

Efficacy of Family-Based Treatment for Adolescents with Eating Disorders: A Systematic Review and Meta-analysis

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ABSTRACT

Objective: To systematically review and quantitatively evaluate the efficacy of Family-Based Treatment (FBT) compared with individual treatment among adolescents with eating disorders.

Method: The literature was reviewed using the MEDLINE search terms “family therapy AND Anorexia Nervosa,” and “family therapy AND Bulimia Nervosa”. This produced 12 randomized controlled trials involving adolescents with eating disorders and family therapy which were reviewed carefully for several inclusion criteria including: allocation concealment, intent-to-treat analysis, assessor blinding, behavioral family therapy compared with an individual therapy, and adolescent age group. References from these articles were searched. Only three studies met these strict inclusion criteria for meta-analysis. A random effects model and odds ratio was used for meta-

analysis, looking at “remission” as the outcome of choice.

Results: When combined in a meta-analysis, end of treatment data indicated that FBT was not significantly different from individual treatment ($z = 1.62$, $p = 0.11$). However, when follow-up data from 6 to 12 months were analyzed, FBT was superior to individual treatment ($z = 2.94$, $p < 0.003$), and heterogeneity was not significant ($p = 0.59$).

Discussion: Although FBT does not appear to be superior to individual treatment at end of treatment, there appear to be significant benefits at 6–12 month follow-up for adolescents suffering from eating disorders. © 2012 by Wiley Periodicals, Inc.

Keywords: adolescents; family-based

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Introduction

Eating disorders are characterized by an excessive preoccupation with body weight or shape, and can have serious physical and psychological consequences, particularly if first developed in adolescence. Anorexia Nervosa (AN), Bulimia Nervosa (BN), and Eating Disorder Not Otherwise Specified (EDNOS) are the categories described within the DSM-IV-TR. AN is known to have the highest mortality rate of any mental illness, a rate which increases 5.6% per every decade that an individual remains ill.^{1,2}

Although there remains relatively little research on interventions that address the complex mental and physical needs of children and adolescents with eating disorders, Family-Based Treatment (FBT) is one form of treatment that has been gaining an evidence base, and is a recommended practice by the American Psychiatric Association.³ Also known as “Maudsley Family Therapy” this treatment model was developed at the Maudsley Hospital in London, England, and has been systematically detailed and manualized by Lock et al.⁴ FBT is an outpatient, intensive treatment that utilizes the family as the primary resource to renourish the affected child or adolescent. It involves approximately 9–12 months of treatment.⁴ One therapist is involved, along with a physician to assess physical health.

A recent Cochrane review and meta-analysis that examined family interventions for individuals of all ages with AN⁵ found that there is some evidence to suggest that family therapy may be more effective in terms of remission compared to treatment as usual (RR = 3.83, 95% CI 1.60–9.13). This Cochrane review could find only two studies^{6,7} involving family therapy compared to treatment as usual that used remission as an outcome, resulting in a com-

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bined total of 81 participants. These two studies involved primarily adults. This review also examined whether family interventions are superior to other psychological therapies in obtaining remission status and found four trials including 149 participants.^{7–10} This comparison could not find a significant difference between family therapy and other psychological interventions for AN (RR 1.13 95% CI 0.72–1.76).

This meta-analysis is the only available one on family therapy for eating disorders; however, there are some methodological issues with the review. First, it combined both adult and adolescent participants, and there is some evidence that adolescents may have a better response to family interventions compared to adults.¹⁰ Second, many different types of family therapy were included, and the largest evidence base currently exists for family therapy that follows Maudsley principles.^{11,12} Our study aims to systematically review the literature as it pertains to family therapies that follow *Maudsley principles* for adolescents with eating disorders, and to compile the results quantitatively using meta-analysis.

Method

Search Strategy

We used three different methods to search for studies comparing the efficacy of FBT to individual treatment among adolescents with eating disorders. First, we reviewed the only Cochrane systematic review and meta-analysis published on the use of family interventions with individuals diagnosed with AN.⁵ Second, we performed a literature search using the database MEDLINE. The phrases “family therapy AND Anorexia Nervosa,” and “family therapy AND Bulimia Nervosa” were used as search terms in the database’s general search engine. Finally, the Cochrane database of controlled trials (www.cochrane.org) and the metaRegister of Controlled Trials (www.controlled-trials.com/mrct) were also used to locate articles using the same search terms. The references of these articles were also reviewed for studies not found in the database searches.

