only one of the depression measures they used, the Hamilton rating scale for depression (HRSD), with unemployed participants having less reduction in symptom severity than employed participants. In Delgadillo et al. (2017), unemployed participants had higher levels of depression and anxiety symptoms posttreatment. In Kelly et al. (2015), the likelihood of treatment response (50% reduction of brief symptom inventory-anxiety and somatization subscales [BSI-12] score, or score < 6) was significantly lower for unemployed participants.

There is some discrepancy in that three studies did not find significant associations. Delgadillo, Kellett, et al. (2016) found similar outcomes in the GAD-7 anxiety measure in patients receiving group psychoeducational CBT regardless of employment status. Fournier et al. (2009) strike a discrepancy with Cort et al. (2012) in that both studies used the same outcome measure (HRSD), but Fournier did not find any significant association with employment status. Fournier et al. (2009) did find, however, that unemployed participants benefitted more from cognitive therapy than from antidepressant use, whereas there was no difference for employed participants. Joutsenniemi et al. (2012) looked at both long- and short-term psychotherapy. They found that those in employment benefitted more from long-term therapy than students,

**TABLE 2** Characteristics of studies included in the review

First Author and Year	Study Design <sup>a</sup>	Setting	Target Condition <sup>b</sup>	Overall N	Analyzed N	SES Indicator(s)	Intervention <sup>c</sup>	Outcome Measure(s)
Button et al. (2012)	RCT	United Kingdom, 55 primary care clinics	Depression	297	210	Education	Online CBT	BDI-II
Cort et al. (2012)	RCT	United States, one community mental health center	MDD	70	70	Income <sup>g</sup> Employment <sup>g</sup>	Mixed PT	
Delgadillo, Asaria et al. (2016)	Cohort	United Kingdom, IAPT services, 211 CCG areas	Combined	110,415	110,415	IMD <sup>g</sup>	Stepped-care	PHQ-9 GAD-7
Delgadillo, Kellet, et al. (2016)	Cohort	United Kingdom, five IAPT services	Combined	4,451	4,220	IMD <sup>g</sup> Employment	Group CBT	GAD-7
Delgadillo et al. (2017)	Cohort	United Kingdom, one IAPT service	Combined	28,498	27,815	IMD <sup>g</sup> Employment <sup>g</sup>	Stepped-care	PHQ-9 GAD-7
El Alaoui et al. (2015)	Cohort	Sweden, one outpatient clinic	SAD	764	729	Education Employment <sup>g</sup>	Online CBT	LSAS-SR
Falconnier (2009)	RCT	United States, three outpatient clinics	Depression	239	225	Income <sup>g</sup> ISP <sup>g</sup> Education	Mixed PT/PhT	HRSD BDI
Firth et al. (2015)	Cohort	United Kingdom, one IAPT service	Combined	6,111	6,111	IMD Employment <sup>g</sup>	Stepped-care	PHQ-9 GAD-7
Fournier et al. (2009)	RCT	United States, two University research clinics	Depression	180	180	Income Education Employment	Mixed PT/PhT	HRSD
Green et al. (2015)	Cohort	United Kingdom, two IAPT services	Combined	7,388	4,393	IMD <sup>g</sup>	Stepped-care	GAD-7 PHQ-9
Hawley et al. (2014)	Cohort	United States, one University counselling service	Combined <sup>d</sup>	54	49	Income Education <sup>g</sup>	Mixed PT	OQ-45.2
Hoyer et al. (2016)	RCT	Germany, outpatient clinics	SAD	244	156	Education	Cognitive Therapy <sup>e</sup>	LSAS-SR
Joutsenniemi et al. (2012)	RCT	outpatient clinics	Combined	326	326	Education Employment	Mixed PT	BDI-II SCL-90-ANX SCL-90-GSI
Kelly et al. (2015)	RCT	US, 17 primary care clinics	Anxiety Disorders <sup>f</sup>	1,004	876	Income <sup>g</sup> Education Employment <sup>g</sup>	Mixed PT/PhT	BSI-12
Pirkis et al. (2011)	Cohort	Australia, GP Divisions (ATAPS)	Combined	16,700	7,747	Income <sup>g</sup> Education <sup>g</sup>	Mixed PT	K-10

(Continues)

TABLE 2 (Continued)

First Author and Year	Study Design <sup>a</sup>	Setting	Target Condition <sup>b</sup>	Overall N	Analyzed N	SES Indicator(s)	Intervention <sup>c</sup>	Outcome Measure(s)
Poots et al. (2014)	Cohort	United Kingdom, one IAPT service	Combined	6,062	1,426	IMD	Stepped-care	PHQ-9
van der Lem et al. (2013)	Cohort	Netherlands, outpatient clinics	MDD	626	626	Employment <sup>e</sup>	Mixed PT/PhT	MADRS

RCT, randomized control trial; IAPT, improving access to psychological therapies programme; ATAPS, access to allied psychological services; IMD, index of multiple deprivation; ISP, index of social position; MDD, major depressive disorder; SAD, social anxiety disorder; CBT, cognitive behavioral therapy; PT, psychotherapy; PhT, pharmacotherapy; BDI, beck depression inventory; HRSD, Hamilton rating scale for depression; PROMs, patient reported outcome measures; GAD-7, generalized anxiety disorder questionnaire; PHQ-9, patient health questionnaire; LSAS-SR, Liebowitz social anxiety scale-self-rated; OQ-45.2, outcome questionnaire; SCL-90-ANX, Symptom check list-anxiety scale; SCL-90-GSI, symptom check list-global severity index; BSI-12, brief symptom inventory-anxiety and somatization subscales; K-10, Kessler-10; MADRS, Montgomery Asberg rating scale for depression.

