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EMPIRICAL PAPER

Psychotherapy for eating disorders: A meta-analysis of direct comparisons

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Abstract

Objective: We conducted a meta-analysis of randomized controlled trials (RCTs) of bona fide psychotherapy for adults with eating disorders (EDs). **Method:** Thirty-five RCTs with 54 direct comparisons were included. The majority of RCTs included participants with bulimia nervosa and/or binge-ED, while only two RCTs included participants with anorexia nervosa, and three RCTs included participants with an ED not otherwise specified. **Results:** There was a clear advantage of bona fide psychotherapy over wait-list controls. Bona fide psychotherapy was superior to non-bona fide treatment; however, the majority of results were not stable. There were no significant differences between bona fide cognitive-behavioral therapy (CBT) and bona fide non-CBT, with the exception of bona fide CBT resulting in greater reductions in ED psychopathology assessed by the ED Examination, which primarily assesses maintenance factors according to the CBT model. **Conclusions:** Generally, the results indicate that any bona fide psychotherapy will be equally effective. While the number of trials remains modest, we hope that as more research becomes available, treatment guidelines can be updated, and more evidence-based treatment options will be available for treating EDs.

Keywords: eating disorders; meta-analysis; psychotherapy

Clinical or methodological significance of this article: Practice guidelines currently suggest specificity of treatment effects for eating disorders (EDs), that is, that certain psychotherapies possess specific therapeutic ingredients that will result in superior efficacy. However, the results of this meta-analysis indicate that any bona fide psychotherapy will be equally effective. Treatment guidelines for adults with EDs may need updating to reflect a common factors view of psychotherapy efficacy.

Individuals diagnosed with an ED experience mental and physical impairments (National Institute for Health and Care Excellence [NICE], 2004). Historically, cognitive-behavioral therapy (CBT) has been the most researched and recommended treatment for bulimia nervosa (BN) and binge-eating disorder (BED; APA Work Group on Eating Disorders, 2006; NICE, 2004). National guidelines were updated in 2012 (Yager et al., 2014) to include

both CBT and interpersonal psychotherapy (IPT; Wilfley et al., 1993, 2002) as front-line treatment options for BN and BED. These treatment recommendations suggest that certain therapies possess specific therapeutic ingredients that will result in superior efficacy for reducing ED symptoms.

Findings from several meta-analyses for other mental disorders (post-traumatic stress disorder, depression, generalized anxiety, and panic disorder)

have not supported the theory of treatment specificity (Benish, Imel, & Wampold, 2008; Cuijpers, van Straten, Andersson, & van Oppen, 2008; Spielmans, Pasek, & McFall, 2007). These meta-analyses are consistent with a common factors model (Frank & Frank, 1993; Wampold & Imel, 2015) which suggests that psychotherapies that are fully intended to be therapeutic perform similarly.

There are several past meta-analyses that examine the efficacy of psychotherapy for EDs, however, many include trials with adolescents and non-RCTs (Hay, Bacaltchuk, Stefano, & Kashyap, 2009; Hay, Caludino, Touyz, & Abd Elbaky, 2015). In a recent meta-analysis, Spielmans et al. (2013) synthesized the results of 53 trials with 77 direct comparisons in order to identify whether there was support for treatment specificity among psychological treatments for BN and BED. Results indicated that: bona fide psychotherapies outperformed non-bona fide treatment; bona fide CBT marginally outperformed bona fide non-CBT for combined primary outcomes (at post-treatment and only when BN and BED trials were combined), and full CBT treatments yielded similar effects as CBT with some active components removed. The authors point out that the finding showing CBT to be superior to non-CBT may be due to study confounds including different treatment dosages which favored CBT. Spielmans et al. (2013) concluded that their meta-analysis generally supported the common factors model of psychotherapy. However, the 53 trials in the Spielmans meta-analysis included a variety of different study designs (i.e., RCTs, non-RCTs, dismantling studies, sequential designs). RCTs are considered the “gold standard” method of evaluating treatment effects, and results from RCTs are often used to determine what treatments are recommended in national guidelines (APA Work Group on Eating Disorders, 2006; NICE, 2004; Yager et al., 2014). By including many uncontrolled designs, the reliability of the results reported by Spielmans et al. (2013) may be limited. Researchers have shown that the biases that can result from uncontrolled designs lead to exaggerated intervention effects while hindering the reliability of results and compromising conclusions about treatments (Higgins & Green, 2011). The current meta-analysis includes only studies with RCT designs.

In addition to including non-RCTs, the Spielmans et al. (2013) meta-analysis combined psychotherapy trials with the following diverse characteristics: (a) samples of children, adolescents, and adults; (b) designs with treatment confounds (i.e., participants concurrently receiving other interventions); and (c) participants with subthreshold or no ED diagnosis. Lastly, Spielmans et al. (2013) combined all

primary outcomes together and secondary outcomes together in analyses. While these inclusion criteria resulted in a larger pool of studies and comparisons, they may also have limited the reliability of the findings.

The current study aims to avoid potential confounds by: (a) including only RCT designs that directly compare a bona fide psychotherapy to a wait-list control condition or to non-bona fide treatment; (b) reviewing only studies with adults diagnosed with an ED; and (c) separately reporting primary (abstinence rates, frequency of binge eating and/or purging, and ED psychopathology) and secondary (depressive symptoms, self-concept, and interpersonal problems) outcomes. As CBT has been the most researched and recommended psychotherapy for BN and BED (APA Work Group on Eating Disorders, 2006; NICE, 2004; Yager et al., 2014), we also compare the effects of bona fide CBT to bona fide non-CBT. We expect that bona fide psychotherapy will be superior to wait-list controls and to non-bona fide treatments. We expect our findings to be consistent with common factors model (Frank & Frank, 1993; Wampold & Imel, 2015) such that bona fide CBT and bona fide non-CBT will yield similar effects.

Method

This meta-analysis builds upon a previous meta-analysis that investigated the effect of group psychotherapy for EDs (Grenon et al., 2017). However, the current meta-analysis differs by including both group and individual psychotherapy for EDs and specifically compares the effects of bona fide psychotherapy and non-bona fide treatments. Effect sizes for group psychotherapy RCTs were taken from Grenon et al. (2017), and effect sizes for individual psychotherapy RCTs were newly extracted for this study.