Selection Criteria

Following the principles outlined in the Cochrane Reviewer’s Handbook¹³ and the Users’ Guides to Medical Literature,¹⁴ there were four selection criteria used to evaluate studies for inclusion in our meta-analysis.

- A. Criteria pertaining to study validity: (1) a randomized parallel design with a control

group, (2) evidence of allocation concealment (investigators could not predict to which group patients were randomly allocated), (3) outcome assessors were blinded to treatment versus placebo condition, (4) use of an intent-to-treat analysis (ensures that data for all randomly allocated patients are analyzed at the completion of the study and validates the randomization process).

- B. Criteria pertaining to the subjects: (1) adolescents (aged 12–20 years) diagnosed with an eating disorder (AN, BN, or EDNOS), meeting criteria in the DSM-IV-TR.
- C. Criteria pertaining to the intervention: (1) Family-based intervention that is behaviorally focused, with parents initially in charge of the refeeding process (hereafter labeled FBT), (2) control condition similar in each study—individual therapy.
- D. Criteria pertaining to the outcome: (1) Data reported in a usable form for meta-analysis. (2) “Remission” was chosen as the preferred outcome, as this outcome can be applied across studies. Remission could be defined in several ways (absence of DSM-IV-TR criteria, attainment of certain % Ideal Body Weight, abstinence from binge eating and purging). (3) The outcome was measured at similar time points, i.e., immediately post-treatment, and at 6–12 month follow-up, and reported within the same study. When follow-up data were reported at 6 and 12 months, we chose the latter.

Several exclusion criteria were established: (1) open trials, (2) studies involving primarily adults, defined as age greater than 20 years, (3) studies comparing family interventions to other interventions such as group therapy or medication, (4) studies involving other types of family interventions that are more psychodynamically oriented (not behaviorally based), and (5) studies that were primarily long-term follow-up studies. Only studies that were accessible in English were included in the screening and abstraction procedure, and finally, if more than one publication described a single study, only the study that examined remission as the primary outcome was included.

Study Identification and Data Extraction

The first two authors (JC and MK) completed the literature search and screening process independently. In each case, the authors completed the searches, extracted the citations and abstracts, performed a title and abstract screen, and from this point, reviewed the entirety of those articles felt to be appropriate for inclusion. Discrepancies

regarding inclusion were resolved through an iterative discussion comparing those articles in question, versus those that met clear inclusion criteria. Data extraction was also done independently and checked for accuracy.

Data Analysis

Meta-analysis was performed using RevMan version 5 for Windows according to the Cochrane Reviewer's Handbook.¹³ Given that the outcome of interest, remission, is a binary variable, an odds ratio was used to compile results. A random effects model was chosen because it is generally more conservative than a fixed effects model. In a random effects model, it is assumed that the true effect can vary from study to study, depending on such things as the reliability of measurement, slight variations in the intervention or characteristics of the participants. A test for heterogeneity was also performed in order to examine whether combining the results across the different studies was appropriate. Data were analyzed at end of treatment and separately at 6–12 month follow-up (using the follow-up data from 12 months if available, or 6 months if 12 month data were not available). An intent-to-treat analysis was used, so that if participants were randomized, they were included in the denominator of the proportion in remission. A subgroup analysis was performed to look at diagnostic categories of AN and BN separately. Significance was set at $p < 0.05$.

Results

Excluded Studies

Overall, 12 randomized controlled trials were found involving adolescents with eating disorders and family therapy. Several studies were excluded from the analysis as they were either long-term follow up studies, or examined different aspects of the original studies (**Table 1**). For example, Eisler et al.¹⁵ reported on the five-year follow-up of the Russell study.¹⁰ Eisler et al.¹⁶ compared two different forms of family intervention, separated and conjoint. Geist et al.¹⁷ also compared two forms of family intervention, family therapy, and family psychoeducation. Lock et al.¹² compared two different durations (6 versus 12 months) of treatment of FBT, and did not include an individual therapy arm. Lock et al.¹⁸ looked at long-term outcomes (5 year) of the 6 versus 12-month duration study. Lock et al.¹⁹ examined predictors of drop-out from the duration study.