<sup>a</sup>RCT refers to a secondary analysis of a RCT; Cohort refers to an observational cohort study.

<sup>b</sup>Combined refers to depression and anxiety-related problems.

<sup>c</sup>Stepped-care involves evidence-based low intensity (CBT-based guided self-help) and/or high intensity (face-to-face CBT, interpersonal psychotherapy, counselling, and eye-movement desensitization and reprocessing) interventions, used in IAPT services; Mixed PT refers to interventions involving various therapies (CBT, interpersonal psychotherapy, solution-focused therapy, counselling); Mixed PT/PhT: these studies combined data from samples that received psychotherapy and/or pharmacotherapy in their analysis. For mixed PT/PhT studies, a proportion of participants may not have received psychotherapy, though it was not possible to separate out the data.

<sup>d</sup>Primarily, but not limited to, depression and anxiety-related problems.

<sup>e</sup>This was the only paper that specified excluding participants receiving concurrent pharmacotherapy treatment.

<sup>f</sup>Anxiety disorders included generalized anxiety, panic disorder, social anxiety disorder, and posttraumatic stress disorder.

<sup>g</sup>Significant association found between the stated SES indicator and treatment outcomes. All associations found in the direction of higher levels/advantageous SES status having better outcomes for common mental health problems.

who benefitted more from short-term therapy, whereas homemakers were not found to benefit from therapy at all. It is difficult to directly compare this finding to the other main findings, due to the way employment status was operationalized in this study, and the fact that it separated out findings for therapy durations.

Overall, with some exceptions, the evidence suggests a relationship between employment status and treatment outcome. To examine this further, we conducted a meta-analysis on all papers that reported the required data ( $k = 6$ ). In addition, as a sensitivity analysis, one of the six studies (El Alaoui et al., 2015) was excluded from a secondary meta-analysis. This decision was made due to uncertainty about the comparability of El Alaoui et al.'s study with the other five studies, since it looked solely at an outcome measure of social anxiety disorder, whereas the rest of the studies reported a measure of depression outcomes. Furthermore, El Alaoui et al. reported standardized beta coefficients that are unusually larger than what might be expected,<sup>1</sup> which brought into question the reliability of the data. Figure 2 shows a forest plot of the effect sizes for employed patients in each study and the overall effect size with and without the study by El Alaoui et al.

The main meta-analysis ( $k = 6$ ) was not statistically significant: overall effect size =  $-0.66$  ( $SE = 0.34$ ),  $z$  ratio =  $-1.91$ ,  $P = .0565$ , confidence intervals (CI)  $-1.33, 0.02$ . However, when the El Alaoui study is excluded from the analysis ( $k = 5$ ), the overall effect size decreases and becomes statistically significant: overall effect size =  $-0.22$  ( $SE 0.07$ ),  $z$  ratio =  $-3.36$ ,  $P = .0008$ , CI  $-0.36, -0.09$ . The sensitivity analysis indicates that unemployment is significantly associated with poorer depression outcomes, although the effect size is small.

To test for homogeneity (consistency) of findings between studies, Cochrane's  $Q$  and  $I^2$  statistics were interpreted. Cochrane's  $Q$  ( $P < .05 =$  not homogenous): main model ( $k = 6$ ):  $Q(df = 5) = 346.7785$ ,

$P < .0001$ ; secondary analysis ( $k = 5$ ):  $Q(df = 4) = 20.7951$ ,  $P = .0003$ .  $I^2$  (the percentage variability in effect estimates due to heterogeneity rather than sampling error): main model ( $k = 6$ ):  $I^2 = 99.66\%$ , secondary analysis ( $k = 5$ ):  $I^2 = 86.84\%$ .  $H^2$  values (main ( $k = 6$ ) =  $292.05$ , secondary ( $k = 5$ ) =  $7.6$ ) also show that there is unexplained heterogeneity in the models.<sup>2</sup> To summarize, in both the main and sensitivity analyses, there appears to be significant heterogeneity between studies. This suggests caution in interpreting the findings of the quantitative analysis, since the level of heterogeneity is unlikely to be due to chance. Heterogeneity between studies may help to explain the contrasting findings from the main and sensitivity analysis. In the main analysis, there is more variability and more uncertainty about the true effect (given the greater CI); whereas in the secondary analysis, the variation is smaller and there is more certainty within that dataset, despite a relatively smaller effect size.