Inclusion and Exclusion Criteria

The following inclusion and exclusion criteria were specified a priori. To be included, studies had to: (a) be published after 1979; (b) have adult participants (>17 years of age) diagnosed with an ED based on DSM-III, DSM-IV, or DSM 5 criteria (and revised versions); (c) include at least one psychotherapy condition that was deemed a bona fide therapy (Wampold et al., 1997); (d) bona fide psychotherapy was compared to a wait-list control condition or a non-bona fide treatment (e.g., behavioral weight loss, self-help, supportive therapy, or non-directive therapy); and (e) use an RCT design.

Search Strategy

A systematic literature search of electronic databases (PsycINFO, MEDLINE, Cochrane Central Register of Controlled Trial) and a clinical trials registry (ClinicalTrials.gov) was conducted separately for group and individual psychotherapy RCTs.

Coding Procedures

For the purposes of classifying treatments as bona fide CBT, bona fide non-CBT, bona fide psychotherapy, or non-bona fide treatment, all studies were reviewed and coded by two psychology doctorate students. In the case of a disagreement or uncertainty about the type of treatment included in an RCT, a third rater (G.A.T.) reviewed the treatment descriptions and the three coders came to consensus.

CBT vs. non-CBT. Interventions with both cognitive and behavioral components were classified as CBT. An intervention that contained only behavioral components was classified behavioral therapy (BT).

Bona fide psychotherapy vs. non-bona fide treatment. To be classified as a bona fide psychotherapy, interventions had to include the following based on the Wampold et al. (1997) definition: (1) delivered by a therapist trained in the type of treatment and with at least a Master's degree; (2) individualized and based on face-to-face meetings so that the therapist and client develop a relationship; and (3) have specific psychologically valid components containing at least two of the following: (i) based on an established school or approach to psychotherapy; (ii) has an established psychological change theory; (iii) uses a treatment manual; and (iv) describes active ingredients of the psychotherapy.

Outcome Measures

Data were extracted for the following outcome measures at post-treatment, short-term follow-up (≤ 6 months), and long-term follow-up (> 6 months). Primary outcomes included: abstinence rates; frequency of binge eating and/or purging, and ED-related psychopathology. Secondary outcomes included: depressive symptoms, self-concept, and interpersonal problems.

Effect Sizes

Effect sizes for continuous outcomes were computed using Hedges' g (standardized mean difference). Hedges' g results in a more precise estimate of the

effect size than Cohen's d (Higgins & Green, 2011), especially for studies with small sample sizes. Effect sizes for dichotomous outcomes were computed using relative risk (RR). The RR compares two groups on the probability of an outcome occurring. In the current meta-analysis, an $RR > 1.00$ indicates greater abstinence rates for bona fide psychotherapy. In the analyses comparing bona fide CBT and bona fide non-CBT, an $RR > 1.00$ indicates greater abstinence rates for CBT.

When a study reported both completer-analyses and intent-to-treat analyses for the same outcome, we used the intent-to-treat data. When studies provided more than one measure for an outcome (e.g., two scales of ED-related psychopathology) the effect sizes were averaged so that there was only one effect size per outcome per study (Borenstein, Hedges, Higgins, & Rothstein, 2009; Cuijpers, 2016). A correlation of 1.00 between outcomes was assumed, which underestimates the precision of the summary effect. Effect size values of 0.20 were considered "small", 0.50 were considered "moderate", and 0.80 were considered "large" (Cohen, 1988). These effect size indices apply to between-group effect sizes, and not within-group (i.e., pre-post) effect sizes (Barber, Barrett, Gallop, Rynn, & Rickels, 2012).

Heterogeneity

The Q -statistic and Higgins' I^2 was used to assess for heterogeneity of effect sizes. The Q -statistic examines whether the variability of effect sizes is greater than would be expected by chance, and Higgins' I^2 represents the proportion of the overall variability that is beyond sampling error (Borenstein et al., 2009). When heterogeneity was significant, we examined whether treatment modality (i.e., group vs. individual psychotherapy) was a significant moderator. The Cochrane Handbook for Systematic Reviews of Interventions (Higgins & Green, 2011) recommends conducting subgroup analyses when at least 10 studies are included. When heterogeneity was non-significant, we did not conduct moderator analyses due to too few studies.

Meta-analysis

A random-effects model was used to aggregate effects across studies. This model allows results to be generalized beyond the studies included in the meta-analysis and assumes the presence of between-study heterogeneity. In addition, a random-effects model yields a more conservative effect size estimate (Cooper, Hedges, & Valentine, 2009). Three

separate meta-analyses were conducted for between-group effect sizes of: (1) bona fide psychotherapy compared to a wait-list controls; (2) bona fide psychotherapy compared to non-bona fide treatment; and (3) bona fide CBT compared to bona fide non-CBT. Meta-analyses were conducted for each outcome at post-treatment, short-term (≤ 6 months), and long-term (> 6 months) follow-up. One study-removed sensitivity analyses were conducted to test the stability of the mean effect size with respect to the primary outcomes. This gauges the impact of any one study on the combined effect by computing the overall effect after removing sequentially each study. Effect size calculations and analyses were computed in the Comprehensive Meta-Analysis program (CMA; Version 3; Borenstein, Hedges, Higgins, & Rothstein, 2005).

Publication Bias

For comparisons that included at least 10 studies, we examined publication bias by observing the funnel plot of the primary outcome measure (Higgins & Green, 2011). When asymmetry of the funnel plot was observed and publication bias was significant as per Egger's test, we conducted the random-effects version of the Duval and Tweedie's trim and fill procedure (Duval & Tweedie, 2000). By this method, we adjusted effect sizes to correct for the number and location of missing studies and for their possible effect on the primary outcome.

Study Quality

The quality rating of all included RCTs can be found in Table I. Quality was assessed using the omnibus rating scale (item 25) of the Randomized Controlled Trials-Psychotherapy Quality Rating Scale (RCT-PQRS; Kocsis et al., 2010). The omnibus quality rating ranges from one (exceptionally poor) to seven (exceptionally good) and takes into consideration the six quality domains: (1) description of participants, (2) definition and delivery of treatment, (3) full description and well-qualified therapists, (4) outcome measures, (5) data analysis, and (6) treatment assignment. The correlation between the total RCT-PQRS score (items 1–24 summed) and the omnibus rating (item 25; Kocsis et al., 2010) is high, $r = 0.88$.