Included Studies

There were three studies that met strict inclusion criteria, including allocation concealment, blind-

ing, and use of intent-to-treat analysis (**Table 2**). Most recently, Lock et al.²⁰ completed a randomized controlled trial comparing outcomes among 121 adolescents with AN treated with either 12 months of treatment with FBT ($n = 61$) or Adolescent Focused Individual Therapy (AFT, $n = 60$). While there were no significant differences in full-remission at the end of treatment, FBT was significantly better than AFT at facilitating full-remission at 6- and 12-month follow-up. In terms of studies involving adolescents with BN, Schmidt et al.,²¹ randomized 85 adolescents with BN or EDNOS to FBT or individual CBT self guided care and found that at end of treatment, binge behaviors were lower in the CBT group, but there were no differences at 6-month follow-up. For combined remission from both binge eating and purging, there were no significant differences at end of treatment, or 6-month follow-up. le Grange et al.²² also tested FBT with 80 patients diagnosed with BN and found that subjects were significantly more likely to be symptom-abstinent when treated with FBT versus those who were treated with an individual type of Supportive Psychotherapy at end of treatment and at 6-month follow-up. These three studies were combined in the meta-analysis.

Because of the paucity of available research studies, a further three randomized controlled trials in which the elements of allocation concealment, assessor blinding, and intent-to-treat analysis were not mentioned were combined in a secondary meta-analysis if they met the other inclusion criteria. These studies included the very first randomized controlled trial of FBT for AN ever published by Russell et al.¹⁰ One subgroup in this study involved adolescents and thus, the sample size was 10 in the FBT group, and 11 in the individual group. In this subgroup of patients with AN, with an onset of illness before age 18, and duration of illness of less than three years, FBT was superior to individual treatment. Robin et al.⁹ compared FBT with individual therapy in adolescents with AN, and both groups improved, but those in FBT had a more rapid recovery. In this study, 19 adolescents in the FBT group were compared with 17 adolescents in the individual group. Ball and Mitchell⁸ studied 18 subjects with AN, 9 in a behavioral family therapy model compared to 9 receiving CBT. They did not find any differences in remission rates.

Meta-Analysis

When the three highest quality studies^{20–22} were combined in a meta-analysis, the test for heterogeneity was not significant ($p = 0.23$) indicating that

TABLE 1. Excluded randomized controlled trials

Study	Participants	Methods	Outcomes	Conclusions	Reason for Exclusion
Eisler et al. ¹⁵	80 individuals having AN or BN aged 14–55 years old.	RCT comparing Family Therapy and Individual Supportive Therapy	Morgan-Russell Scales	Patients with early onset and a short history of AN were more likely to be doing well had they used FT; whereas those with a late-onset of AN were more likely to be doing better if they had IST.	5 year follow-up study as well as age of sample
Eisler et al. ¹⁶	40 adolescents diagnosed with AN aged 11–17 years.	RCT comparing effectiveness of Conjoint Family Therapy vs. Separated Family Therapy.	Eating Attitude Test Eating Disorder Inventory Short-Mood and Feeling Questionnaire Rosenberg Self-Esteem Scale Morgan and Russell Scales Family Adaptability and Cohesion Evaluation Scales Standard Clinical Family Interview	Globally, CFT and SFT outcomes were equal at the end of treatment. However, those completing CFT had greater psychological improvement; whereas symptoms had greater improvement in SFT.	Comparing two forms of Family Therapy
Geist et al. ¹⁷	25 adolescents with AN aged 12–17.4 years	RCT comparing family therapy with family group psychoeducation	Ideal body weight Family Assessment Measure	No differences between groups in terms of weight restoration or family functioning	Comparing two forms of family intervention
Lock et al. ¹²	86 adolescents aged 12–18 years diagnosed with AN	RCT comparing short-term FBT (10 sessions over 6 months) and long-term FBT (20 sessions over 12 months)	Eating Disorder Examination	No significant differences between short-term and long-term family therapy	Comparing short and long-term FBT; with no control arm
Lock et al. ¹⁸	71 adolescents diagnosed with AN who were aged 12–18 years	RCT comparing short-term versus long-term FBT therapy	Body Mass Index Eating Disorder Examination	Short course of therapy is as effective a long-term therapy	5 year follow up of short versus long-term FBT
Lock et al. ¹⁹	86 adolescents diagnosed with AN aged 11–18 years	RCT comparing short (10 session, 6 months) FBT to long (20 session, 12 months) FBT.	Eating Disorder Examination Yale-Brown-Cornell Eating Disorder Scale Child Behavior Checklist Family Environment Scale	A co-morbid psychiatric diagnosis, as well as being randomized to the longer treatment predicted greater drop-out	Predicting therapy drop out by comparing short vs. long-term family therapy