### 3.2.2 | Education

Level of education was measured in nine of the 17 studies and operationalized in a number of different ways (see Table 3). Two of these nine studies found a significant association with treatment outcomes (Hawley, Leibert, & Lane, 2014; Pirkis et al., 2011). In both studies, higher levels of education were associated with better treatment outcomes. Seven of the studies that measured education did not find significant associations with treatment outcomes (Button, Wiles, Lewis, Peters, & Kessler, 2012; El Alaoui et al., 2015; Falconnier, 2009; Fournier et al., 2009; Hoyer et al., 2016; Joutsenniemi et al., 2012; Kelly et al., 2015).

In contrast to the above, Hawley et al. (2014) found that with every increase in education level, final OQ scores reduced by an average of 3.6 points compared to initial scores. Pirkis et al. (2011) found that

**TABLE 3** Operationalization of SES indicators in each study

First Author and Year	Employment	Education	Income	IMD	ISP
Button et al. (2012)		Two-levels: more than/less than A level			
Cort et al. (2012)	Two levels: <sup>a</sup>		Two levels: private/public assistance income		
Delgadillo, Asaria et al. (2016)				Continuous: lower rank = greater dep.	
Delgadillo, Kellet, et al. (2016)	Two levels: <sup>a</sup>			Quintile ranking (1-5): 1 = most dep.	
Delgadillo et al. (2017)	Two levels: <sup>a</sup>			Quintile ranking (1-5): 1 = most dep.	
El Alaoui et al. (2015)	Two levels: <sup>a</sup>	7-Point scale <sup>b</sup>			
Falconnier (2009)		Two levels: more than/less than HS	Continuous: average family income		Three levels: <sup>c</sup>
Firth et al. (2015)	Two levels: <sup>a</sup>			Continuous: higher score = greater dep.	
Fournier et al. (2009)	Two levels: <sup>a</sup>	Continuous: number of years in education	Continuous: gross annual income		
Green et al. (2015)				Continuous: higher score = greater dep.	
Hawley et al. (2012)		Eight levels: <sup>d</sup>	Eight levels: brackets of \$0-\$100k		
Hoyer et al. (2016)		Two levels: finished HS (Y/N)			
Joutsenniemi et al. (2012)	Five levels: <sup>e</sup>	Three levels: basic/intermediate/high			
Kelly et al. (2017)	TWO levels: <sup>a</sup>	Two levels: finished HS (Y/N)	Continuous: personal, family, disability income		
Pirkis et al. (2011)		Five levels: <sup>f</sup>	TWO levels: low/not low		
Poots et al. (2014)				Quintile ranking into terciles: 1 = low dep. 2-4 = med dep. 5 = high dep.	
van der Lem et al. (2013)	Two levels: <sup>a, g</sup>				

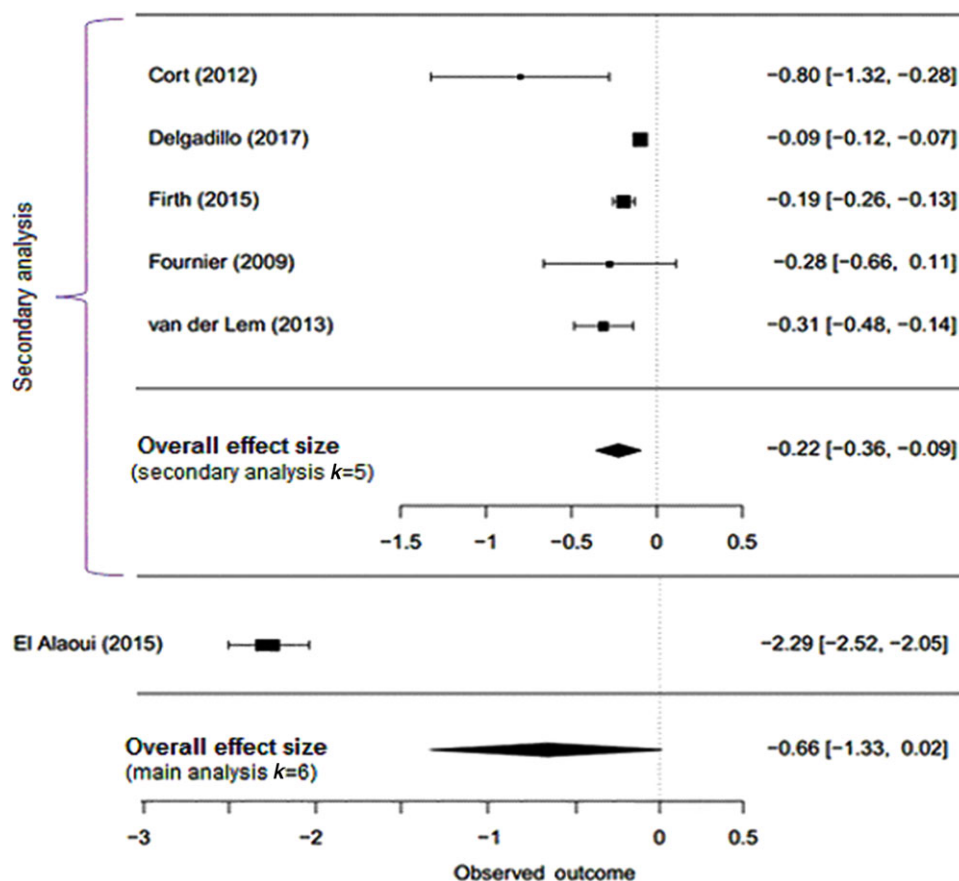
<sup>a</sup>Employed/unemployed.<sup>b</sup>7-Point scale, 1 = less than 7-9 years in school; 2 = 7-9 years in school; 3 = incomplete vocational or secondary school; 4 = vocational school; 5 = secondary school; 6 = university started but not completed studies; 7 = completed university studies.<sup>c</sup>Upper class (Class 1), middle class (Class 2 and 3), and working class (Class 4 and 5).<sup>d</sup>Did not finish high school, high school diploma or equivalent, some college, undergraduate degree, in master's program, master's degree, in doctoral program, and doctoral degree.<sup>e</sup>Employed; full-time student, student and at work, homemaker, and other.<sup>f</sup>Did not complete high school, completed high school to Year 10, to Year 11, to Year 12, tertiary level education.<sup>g</sup>Two definitions of "employed": Definition 1, in paid work at baseline; Definition 2, included those out of work but in receipt of sickness benefit at baseline. IMD, index of multiple deprivation; ISP, index of social position; HS, high school; dep., deprivation.