Results

For detailed information regarding the following: search terms and strategies; Preferred Reporting Items for Systematic Reviews and Meta-Analyses

(PRISMA) study flow chart; reference list of included primary studies; exclusion criteria; excluded studies that underwent a full review and reasons for exclusion; primary and secondary outcome measures; references for outcome measures; detailed descriptions of non-bona fide treatments; interrater reliability; and forest plots for abstinence rates at post-treatment, please see the Online Supplementary Material.

Study Selection

The literature search resulted in 3464 hits (2793 after removing duplicates). Of these, 2721 were excluded based on the title and/or abstract. The full texts of 72 studies were examined. Sixty studies were excluded because they did not meet inclusion criteria, resulting in 12 RCTs of bona fide individual psychotherapy. Twenty-three RCTs of bona fide group psychotherapy were included from a recent meta-analysis (Grenon et al., 2017). A total of 35 RCTs with 54 comparisons (see Table I for characteristics of included comparisons) were included in this meta-analysis.

Study Characteristics

The 35 RCTs included the following comparisons: 23 bona fide psychotherapy versus a wait-list control, 17 bona fide psychotherapy versus non-bona fide treatment, and 14 bona fide CBT versus bona fide non-CBT. The mean percentage of female participants was 99.27%. Ten RCTs compared bona fide psychotherapy versus wait-list comparison and reported post-treatment analyses only. Four RCTs with comparisons not including wait-list controls reported post-treatment analyses only. The average length of follow-up for the remaining 21 RCTs in months was 10.62, and only 2 trials included a follow-up over 12 months. Two trials included participants with AN, 18 trials included participants with BN, 18 trials included participants with BED, and 3 trials included participants with an ED not otherwise specified. Out of the 54 comparisons, 41 included CBT as the bona fide psychotherapy.

Thirty-four of 35 RCTs reported the number of participants that dropped out of treatment and/or wait-list. Mean dropout rates were comparable for bona fide psychotherapy (17.51%, $SD = 11.94$; range 0–53.13%; $N = 45$) and wait-list controls (13.20%, $SD = 14.31$; range 0–50%; $N = 17$). Non-bona fide treatment had a significantly greater mean dropout rate (29.12%, $SD = 10.97$; range 0–45.83%; $N = 16$) than the other two conditions ($F(2,75) = 7.63$, $p = .001$).

Table I. Characteristics of included studies and comparisons.

Study	C	IG	Tx type	CG	N _{IG}	N _{CG}	Quality	Subjects		
								Diagnosis	Age <i>M</i> (<i>SD</i>)	% Female
Bona fide psychotherapy versus wait-list										
Agras et al. (1989)	US	CBT	Ind.	WL	39	19	5	B N	29.2 (8.6)	100
Agras et al. (1995)	US	CBT	Grp.	WL	39	11	4	BED	47.6 (10.10)	86
Allen (1997)	US	CBT (AAT)	Grp.	WL	15	14	3	BED	21 (na)	100
Freeman et al. (1988)	UK	CBT	Ind.	WL	32	20	2	BN	24.2 (5.6)	100
		BT	Ind.	WL	30	20		–	–	–
Gorin et al. (2003)	US	CBT	Grp.	WL	32	31	5	BED	45.2 (10.03)	100
Griffiths et al. (1994)	AU	CBT	Ind.	WL	23	28	3	BN	25.91 (5.73)	100
Laessle, Zoetl, and Pirke (1987)	DE	CBT	Grp.	WL	8	9	3	BN	23.39 (2.5)	100
Lee et al. (1986)	US	CBT	Grp.	WL	15	15	4	BN	27.7 (5.3)	100
Leitenberg et al. (1988)	US	CBT	Grp.	WL	12	12	4	BN	26 (6.04)	100
		CBT + ERP	Grp.	WL	11	12		–	–	–
Peterson et al. (1998)	US	CBT	Grp.	WL	16	11	4	BED	42.4 (10.2)	100
Peterson, Mitchell, Crow, Crosby, and Wonderlich (2009)	US	CBT	Grp.	WL	60	69	6	BED	47.10 (10.4)	90
Schlup et al. (2009)	CH	CBT	Grp.	WL	18	18	5	BED	44.3 (10.3)	100
Tasca et al. (2006)	CA	CBT	Grp.	WL	50	46	7	BED	42.75 (10.76)	91
		GPIP	Grp.	WL	50	46		–	–	–
Telch et al. (1990)	US	CBT	Grp.	WL	23	21	5	BED	42.5 (8.4)	100
Telch et al. (2001)	US	DBT	Grp.	WL	22	22	4	BED	50 (9.1)	100
Vocks et al. (2011)	DE	CBT (BIT)	Grp.	WL	32	30	4	AN/BN/ EDNOS	28.22 (6.73)	100
Wilfley et al. (1993)	US	CBT	Grp.	WL	18	20	4	BED	44.3 (8.3)	100
		IPT	Grp.	WL	18	20		–	–	–
Wolf et al. (1992)	US	CBT	Grp.	WL	15	12	3	BN	26 (na)	100
		BT	Grp.	WL	15	12		–	–	–
Bona fide psychotherapy versus non-bona fide treatment										
Agras et al. (1994)	US	CBT	Grp.	BWL	72	37	4	BED	45 (10)	100
Bailer et al. (2004)	AT	CBT	Grp.	Self-help	41	40	4	BN	23.76 (4.5)	na
Esplen et al. (1998)	CA	Guided Imagery	Ind.	ND	28	30	21	BN	26.6 (6.0)	96.65
Freeman et al. (1988)		CBT	Ind.	SG	32	30	3	–	–	–
		BT	Ind.	SG	30	30		–	–	–
Grilo et al. (2011)	US	CBT	Grp.	BWL	45	45	7	BED	44.8 (9.4)	67
Hsu et al. (2001)	US	CT	Ind.	SG	26	24	4	BN	24.5 (6.4)	100
		CT	Ind.	NT	26	23		–	–	–
Kirkley et al. (1985)	US	CBT	Grp.	ND	14	14	3	BN	28.3 (na)	100
			Group							
McIntosh et al. (2005)	NZ	CBT	Ind.	SCM	19	16	5	AN	na	100
	NZ	IPT	Ind.	SCM	21	16		AN	na	–
Munsch et al. (2007)	CH	CBT	Grp.	BWL	44	36	5	BED	46.1 (11.65)	89
Peterson et al. (1998)	US	CBT	Grp.	Self-help	16	15	4	BED	42.4 (10.2)	100
Peterson et al. (2009)	US	CBT	Grp.	Self-help	60	67	6	BED	47.10 (10.4)	90
Safer et al. (2010)	US	DBT	Grp.	ST	50	51	6	BED	52.2 (10.6)	85
Wilson, Wilfley, Agras, and Bryson (2010)	US	IPT	Ind.	BWL	75	64	6	BED	na	100
		IPT	Ind.	Self-help	75	66		–	–	–
			Help							
Agras et al. (2000)	US	CBT	Ind.	IPT	110	110	6	BN	28.1 (7.2)	na
Cooper et al. (1995)	UK	CBT	Ind.	ERP	13	14	4	BN	23.8 (na)	100
Fairburn et al. (1986)	UK	CBT	Ind.	STF	12	12	5	BN	22.9 (4.4)	100
Fairburn et al. (1991)	UK	CBT	Ind.	BT	25	25	4	BN	24.2 (na)	100
		CBT	Ind.	IPT	25	25		–	–	–
Fairburn et al. (2015)	UK	CBT	Ind.	IPT	65	65	6	BN/BED/ EDNOS	25.9 (7.7)	97.7