combining results was appropriate. However, the results of the meta-analysis were not significant ($z = 1.62$, $p = 0.11$) (**Fig. 1**), indicating that FBT was no different from individual therapy at end of treatment. A funnel plot demonstrates there is no bias in the selection of studies, although it is hard to be certain with only three studies (**Fig. 2**). However, when the 6–12 month follow-up data from these three studies were analyzed, the results were statistically significant ($z = 2.94$, $p < 0.003$), indicating that FBT was superior to individual treatment. Heterogeneity was again not significant ($p = 0.59$) (**Fig. 3**). All follow-up data was reported in the original three articles.^{20–22}

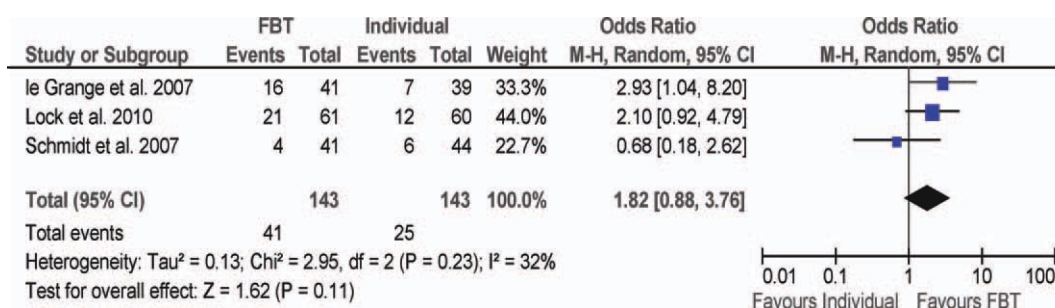
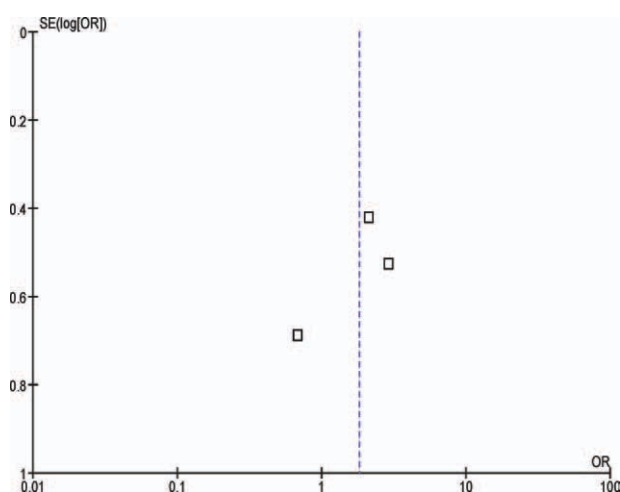
When a more inclusive approach was taken, and six studies were combined, heterogeneity was not significant ($p = 0.09$), indicating that combining results was appropriate. However, the results of the meta-analysis were still not significant ($z = 1.72$, $p = 0.09$) (**Fig. 4**), indicating that FBT was no differ-

ent from individual treatment in terms of remission at end of treatment. Lack of bias is shown in a second funnel plot (**Fig. 5**). However, when 6–12 month follow-up data from five out of these six studies were analyzed (one study did not have follow-up data), the results were statistically significant ($z = 2.96$, $p = 0.003$), indicating that FBT was superior to individual treatment in maintaining remission. Heterogeneity was not significant ($p = 0.79$) (**Fig. 6**). All follow-up data were reported in the original five articles.^{8,9,20–22}

A subgroup analysis was performed to examine whether separating out diagnostic groups produced different results. At end of treatment, looking at studies involving patients diagnosed with AN,^{8–10,20} FBT was not significantly different from individual treatment ($z = 1.50$, $p = 0.13$). This was the same for BN studies^{21,22} ($z = 0.57$, $p = 0.57$). However, at 6–12 month follow-up when just the studies involving patients with AN were combined, FBT