those who had completed the highest level of education had the greatest improvement in K-10 scores, average of 1.6 points more than those who had not completed high school, and those who completed high school to at least Year 10 improved by an average of 1.5 points on the K-10. Both studies used outcome measures (OQ-45.2 and K-10) that assessed nonspecific psychological distress. Differences in type of

psychotherapy, outcome measures, data analysis, and population samples make it difficult to directly compare these two studies on their similar findings.

As can be seen in Table 3, a considerable limitation concerns the variety of ways in which education has been operationalized by different researchers. Only two papers used the same categories within their





**FIGURE 2** Forest plot of the effect sizes for studies examining employment status. Plot shows the main analysis ( $k = 6$ ; below), and the secondary analysis ( $k = 5$ ; above) which excludes the study by El Alaoui et al. 2015

Note: van der Lem et al. (2013) for this analysis is based on treatment response (this study also looked at remission)

education variable (finished high school Y/N), and one paper stands out in its use of a continuous variable (Fournier et al., 2009), whereas the rest used different levels within a categorical variable. For this reason, a meta-analysis was not viable, and overall the majority of studies had null findings.

### 3.2.3 | Income

A form of income was measured in six of the 17 studies (see Table 3). Four studies found significant associations indicating that higher income was associated with greater improvement in treatment outcomes (Cort et al., 2012; Falconnier, 2009; Kelly et al., 2015; Pirkis et al., 2011). Two studies found no significant associations between measures of income and treatment outcomes (Fournier et al., 2009; Hawley et al., 2014).

Cort et al. (2012) found that being in receipt of public assistance income (a proxy for financial hardship) was associated with less reduction in depression symptom severity on the BDI-II but not the HRSD measure. Pirkis et al. (2011) found that being on a higher income was associated with greater improvements posttreatment. Falconnier (2009) found that higher average family income was associated with greater improvements on BDI-II scores for depression, but not in the HRSD outcome measure. Kelly et al. (2015) found that having low personal income and low family income were

associated with less likelihood of symptom reduction in one of the treatment groups. There was a 30% likelihood of positive treatment response in the lower income group, whereas for higher income participants this increased to 70%.

In these papers, again, it is difficult to directly compare findings due to the differences in how income was operationalized (see Table 3). Overall, the evidence suggests that financial hardship was associated with poorer psychological treatment outcomes.

### 3.2.4 | Index of multiple deprivation

Participants' home postcodes were linked to a neighborhood index of multiple deprivation (IMD score/rank) in six of the 17 included studies (see Table 3). Four of these found significant associations indicating that greater socioeconomic deprivation was associated with poorer treatment outcomes (Delgadillo, Asaria, et al., 2016; Delgadillo et al., 2017; Delgadillo, Kellet, et al., 2016; Green et al., 2015). Two of the studies that measured IMD did not find the same overall relationship (Firth et al., 2015; Poots et al., 2014).

Delgadillo, Asaria, et al. (2016) found that lower posttreatment recovery rates were associated with greater deprivation, analyzing outcomes data clustered within geographical areas (e.g., percentage of cases recovered across clinical commissioning groups). Living in a more deprived area was also found to be associated with poorer

anxiety (Delgadillo, Kellet, et al., 2016) and depression (Delgadillo et al., 2017) outcomes in large cohort studies that analyzed individual-patient data. Green et al. (2015) also found significant associations between greater deprivation and poorer depression and anxiety outcomes using individual-patient data.