(Continued)

Table I. Continued.

Study	C	IG	Tx type	CG	N _{IG}	N _{CG}	Quality	Diagnosis	Subjects	
									Age <i>M</i> (<i>SD</i>)	% Female
Freeman et al. (1988)	UK	CBT	Ind.	BT	32	30	2	BN	24.2 (5.6)	100
Griffiths et al. (1994)	AU	CBT	Ind.	Hypno.	23	27	3	BN	25.91 (5.73)	100
Lavender et al. (2012)	UK	CBT	Grp.	ESM	37	37	5	EDNOS/BN	27.7 (7.45)	91
McIntosh et al. (2005)	NZ	CBT	Ind.	IPT	19	21	5	AN	na	100
Tasca et al. (2006)	CA	CBT	Grp.	GPIP	50	50	7	BED	42.75 (10.76)	91
Wilfley et al. (1993)	US	CBT	Grp.	IPT	18	18	6	BED	44.3 (8.3)	100
Wilfley et al. (2002)	US	CBT	Grp.	IPT	81	81	6	BED	45.25 (9.61)	82.72
Wolf (1992)	US	CBT	Grp.	BT	15	15	3	BN	26 (na)	100

Note: The reference list of included primary studies can be found in the Online Supplementary Material. Abbreviations: C: Country; US: United States; UK: United Kingdom; DE: Germany; CH: Switzerland; AU: Australia; CA: Canada; NZ: New Zealand; SE: Sweden; IG: Intervention group; CBT: Cognitive-Behavior Therapy; AAT: Appetite Awareness Training; GPIP: Group Psychodynamic Interpersonal Psychotherapy; DBT: Dialectical Behavior Therapy; BT: Behavior Therapy; BIT: Body Image Therapy; CT: Cognitive Therapy; IPT: Interpersonal Psychotherapy; CG: Comparison group; Ind.: Individual; Grp: Group; WL: wait-list; ERP: exposure plus response-prevention; ESM: Emotional and Social Mind Training; ND: non-directive; STF: short-term focal therapy; SG: support group; ST: Supportive Therapy; Pharma.: pharmacotherapy; Hypno.: Hypnbehavioral Therapy; NT: nutritional therapy; SCM: supportive clinical management; BWL: Behavioral Weight Loss; NIG: sample size of intervention group; NCG: sample size of comparison group; Quality: Omnibus score ranging from 1 (exceptionally poor) to 7 (exceptionally good) from the Randomized Controlled Trial-Psychotherapy Quality Rating Scale (RCT-PQRS; Kocsis et al., 2010); Tx: Treatment; *M*: mean; *SD*: standard deviation; na: authors did not report standard deviations for the mean age or percentage of females.

Comparison 1 – Bona Fide Psychotherapy versus Wait-List Control

Post-treatment. Results of comparison 1 can be seen in Table II. Bona fide psychotherapy for EDs showed statistically significantly higher abstinence rates from binge eating and/or purging, had a greater effect in reducing the frequency of binge eating and/or purging frequency, and was more effective in reducing ED psychopathology compared to wait-list control at post-treatment. The overall abstinence rates for bona fide psychotherapy and wait-list controls at post-treatment were 53.89% and 8.92%, respectively. Similar results were obtained for secondary outcomes. Statistically significant effects in favor of bona fide psychotherapy versus wait-list control were found for depressive symptoms and

self-concept. Results were not statistically significant for improving interpersonal problems. Heterogeneity was not statistically significant for any analyses and so no moderators were tested. One study-removed analysis did not change the statistical significance or direction of any finding. No follow-up analyses were conducted for this comparison as wait-listed participants did not provide data following post-treatment.

Comparison 2 – Bona Fide Psychotherapy versus Non-Bona Fide Treatment

Post-treatment. Results of comparison 2 can be seen in Table III. Bona fide psychotherapy showed statistically significantly higher abstinence rates (51.13%) from binge eating and/or purging

Table II. Effects of bona fide psychotherapy compared to wait-list.