TABLE 2. Included randomized controlled trials

Study	Participants	Methods	Outcome Measures	Definition of Remission	Conclusions
Russell et al. ¹⁰	21 adolescents with AN Age 16.6 years \pm 1.7	Random allocation to FBT or individual therapy in weight restored individuals. Not intent to treat, no allocation concealment, no blinding.	Morgan Russell scale	Good/intermediate outcome on Morgan Russell (weight greater than 85%)	9/10 in FBT vs. 2/11 in individual therapy were in remission at end of treatment
Robin et al. ⁹	37 adolescents with AN Age 11–20 DSM-III-R criteria for AN	Random allocation to 12 months of Behavioral Family Systems Therapy (very similar to FBT) vs. Ego Oriented Individual Therapy. Not intent to treat, no allocation concealment, no blinding.	BMI Eating Attitudes Test Eating Disorders Inventory Child Behavior Checklist BDI Parent Adolescent Relationship Questionnaire	Attainment of target weight	13/19 in BFST vs. 12/18 in individual therapy in remission at end of treatment. 15/19 in FBT vs. 12/18 in individual therapy in remission at 1 year follow-up. BFST greater weight gain and higher rates of menstrual functioning at 1 year follow-up
Ball & Mitchell ⁸	25 Females 13–23 years AN <90%	25 sessions over a 12 month period CBT is the comparison group Not intent to treat, No allocation concealment, no blinding of assessors	Morgan Russell Treatment completers only (9 in each group) at least 21/25 sessions	Good/intermediate outcome on Morgan Russell scale (weight within 85%)	7/12 in remission in FBT versus 7/13 in remission in individual CBT at end of treatment and 6-month follow-up
Le Grange et al. ²²	80 adolescents aged 12–19 years DSM-IV BN, but also EDNOS if binged or purged at least once per week for 6 months	Random allocation to 6 months of FBT versus Individual Supportive Psychotherapy. Allocation concealment Independent assessor Intent to treat analysis	Abstinence from B-P behaviors Eating Disorder Examination	No binge episodes or compensatory behavior for a duration of 4 weeks	16/41 FBT vs. 7/39 SPT in remission at end of treatment. 12/41 vs. 4/39 at 6-month follow-up
Schmidt et al. ²¹	85 adolescents with BN or EDNOS Age 13–20	Random allocation to FBT or to individual CBT self guided care 6 months Blind assessors Allocation concealment Intent to treat	Abstinence from B-P behaviors Short evaluation of eating disorders	Combined abstinence from binge or purge behavior for 4 weeks	4/41 FBT vs. 6/44 CBT in remission at end of treatment. 12/41 FBT vs. 9/44 CBT in remission at 6 months.
Lock et al. ²⁰	121 randomized Adolescents age 12–18 years AN	Random allocation to FBT or AFT Allocation concealment, independent data analysis, intent to treat	Weight Eating Disorders Examination	Full remission = weight greater than 95% IBW and scores within 1 SD on the global mean Eating Disorders Examination	21/61 FBT vs. 12/60 AFT in remission at end of treatment. 22/61 FBT vs. 11/60 AFT at 1 year follow-up.

FIGURE 1. End of treatment outcomes for highest quality studies. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]**FIGURE 2.** Funnel plot of highest quality studies. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

was superior to individual treatment [$z = 2.17$; $p = 0.03$, (**Fig. 7**)]. The same result was found in the meta-analysis of the two studies involving patients diagnosed with BN [$z = 2.01$, $p = 0.04$ (**Fig. 8**)].

Discussion

This is the second meta-analysis to report on family therapy in eating disorders, and the first to focus on both FBT and adolescents with eating disorders. Fisher et al.⁵ produced a Cochrane review and meta-analysis on this topic which combined all age groups and types of family therapy. These authors concluded that although remission rates were higher in family therapy compared with treatment as usual, there was not enough evidence to determine whether family therapy had better remission rates compared with other psychological interventions. In addition, they did not find any differences in relapse rates, symptom scores, weight, or rates of dropout between those treated with family ther-

apy compared to those treated with other therapies. However, past literature has indicated that family therapy that is behaviorally based and focused on symptom resolution is more effective in adolescent patients who have been ill for less than three years.¹⁰ Thus, it was critical to examine this age group separately for the effect of this specific type of family therapy.

Our results indicated that although there does not appear to be a significant difference between FBT and individual therapy when measured at the end of treatment, when measured at 6–12 month follow-up, FBT is superior. This result was the same within the primary meta-analysis combining the three highest quality studies that employed allocation concealment, intent-to-treat analysis and assessor blinding, and also within our secondary meta-analysis involving these three studies plus three additional studies that did not comment on these methods. When the subgroup analysis was performed, separating out studies involving just AN or BN, the results were the same at end of treatment (FBT was the same as individual treatment). However, at 6–12 month follow-up, the results consistently indicate that for subjects with AN, and separately for those with BN, FBT is superior.