Although Firth et al. (2015) did not find a main effect for IMD on treatment outcomes, the study did find an interaction effect between IMD and employment status, suggesting that living in a more deprived area was negatively associated with outcomes for unemployed patients only. Poots et al. (2014) also found no relationship between IMD and outcomes.

A meta-analysis was considered for a subgroup of the papers using this variable; however, insufficient statistical data were reported by the papers to enable a calculation of effect sizes. Overall, the majority of these studies indicated a significant association between higher socioeconomic deprivation (IMD) and poorer treatment outcomes.

### 3.2.5 | Index of social position

The ISP was measured in one controlled trial by Falconnier (2009), comparing “middle-class” and “working-class/poor” patients. Working-class/poor participants had poorer rates of depression (HRSD) improvement than middle-class patients, although there was no significant association on the BDI-II measure. This effect concurs with the study's other main finding that higher family income was also associated with greater improvement (though this was only found for BDI-II).

ISP is clearly not as widely used as other indicators; therefore, it is difficult to draw general conclusions. However, since ISP is reported to be a combination of education level and occupational prestige, the direction of the main findings fit with the results from those studies that found a significant effect of employment status (six out of nine studies), and of education level (two out of nine studies). Falconnier's (2009) ISP findings also parallel those of Cort et al. (2012) for employment status, in that both studies found associations for the HRSD but not the BDI-II.

## 3.3 | Results by study design

Ten cohort studies were included in the review, whereas seven were RCTs. Nine of the 10 cohort studies found significant associations between at least one of their measures of SES and psychological therapy outcomes (see Table 2 for study design). Poots et al. (2014) was the only cohort study not to find any evidence of an association. This study analyzed data at population level, and the authors suggested that a patient-level analysis would be helpful to clarify any masked heterogeneity in their results.

The findings from the RCTs were more inconsistent. Three of the studies (Cort et al., 2012; Falconnier, 2009; Kelly et al., 2015) found significant associations between two SES indicators and psychological therapy outcomes, while four did not find any relationships (Button et al., 2012; Fournier et al., 2009; Hoyer et al., 2016; Joutsenniemi et al., 2012).

None of the six RCTs that investigated education found a significant effect, compared with cohort studies where two out of three found

a significant effect. Significant findings were more mixed for investigations of employment (two of four RCTs, four of five cohort studies) and income (three of four RCTs, one of two cohort studies). All studies investigating IMD were cohort studies, while the only study to investigate ISP was an RCT.

## 3.4 | Quality assessment

For cohort studies, six out of the 10 studies were rated as “good,” four were rated as “fair,” and none were rated as “poor.” Reasons for studies rated as “fair” were due to inappropriate imputation of data, no measure of potential confounding variables, and risk of selection bias. For RCTs, five out of the seven studies were rated as “good,” one rated “fair,” and one “poor” quality.

Two studies did not describe their process of random allocation (selection bias), and two studies did not provide enough information to judge the risk of selective reporting (reporting bias). Blinding of outcome assessors was not done or not described in over half of the studies. The quality of one paper stands out from the majority, Joutsenniemi et al. (2012), which had a strong indication of bias. As this paper found no significant associations, there is no risk of Type I errors, but a potential risk of a Type II error regarding employment or education. Selection bias was indicated for El Alaoui et al. (2015) as all participants actively sought out the specified intervention (online CBT) rather than being referred (e.g., by a medical professional). This might help to explain the significantly larger effect detected by El Alaoui et al. (2015) compared with other studies, and may mean that results are less generalizable to typical routine mental health patients. These factors support the decision to exclude this study from the sensitivity meta-analysis. The quality assessment process revealed that detection bias was the aspect of quality most consistently rated as high risk or unclear, while this is important for the individual studies, the impact is minimal for the results of this review, as results for RCT papers came from pooled data of the different treatment conditions. The overall quality of the included studies is high. Further details about the quality assessment for each study are available in Appendix C.

## 4 | DISCUSSION

### 4.1 | Interpretation of findings

In general, studies that measured some aspect of SES tended to find significant associations between lower SES and poorer psychological treatment outcomes, although findings were mixed. Heterogeneity in the types of SES measures and definitions across studies meant that the systematic review was largely restricted to a narrative description of the findings. A quantitative meta-analysis was only possible for studies examining employment status. After excluding one unusual outlier study, our meta-analysis of five studies indicated a small (−0.22) but statistically significant overall effect, indicating that unemployed patients tended to attain poorer treatment outcomes compared to employed patients. Weighing up the evidence from statistically significant and null findings across studies, we observed an evident trend



of poorer treatment outcomes associated with unemployment, lower income, and living in deprived neighborhoods (based on the IMD measure). Studies examining educational level and social class had mostly null or unreplicated findings.