Time	Outcome	Tx type	<i>N</i> (<i>k</i>)	<i>g</i>	<i>RR</i>	95% CI	<i>p</i>	<i>Q</i>	<i>p</i> (<i>Q</i>)	<i>I</i> ² (%)	<i>ES</i> range
Post-treatment	Abstinence	All	11(14)		5.64	3.92; 8.12	<.001	5.44	.964	0	1.00, 16.58
	Frequency	All	13(16)	.81		.58; 1.04	<.001	24.54	.056	38.88	.05, 2.90
	ED psychopathology	All	15(19)	.54		.39; .70	<.001	13.14	.783	0	0, 1.10
	Depression	All	13(16)	.47		.28; .66	<.001	19.92	.175	24.68	0, 1.44
	Self-concept	All	10(13)	.30		.13; .47	.001	8.03	.783	0	0, .98
	Interpersonal problems	All	4(6)	.24		-.04; .51	.091	1.24	.942	0	0, .49

Note: Tx: Treatment; *N*(*k*): number of studies (number of comparisons); *g*: Hedge's *g*; *RR*: relative risk; *ES* range: effect size range of all studies included in the analysis; ED: eating disorder. Abstinence: dichotomous outcome of the number of participants in each condition with cessation of binge eating and/or purging in the last seven, 14, 21, or 28 days. Frequency: continuous outcome of the number of binge-eating and/or purging episodes in the last 7 or 28 days. ED psychopathology: continuous outcome of subscale scores of valid eating disorder psychopathology measures. Depression: valid self-report measures of depressive symptoms. Self-concept: valid self-report measures of self-esteem and/or self-efficacy. Interpersonal problems: Inventory of Interpersonal Problems.

Table III. Effects of bona fide psychotherapy compared to non-bona fide treatment.

Time	Outcome	Tx Type	N(k)	g	RR	95% CI	p	Q	p(Q)	I ² (%)	ES range
Post-treatment	Abstinence	All	8(10)		1.41	1.10; 1.80	.007	19.65	.020	54.19	.53, 2.89
		Group	5(5)		1.55	.94; 2.54	.084	10.50	.033	61.90	.53, 2.89
		Individual	3(5)		1.14	.99; 1.32	.076	2.94	.568	0	1.08, 1.99
	Frequency	All	10(12)	-.03		-.49; .43	.892	87.07	< .001	87.37	-3.32, 1.55
		Group	6(6)	.29		-.05; .63	.093	12.51	.028	60.04	-.50, .61
		Individual	4(6)	-.41		-1.36; .53	.393	66.55	< .001	92.49	-3.32, 1.55
	ED psychopathology	All	11(13)	.17		.03; .32	.022	15.75	.203	23.83	-.55, .64
		Group	7(7)	.13		-.08; .34	.210	8.60	.197	30.26	-.55, .40
		Individual	4(6)	.22		-.01; .45	.061	6.91	.228	27.60	-.12, .64
Depression	All	10(12)	.12		-.05; .28	.181	14.92	.186	26.25	-.42, .54	
Self-concept	All	4(4)	.01		-.24; .27	.912	3.83	.280	21.68	-.27, .32	
≤6 Months	Abstinence	All	5(5)		1.48	.91; 2.41	.117	7.14	.129	43.94	.67, 3.46
	Frequency	All	3(3)	.31		.05; .56	.018	0.58	.749	0	.17, .43
	ED Psychopathology	All	3(3)	.24		-.02; .49	.066	0.31	.855	0	.17, .32
Depression	All	3(3)	.31		.06; .57	.017	0.57	.754	0	.28, .61	
Self-concept	All	2(2)	-.05		-.37; .28	.770	.001	.972	0	-.05, -.04	
>6 Months	Abstinence	All	6(7)		1.18	1.00; 1.39	.045	4.90	.556	0	.65, 1.39
	Frequency	All	5(5)	.13		-.17; .44	.385	7.01	.136	0	-.28, .52
	ED Psychopathology	All	8(9)	.11		-.04; .25	.162	3.79	.804	0	-.24, .28
	Depression	All	6(7)	.11		-.08; .29	.261	2.59	.763	0	-.18, .30
	Self-concept	All	4(4)	-.02		-.25; .21	.847	0.49	.921	0	-.23, .06

Note. Tx: Treatment; N(k): number of studies (number of comparisons); g: Hedge's g; RR: relative risk; ES range: effect size range of all studies included in the analysis; ED: eating disorder. No data available for interpersonal problems at any time-point. Abstinence: dichotomous outcome of the number of participants in each condition with cessation of binge eating and/or purging in the last seven, 14, 21, or 28 days. Frequency: continuous outcome of the number of binge-eating and/or purging episodes in the last 7 or 28 days. ED psychopathology: continuous outcome of subscale scores of valid eating disorder psychopathology measures. Depression: valid self-report measures of depressive symptoms. Self-concept: valid self-report measures of self-esteem and/or self-efficacy.

compared to non-bona fide treatment (40%). However, no statistically significant difference was found between bona fide psychotherapy and non-bona fide treatment in reducing the frequency of binge eating and/or purging at post-treatment. Heterogeneity was statistically significant for both abstinence and frequency of binge eating and/or purging. Treatment modality was not a statistically significant moderator of abstinence rates (between-level $Q = 1.32$, $df = 1$, $p = .251$) or frequency of binge eating and/or purging (between-level $Q = 1.89$, $df = 1$, $p = .169$). One likely explanation for the heterogeneity among studies is the different types of non-bona fide treatments (i.e., self-help, behavioral weight loss, non-directive/supportive therapy, nutritional counseling, self-monitoring) included in this analysis. With too few comparisons for any one treatment type, a moderator analysis was not possible. One study-removed analysis did not change the statistical significance or direction of either finding. When compared to non-bona fide treatment, bona fide psychotherapy resulted in a statistically significantly greater reduction in ED psychopathology. Heterogeneity was not statistically significant. Two studies had a pronounced effect on the results of this analysis. Removal of Wilson et al., (2010) or Safer, Robinson, and Jo (2010) resulted in no statistically significant difference

between bona fide psychotherapy and non-bona fide treatment in reducing ED psychopathology.

No statistically significant difference was found between bona fide psychotherapy and non-bona fide treatment in reducing depressive symptoms or improving self-concept. Heterogeneity was not statistically significant and one study-removed analysis did not change the statistical significance or direction of these findings.