Findings varied depending on which SES indicators were used. This was particularly evident from looking at level of education. Education did not generally demonstrate an association with psychological therapy outcomes, while employment status, income, and IMD showed relatively more consistent associations—significant effects for each were detected by two thirds of studies. The finding that associations were found more consistently in cohort studies than in RCTs is relevant when thinking about the representativeness of study populations to natural clinical settings. For example, van der Lem et al. (2013) found that the rate of employment in routine outpatients is half of that of participants in RCTs. This could indicate that, although RCTs have stronger internal validity, cohort studies may have greater variability across SES measures and large sample sizes that may be more representative of ordinary clinical populations. It is possible that the large sample sizes and diversity of participants across cohort studies enabled the detection of significant associations, while some trials may be underpowered for this purpose. Alternatively, RCTs tend to have more methodological rigor and the cohort studies may have been more likely to result in Type I errors.

## 4.2 | Strengths and limitations

This is the first systematic review to examine associations between multiple indices of SES and psychological treatment outcomes in contemporary outcomes research studies. Particular strengths included the registration of our study protocol in a public database ahead of conducting the review, study selection and quality assessment by two independent assessors, and the application of quantitative meta-analysis where sufficient data were available.

A number of limitations should also be considered when interpreting the results of this review. The considerable extent of heterogeneity in SES measures, psychological treatments, and samples across studies made it difficult to directly compare findings, and therefore our conclusions should be taken as a preliminary scoping of contemporary outcomes research studies. This is the first study to have reported a meta-analysis of the effects of employment on psychological therapy outcomes. However, the number of studies included in meta-analysis ( $n = 6$ ) was low, making it difficult to draw firm conclusions from these scarce data. Nevertheless, these quantitative results complement a previous larger meta-analysis that found compelling evidence of the risk that unemployment poses for public mental health (Paul & Moser, 2009).

Another limitation concerns the inclusion of mixed samples of cases with several common mental disorders, which may have obscured specific associations between indices of SES and specific symptom domains. We found, for example, that associations between SES indices were significant mostly with measures of depression, although some studies using more than one depression measure (e.g., BDI-II and HRSD) showed significant associations in one but not the other (Cort et al., 2012; Falconnier, 2009). This discrepancy

could reflect a methodological artifact (e.g., chance association in one measure), or it could indicate more granular associations between indices of SES and specific aspects of depressive symptomatology that may be captured in some but not in other outcome measures. Future studies could examine this in more detail using item-level data and informed by item-response theory or factor-analysis methods.

Our decision to combine literature from both cohort studies and trials meant that the review included studies with high external validity (i.e., cohort studies) and high internal validity (i.e., RCTs). There are, however, limitations in both types of study designs. RCTs providing post-hoc subgroup analyses should be interpreted with caution as secondary analyses can lack statistical power, especially as multiple testing can increase the likelihood of chance findings (Type 1 error, false positives). Meanwhile, cohort studies typically do not have the rigorous controls (e.g., inclusion/exclusion criteria, treatment adherence checks, independent outcomes assessment) that are found in clinical trials, so we cannot draw firm conclusions about specific relationships in specific treatment modalities. The variation in RCT findings may be reflective of strict patient selection in controlled versus naturalistic population studies, possibly limiting the variability in SES measures which is observed in cohort studies. A further limitation concerns our decision to limit the inclusion of studies to the past decade of published research, in order to reflect contemporary methodological, socioeconomic, and therapeutic contexts in a rapidly evolving landscape.

## 4.3 | Implications for research, theory, and practice

A clear observation from our review is that indices of SES are inconsistently applied and operationalized across studies, making it difficult to apply meta-analysis and thus to weigh up the significance and relative strength of associations. Future studies could adopt standardized ways of grouping respondents. For example, employment status could be defined as a binary variable where those who are unemployed (expected signal) are contrasted to all others as a reference category (employed, employed but away from work due to sickness, retired, voluntary unpaid work). The IMD variable was found to be prognostic of treatment outcomes and could lend itself to meta-analytic review, if future studies collect individual-level IMD indices categorized in quintile groups (as is common across studies: Delgadillo et al., 2017; Delgadillo, Kellet, et al., 2016; Poots et al., 2014). Income level can also be captured both as a continuous monetary value (e.g., yearly family income), which would enable reviewers to derive equivalent scales using contemporaneous currency exchange rates to compare studies. Overall, on the basis of our review, we would recommend that gathering at least employment status and income measures in psychotherapy outcome research studies would enable us to advance our understanding of its relevance to psychological health and treatment.

Previous reviews have indicated consistent and significant associations between socioeconomic deprivation with higher prevalence and severity of mental health problems (Reiss, 2013; Wilkinson & Pickett, 2010). The findings of this review indicate that adverse socioeconomic

conditions (unemployment, low income, living in deprived neighborhoods) are also associated with poorer response to psychological treatment for common mental disorders. Studies show that the association between indices of SES remains significant after controlling for other known prognostic factors, such as baseline severity of symptoms, functional impairment, disability, and comorbid illnesses (e.g., Delgadillo et al., 2017). These findings lend support to *social causation theory* (Dohrenwend et al., 1992), suggesting that ongoing exposure to socioeconomic hardship and neighborhood stress may impact mental health and therefore mitigate the effects of psychological treatment.