Follow-up. At short-term follow-up (≤6 months), there was no statistically significant difference in abstinence rates between bona fide psychotherapy and non-bona fide treatment. Heterogeneity was not statistically significant. Removal of Safer et al. (2010) led to a statistically significant difference in abstinence rates in favor of bona fide psychotherapy. Bona fide psychotherapy showed a statistically significantly greater reduction in frequency of binge eating and/or purging compared to non-bona fide treatment, however, removal of the Grilo, Masheb, Wilson, Gueorguieva, and White (2011) study resulted in no statistically significant difference. Bona fide psychotherapy yielded a statistically significantly greater reduction in depressive symptoms compared to non-bona fide treatment and no statistically significant difference was found between bona fide psychotherapy and non-bona fide treatment

in reducing ED psychopathology or improving self-concept. Heterogeneity was not statistically significant for any of these analyses. No studies reported interpersonal problems outcomes for this comparison.

At long-term follow-up (>6 months), bona fide psychotherapy showed statistically significantly higher abstinence rates compared to non-bona fide treatment, however, removal of either Safer et al. (2010) or Wilson et al. (2010) results in no statistically significant difference. There were no other statistically significant differences between bona fide psychotherapy and non-bona fide treatment at long-term (>6 months) follow-up. Heterogeneity was not statistically significant for any of these analyses. No studies reported interpersonal problems as an outcome for this comparison at any time-point.

Comparison 3 – Bona Fide CBT versus Bona Fide Non-CBT

Post-treatment. Results of comparison 3 can be seen in Table IV. There were no statistically significant differences between bona fide CBT and bona fide non-CBT in abstinence rates (58.92% and 48.15%, respectively), frequency of binge eating and/or purging, depressive symptoms, self-concept, or interpersonal problems. Heterogeneity was not statistically significant for these analyses with the exception of frequency. However, with too few comparisons ($k = 5$), moderator analyses were not conducted. Bona fide CBT was superior to bona fide non-CBT in reducing ED psychopathology ($g = .31$, $p < .001$) at post-treatment. The effect was small, heterogeneity was not statistically significant, and a one study-removed analysis did not change these findings

Table IV. Effects of bona fide CBT compared to bona fide non-CBT.

Time	Outcome	Tx type	$N(k)$	g	RR	95% CI	p	Q	$p(Q)$	I^2	ES range	
Post-treatment	Abstinence	All	6(7)		1.16	.93; 1.45	.183	11.27	.080	46.74	0.63, 2.80	
	Frequency	All	4(5)	-.10		-.92; .71	.807	25.19	< .001	84.12%	-2.04, .72	
		All	11	.31		.16; .46	< .001	10.68	.470	0%	-.35, .82	
	ED Psychopathology	Group	4(4)	.19		-.06; .45	.138	1.88	.589	0%	-.35, .37	
		Individual	7(8)	.37		.18; .56	< .001	7.62	.367	8.11%	-.14, .82	
			vs. IPT	6(6)	.28		.09; .48	.004	5.84	.322	14.33%	-.35, .68
		Depression	All	7(7)	.08		-.11; .27	.417	6.52	.367	8.02%	-.48, .64
	Self-concept	All	5(5)	.08		-.15; .31	.506	5.47	.242	26.90%	-.43, .37	
	Interpersonal problems	All	4(4)	.04		-.20; .27	.768	4.09	.252	26.69%	-.53, .19	
≤6 months	Abstinence	All	3(3)		1.10	.81; 1.49	.563	4.68	.096	57.24%	.90, 1.64	
	Frequency	All	1(1)	-.96		-1.70; -.21	.012	NA	NA	NA	NA	
≤6 months	ED Psychopathology	All	6(6)	.24		.05; .43	.013	1.29	.936	0%	.47, .12	
		Group	3(3)	.17		-.08; .42	.187	0.34	.845	0%	.12, .34	
	Individual	3(3)	.33		.05; .62	.023	0.23	.891	0%	.29, .47		
	Depression	All	3(4)	.18		-.05; .42	.128	2.85	.415	0%	-.14, .55	
≤6 months	Self-concept	All	4(4)	-.45		-1.25; .35	.273	40.51	<.001	0	-2.0, .11	
	Interpersonal Problems	All	3(3)	.14		-.08; .35	.209	0.30	.860	0%	.02, .17	
>6 months	Abstinence	All	5(6)		1.23	.88; 1.73	.232	12.24	.032	59.15%	.82, 5.50	
		Group	2(2)		1.01	.78; 1.30	.950	1.43	.233	29.85%	.91, 1.19	
		Individual	3(4)		1.73	.85; 3.54	.133	7.90	.048	62.04%	.82, 5.50	
	Frequency	All	1(1)	-.47		-1.26; .33	.254	NA	NA	NA	NA	
	ED Psychopathology	All	5(6)	.16		-.02; .34	.079	2.63	.756	0%	.04, .47	
	Depression	All	4(5)	.29		-.06; .63	.106	8.78	.067	54.41%	-.07, 1.11	
	Self-concept	All	4(4)	.01		-.21; .22	.947	1.71	.634	0%	-.04, .50	
	Interpersonal Problems	All	2(2)	.09		-.15; .32	.474	0.47	.494	0%	0, .17	

Note: CBT: cognitive behavioral therapy; Tx: Treatment; $N(k)$: number of studies (number of comparisons); ED: eating disorder; g : Hedge's g ; RR : relative risk; ES range: effect size range of all studies included in the analysis. Abstinence: dichotomous outcome of the number of participants in each condition with cessation of binge eating and/or purging in the last seven, 14, 21, or 28 days. Frequency: continuous outcome of the number of binge-eating and/or purging episodes in the last 7 or 28 days. ED psychopathology: continuous outcome of subscale scores of valid eating disorder psychopathology measures. Depression: valid self-report measures of depressive symptoms. Self-concept: valid self-report measures of self-esteem and/or self-efficacy. Interpersonal problems: Inventory of Interpersonal Problems.

Follow-up. At short-term (≤ 6 months) follow-up, there were no statistically significant differences between bona fide CBT and bona fide non-CBT in abstinence rates, depressive symptoms, self-concept, or interpersonal problems. Heterogeneity was not statistically significant for these analyses with the exception of self-concept. Moderator analyses were not conducted as there were too few comparisons ($k = 4$). Only one study (Wolf & Crowther, 1992) reported frequency of binge eating and/or purging at short-term follow-up and results were statistically significantly in favor of behavior therapy (BT) over CBT. Bona fide CBT was superior to bona fide non-CBT in reducing ED psychopathology ($g = .24$, $p = .013$) at short-term (≤ 6 months) follow-up. The effect was small and heterogeneity was not statistically significant. A one study-removed analysis did not change these findings, with the exception of depressive symptoms. Removal of Tasca et al. (2006) lead to a statistically significant difference between bona fide CBT and bona fide non-CBT (in favor of CBT) in improving depressive symptoms.

At long-term (> 6 months) follow-up, there were no statistically significant differences between bona fide CBT and bona fide non-CBT for any outcome. Heterogeneity was not statistically significant for these analyses with the exception of abstinence. To attempt to explain the variability among effect sizes for abstinence we computed effects for group psychotherapy and individual psychotherapy separately. Treatment modality was not a statistically significant moderator of abstinence rates (between-level $Q = 2.91$, $df = 1$, $p = .088$). A one study-removed analysis did not change the statistical significance or direction of any of these findings.

Publication Bias

Eleven analyses included 10 or more trials. Publication bias was detected in two analyses: (1) bona fide psychotherapy vs. wait-list for depressive symptoms outcome (adjusted for one study missing); and (2) bona fide psychotherapy vs. wait-list for the self-efficacy outcome (adjusted for four studies missing). After adjusting with the trim & fill procedure, the overall effect sizes for depressive symptoms and self-efficacy remained non-significant. The conclusions are therefore robust even if it is assumed that one and four studies are missing.

Study Quality

The average omnibus rating (item 25) was 4.51 ($SD = 1.22$; range = 2, 7) out of a possible range of one (exceptionally poor) to seven (exceptionally good).

Twelve RCTs (34.3%) received an “average” rating (omnibus rating of 4) while only two RCTs (5.7%) received an “exceptionally good” rating (omnibus rating of 7). See Table I for all omnibus ratings.

Discussion

The primary goal of the current meta-analysis was to estimate the effect of bona fide psychotherapy for adults with EDs. Compared to wait-list control conditions, bona fide psychotherapy yielded superior results at post-treatment compared to wait-list control conditions with small to large effect sizes (g range = .24–.81). Participants who received bona fide psychotherapy were 5.64 times more likely to be abstinent from binge eating and/or purging than participants in the wait-list control conditions. On average, 2.2 (numbers needed to treat; NNT) individuals would have to receive bona fide psychotherapy (instead of wait-list) for one additional individual to be abstinent at post-treatment. These findings are consistent with the general psychotherapy research in which bona fide psychotherapy is more effective than wait-list control conditions (Wampold et al., 1997).

Compared to non-bona treatment, participants who underwent bona fide psychotherapy were 1.41 times more likely to be abstinent from binge eating and/or purging at post-treatment. However, many of the significant differences between bona fide psychotherapy and non-bona fide treatment were not reliable once single studies were removed from the analyses, and so results should be interpreted with caution. Significant heterogeneity was observed for abstinence and frequency of binge eating and/or purging at post-treatment. We suspect that this is a result of the differences in the focus of the non-bona fide treatments. For example, while all the bona fide psychotherapies are fairly similar with regard to effects on the outcomes included, the non-bona fide treatments vary in their focus (e.g., nutritional therapy, supportive therapy) and so might yield different effects on these outcomes. The majority of analyses of other primary outcomes showed similar outcomes for bona fide psychotherapy and non-bona fide treatment. These findings are in contrast to the Spielmans et al. (2013) meta-analytic findings in which bona fide psychotherapy was superior to non-bona fide treatment for combined primary outcomes at both post-treatment and follow-up. A likely explanation for these contradictory findings is that unlike the Spielmans et al. review, the current meta-analysis included only RCTs. Also, we did not combine primary outcomes and secondary outcomes. The non-bona fide

treatments included in this review may contain key common factors (e.g., therapeutic alliance, instillation of hope, therapist empathy, intention to be effective) that may account for the relative effectiveness of these interventions. Similarly, some of the non-bona fide treatments may contain some specific ingredients as well. We encourage researchers to continue investigating non-bona fide treatments so that clear conclusions can be drawn for these treatments. Currently, based on the available literature, we recommend that adults with an ED seek out bona fide psychotherapy to optimize their treatment outcomes, although we recognize that some non-bona fide interventions on average may be just as effective. Nine individuals would have to receive bona fide therapy instead of non-bona fide treatment for one additional individual to be abstinent at post-treatment.

Our second goal was to investigate whether bona fide psychotherapies yielded equivalent effects by comparing bona fide CBT to bona fide non-CBT. Bona fide psychotherapy, regardless of treatment orientation (CBT vs. non-CBT), performed similarly for almost all outcomes at all time points. However, at post-treatment ($g = .31$) and short-term follow-up (≤ 6 months; $g = .24$), bona fide CBT showed small superior effects for improving ED psychopathology compared to bona fide non-CBT. One possible explanation for this finding is that the majority (75%) of the studies used the Eating Disorder Examination (EDE; Fairburn & Cooper, 1993) and the EDE-Questionnaire (EDEQ; Fairburn & Beglin, 1994) as a measure of ED psychopathology. These measures were designed to assess the cognitive and behavioral maintenance factors of EDs (Fairburn & Beglin, 1994; Fairburn & Cooper, 1993). For example, items ask participants about their desire to lose weight, fear of losing control over eating, and whether they have deliberately limited the amount of food they consume. Thus, it is not surprising that the items on these measures are particularly sensitive to CBT interventions. By contrast bona fide CBT and bona fide non-CBT did not differ on depression, self-concept, and interpersonal problems which are mechanisms purported by the interpersonal model to underlie binge eating (Wilfley et al., 2002). Our findings are consistent with what was demonstrated in CBT trials for depression. For example, Shapiro et al. (1994) compared CBT and psychodynamic IPT for depression and found no differences between the two treatments on eight outcome measures except for the Beck Depression Inventory (BDI; Beck, Ward, Mendelson, Mock, & Erbaugh, 1961), which resulted in a large effect in favor of CBT, a treatment also developed by Beck, Rush, Shaw, and Emery (1979). Similarly, in a meta-analysis, Oei and Free (1995) demonstrated that change in

cognitions following psychotherapy were related to decreases in depressive symptoms as measured only by the BDI (Beck et al., 1961) but on no other depression scale.