The mechanisms whereby SES dampens the effect of psychological treatment are not yet fully understood, but some clues may be found in the wider literature on socioeconomic deprivation and health. Studies showing a correlation between income and quality of health (e.g., see Gunasekara, Carter, & Blakely, 2011) indicate that greater income may enable access to health-enhancing goods, as suggested by Grossman (1972). The *relative deprivation hypothesis*, on the other hand, suggests that if an individual's income is relatively lower than other people (e.g., average neighborhood income), their perception of low social status can lead to psychosocial stress even if the person is not absolutely deprived (Smith, Pettigrew, Pippin, & Bialosiewicz, 2012; Wilkinson, 2005). Low social status has been suggested to increase stress by reducing people's sense of control over their lives (Marmot, 2004) and through direct experiences of prejudice and devaluation by others (Charlesworth, Gilfillan, & Wilkinson, 2004). The notion of relative deprivation and the function of social comparison may be particularly relevant in depression, given that depression sufferers often think of themselves as worthless or not as good as others. Indeed, longitudinal studies have shown that a reduction in relative income rank is significantly associated with the development of depression symptoms (Hounkpatin, Wood, Brown, & Dunn, 2015). Therefore, it is plausible that socioeconomic deprivation impacts on depression treatment outcomes in direct (reduced access to health-enhancing goods) and indirect ways (via social comparison and perceptions of low social status that endure even if other depressogenic cognitions are successfully treated). Previous studies have also shown associations between neighborhood deprivation and exposure to crime and violence (Blau & Blau, 1982; Fajnzylber, Lederman, & Loayza, 2002; Hsieh & Pugh, 1993). It is possible that perceived or actual risk of exposure to crime, discrimination, and antisocial behavior could maintain enduring anxiety symptoms after psychological treatment.

## 5 | CONCLUSIONS

In conclusion, this review indicates that socioeconomic deprivation can attenuate the effectiveness of psychological interventions for depression and anxiety problems. In particular, unemployment, low income, and relative neighborhood deprivation were most consistently associated with poorer treatment outcomes. Future studies should investigate the mechanisms whereby socioeconomic deprivation may impede the successful remission of common mental health problems.

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## CONFLICT OF INTERESTS

The authors declare no conflict of interests.

## ENDNOTES

<sup>1</sup> Standardized coefficients are expected to range between  $-1$  and  $1$  except in cases of high multicollinearity (Jöreskog, 1999), yet the average reported standardized coefficient reported in El Alaoui et al. is 12.1.

<sup>2</sup> We also conducted several tests for publication bias that cannot be reported here for reasons of space. Few and only weak signs for the existence of such a bias were detected. In sum, it is unlikely that publication bias poses a relevant threat to the validity of the meta-analytic results presented here. A detailed appendix document is available from the first author.

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## APPENDIX A: KEY-TERM SEARCH STRATEGY

(socioeconomic OR socio- economic OR poverty OR income OR "social class" OR "social inequ*"	AND	( anxiety OR depression OR depress* OR stress )	AND	( "psych* intervention" OR "psych* therap*" OR "psych* treatment" OR psy- chotherap* OR therap* OR cbt OR "cognitive behav*"
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## APPENDIX B: LIST OF EXCLUDED PAPERS WITH REASONS (AT STAGE 2, FULL-TEXT REVIEW)