Our findings are similar to those reported in the Spielmans et al. (2013) meta-analysis with one exception. Spielmans et al. found bona fide CBT to be superior to bona fide non-CBT on combined primary outcomes (including abstinence, frequency of binge eating and/or purging, and ED psychopathology) at post-treatment. The authors pointed out that this result may be due to study confounds which favored CBT. Given the results of the current meta-analysis, there does not appear to be any clear advantage of bona fide CBT over other bona fide psychotherapies in improving abstinence rates, reducing the frequency of binge eating and/or purging. On average, 9.3 individuals (NNT) would have to receive bona fide CBT (instead of bona fide non-CBT) for one additional individual to be abstinent at post-treatment. While treatment guidelines recommend CBT and IPT as first-line treatment options (APA Work Group on Eating Disorders, 2006; NICE, 2004; Yager et al., 2014), the available evidence in the ED literature does not indicate that any bona fide psychotherapy is clearly superior in the treatment of EDs, although CBT may be more effective in reducing CBT-defined ED psychopathology.

Identifying what specific factors are responsible for psychotherapeutic change for EDs is beyond the scope of our study. However, past meta-analyses that examined the effects of both common (i.e., alliance, goal consensus, expectations, etc.) and specific (i.e., differences between treatment types, adherence to protocol, specific ingredients, etc.) psychotherapy factors for other mental disorders (see Ahn & Wampold, 2001; Baldwin & Imel, 2013; Bell, Marcus, & Goodlad, 2013; Norcross, 2011; Wampold et al., 1997; Webb, DeRubeis, & Barber, 2010) indicated that effects produced by the common factors were much larger than those produced by specific factors. More research is needed in the ED field to replicate these findings regarding common factors; however, we suspect that similar results will be obtained among those with an ED. For example, with regard to alliance, a meta-analysis by Graves et al. (2017) indicated that early symptom improvement was related to subsequent therapeutic alliance level, and that previous alliance level was related to subsequent symptom improvement in individuals with an ED.

An implication of these findings for the treatment of EDs is that therapists skilled in any bona fide psychotherapy for EDs may effectively treat individuals. Thus, recommending only one or two bona fide psychotherapies for individuals with an ED as is done by

some treatment guidelines may not be consistent with the cumulative evidence from meta-analyses. Including a wider range of bona fide psychotherapies as treatment options would give providers and individuals with an ED more treatment options. Some have argued that to enhance outcomes, common or contextual factors need to be taken into consideration when delivering treatment (Wampold & Imel, 2015). For example, the therapist can: (a) adapt treatment to the patient's culture and values; and (b) develop and maintain a therapeutic alliance (Wampold & Imel, 2015).

Limitations and Future Directions

Many of the analyses in this study included a small number of comparisons, and there was insufficient power to detect differences or conduct meaningful moderator analyses. The small number of comparisons may also have influenced the results of the sensitivity analyses. For example, the removal of some comparisons that lead to a different conclusion could have been due to their large sample sizes compared to the other comparisons in the analysis. Thus, results should be interpreted with an appropriate degree of caution. As more trials become available, the number of comparisons needed for these analyses will increase, the power of the analyses will be improved, and the effects of important moderators (i.e., type of non-bona fide treatment, ED diagnosis) can be assessed. There is a need for more RCTs on bona fide psychotherapy for AN, however, high treatment refusal rates, low recruitment numbers, and an approximately 40% dropout rate make completing such trials difficult (Halmi, 2008). Additionally, over half (53%) of the bona fide vs. non-bona fide comparisons include CBT as the bona fide psychotherapy. We encourage researchers to continue investigating all types of bona fide psychotherapies for EDs so that treatment guidelines can be updated accordingly, and more evidence-based treatment options can be available for individuals with an ED.

While we evaluated the quality of all included RCTs, we did not directly examine the effect of overall quality or single quality items (i.e., researcher allegiance, therapist allegiance, etc.) on the magnitude of effect sizes. We recommend that in the future, the quality of RCTs of psychotherapy for EDs be investigated and the effect of quality on the magnitude of effect sizes be reported.

The current meta-analysis used a different coding procedure for CBT vs. non-CBT bona fide psychotherapies than Spielmans et al. (2013), which can lead to different results. For example, in the current study, behavior therapy without a cognitive

component and cognitive therapy without a behavioral component were not coded as CBT. The categorization of types of psychotherapies is something that is often overlooked in psychotherapy research but should be taken into consideration in the future.

Our data came from published trials (with the exception of one dissertation; Allen, 1997) and publication bias was identified in two analyses. To improve the results of future meta-analyses, we suggest all trials be registered, have a published protocol, and all results be reported in peer-reviewed journals following the CONSORT (CONsolidated Standards of Reporting Trials) standards. Finally, as is the case in ED research in general, males and other ethnic groups were underrepresented.

Conclusion

Overall, results of this meta-analysis indicate that bona fide psychotherapy is effective in the treatment of EDs. While bona fide psychotherapy and non-bona fide treatments yielded similar results for many outcomes, bona fide psychotherapy outperformed non-bona fide treatments on several outcomes, though the latter results may not be stable. Until further research is conducted and more accurate conclusions can be drawn, we recommend individuals with an ED seek out bona fide psychotherapy as a first-line treatment option. As more research on non-bona fide treatments become available, it will be possible to identify whether any of these treatment options (i.e., self-help, supportive therapy, behavioral weight loss) yield outcomes equivalent to or better than those of bona fide psychotherapy.

Our results are consistent with common factors model, in that bona fide psychotherapy, regardless of treatment orientation, yielded similar effects. Therapeutic alliance is the most researched common factor in psychotherapy research (Huibers & Cuijpers, 2015). However, more research is needed to identify mechanisms by which alliance and other common factors are responsible for therapeutic change in ED treatment trials. Future research should be designed to enable researchers to isolate and manipulate key common and specific factors while treating individuals with an ED in order to examine causal links to outcomes. Our conclusion at this time is in line with that of Wampold (2005) who posits that *how* a bona fide psychotherapy is conducted is more important than *what* bona fide psychotherapy is conducted.

Supplemental Data

Supplemental data for this article can be accessed at <https://doi.org/10.1080/10503307.2018.1489162>

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