First Author	DOI	Excluded Reason/Note
Aelfers, E.	10.1186/1471-2458-13-129	Protocol, not a completed study.
Aguilera, A.	10.1002/jclp.20706	No measure of SES. Qualitative analysis.
Akincigil, A.	10.2105/ajph.2011.300349	No measure of mental health outcomes.
Alonzo, D. M.	10.1080/13811118.2011.566052	Target condition severe mental disorder (bi-polar).
Arnberg, F. K.	10.1016/j.jpsychores.2013.08.019	No measure of SES.
Arnold, B. A.	10.1016/j.jad.2006.06.017	No means of SES comparison.
Asuncion, L. M.	O <sup>1</sup>	No means of SES comparison.
Barrera, T. L.	10.1016/j.janxdis.2015.04.005	No means of SES comparison.
Bassilios, B.	O <sup>2</sup>	No measure of mental health outcomes.
Bassilios, B.	10.1186/s13033-016-0092-4	No means of SES comparison.
Beard, C.	10.1002/da.20676	No psychological therapy as part of study.
Beck, A.	10.1111/bjc.12072	No measure of SES.
Bernaldo-de-Quiros, M.	O <sup>3</sup>	No measure of mental health outcomes.
Blanco, V.	10.1080/10503307.2013.847989	No means of SES comparison.
Blay, S. L.	10.1097/nmd.0000000000000181	No measure of mental health outcomes.
Chibanda, D.	10.1001/jama.2016.19102	No means of SES comparison.
Cohen, C. I.	10.1016/j.jad.2009.05.021	No psychological therapy as part of study.
Eilenberg, T.	10.1017/S0033291715001579	No means of SES comparison.
Ell, K.	10.1097/JGP.0b013e3181cc0350	No measure of SES.
Ell, K.	10.1016/j.genhosppsych.2011.05.018	No means of SES comparison.
Falconnier, L.	10.1037/10002-9432.78.1.37	No measure of SES.
Kurzweil, S.	O <sup>4</sup>	No access to full-text.
Lester, K.	10.1037/a0019551	Analysis of non-completion rather than outcome.
Leung, S. S. K.	O <sup>5</sup>	No means of SES comparison.
Lokman, S.	10.2196/jmir.6581	No means of SES comparison.
Moayedoddin, A.	10.4414/smw.2013.13769	No means of SES comparison.
Naeem, F.	10.1016/j.jad.2013.10.051	No means of SES comparison.
Piette, J. D.	10.1097/MLR.0b013e318215d0c9	No means of SES comparison.
Piette, J. D.	10.1177/1742395311409259	No means of SES comparison.
Poleshuck, E. L.	10.1016/j.jpsychores.2014.07.016	No means of SES comparison.
Posmontier, B.	10.1111/jmwh.12411	No means of SES comparison.
Prytys, M.	10.1017/S1352465809990129	No means of SES comparison.
Talbot, N. L.	O <sup>6</sup>	No means of SES comparison.
Taylor, J. H.	10.1016/j.jpsychires.2015.03.020	Likelihood of recurrence rather than outcomes.

Note: For conciseness, only the first author, DOI, and the reason have been given. Where DOI is not available, title of the paper, journal, and volume number have been given below the table. The full dataset can be requested by the author if required.

The majority reason (53%) for excluding a study was a socioeconomic measure with no means of comparison was offered.

<sup>1</sup>A 4-year experience with a web-based self-help intervention for depressive symptoms in Mexico. *Pan American Journal of Public Health*, 35.

<sup>2</sup>The complementarity of two major Australian primary mental health care initiatives. *Australian and New Zealand Journal of Psychiatry*, 44.

<sup>3</sup>Sociodemographic, clinical, and outcome differences among anxiety disorders. *Psicothema*, 24.

<sup>4</sup>Psychodynamic therapy for depression in women with infants and young children. *American Journal of Psychotherapy*, 66.

<sup>5</sup>A brief group intervention using a cognitive-behavioral approach to reduce postnatal depressive symptoms: A randomized controlled trial. *Hong Kong Medical Journal*, 22.

<sup>6</sup>A randomized effectiveness trial of interpersonal psychotherapy for depressed women with sexual abuse histories. *Psychiatric Services*, 62.

## APPENDIX C: QUALITY ASSESSMENT AND RISK OF BIAS SUMMARY TABLES

Quality Assessment Ratings of Cohort Studies									
Delgadillo, Asaria et al. (2016)	Delgadillo, Kellet, et al. (2016)	Delgadillo et al. (2017)	El Alaoui et al. (2015)	Firth et al. (2015)	Green et al. (2015)	Hawley et al. (2014)	Pirkis et al. (2011)	Poots et al. (2014)	van der Lem et al. (2013)
FAIR <sup>1</sup>	GOOD	GOOD	FAIR <sup>2</sup>	GOOD	GOOD	GOOD	GOOD	FAIR <sup>1</sup>	FAIR <sup>3</sup>
Risk of Bias For RCT Papers (Secondary Analyses)									
Paper (First Author and Year) <sup>a</sup>	Selection Bias <sup>b</sup>	Performance Bias	Detection Bias	Attrition Bias	Reporting Bias	Other Bias	Overall Quality Rating		
Button et al. (2012)	L	L	U	L	L	L	Good		
Cort et al. (2012)	U	L	H	L	U	L	Fair		
Falconnier (2009)	L	L	U	L	L	L	Good		
Fournier et al. (2009)	U	L	L	L	L	L	Good		
Hoyer et al. (2016)	L	L	L	L	L	L	Good		
Joutsenniemi et al. (2012)	L	U	H	H	U	H	Poor		
Kelly et al. (2015)	L	L	L	L	L	L	Good		

<sup>1</sup>Confounding variables not investigated.

<sup>2</sup>Risk of selection bias: All participants actively sought out the specified intervention (online CBT) rather than being referred (e.g., by a GP). Results may not be generalizable to typical routine mental health patients.

<sup>3</sup>Imputed values used to estimate missing data for socioeconomic characteristics and type of treatment.

<sup>a</sup>The original studies that conducted the RCT were also referred to when assessing bias to gather further information. These are DeRubeis et al. (2005), Elkin et al. (1989), Kessler et al. (2009), Knekt et al. (2008), Leichsenring et al. (2013), Roy-Byrne et al. (2010), and Talbot et al. (2011).

<sup>b</sup>Includes random sequence generation and allocation concealment.



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