It is interesting that in our study no difference was seen at end of treatment, whereas the difference was significant at 6–12 month follow-up. One potential explanation for the significant difference at follow-up is that those who were in individual treatment no longer have the support of their therapist and revert back to eating disordered behaviors, whereas those who underwent FBT still have the support of their parents who are acting as a proxy for a therapist. In FBT, parents learn techniques that they can apply to help their child or adolescent for many years to come. This likely helps to keep these adolescents well, when the others relapse. Another plausible explanation is that those in the FBT group continue to make progress after treatment has ended by gaining more weight with

FIGURE 3. Outcomes at 6-12 month follow-up for highest quality studies. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

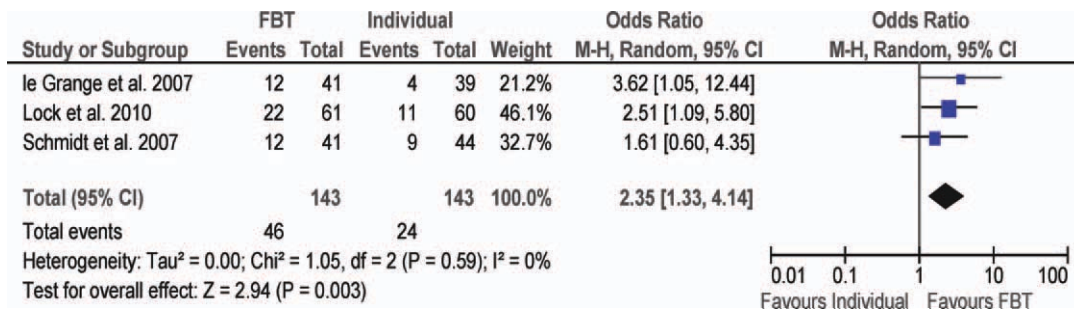


FIGURE 4. End of treatment outcomes, more inclusive approach. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

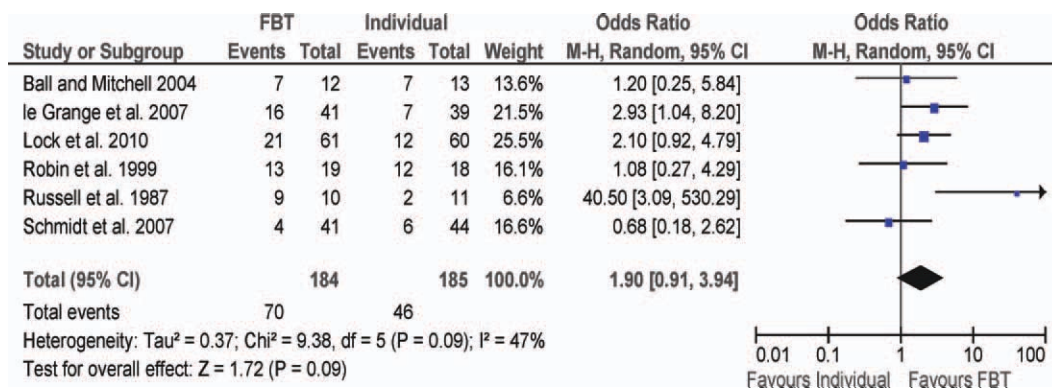
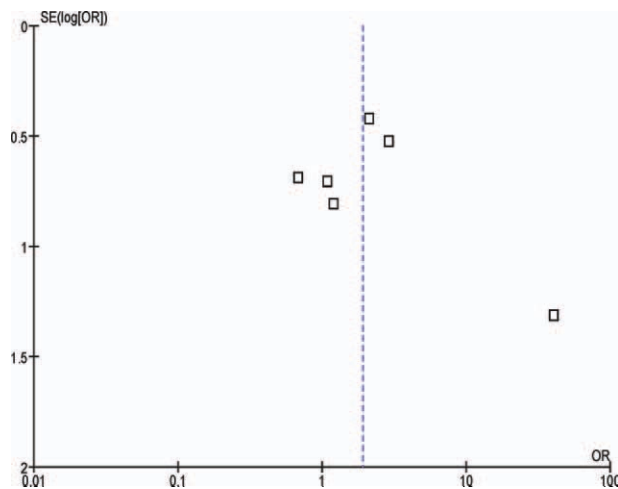


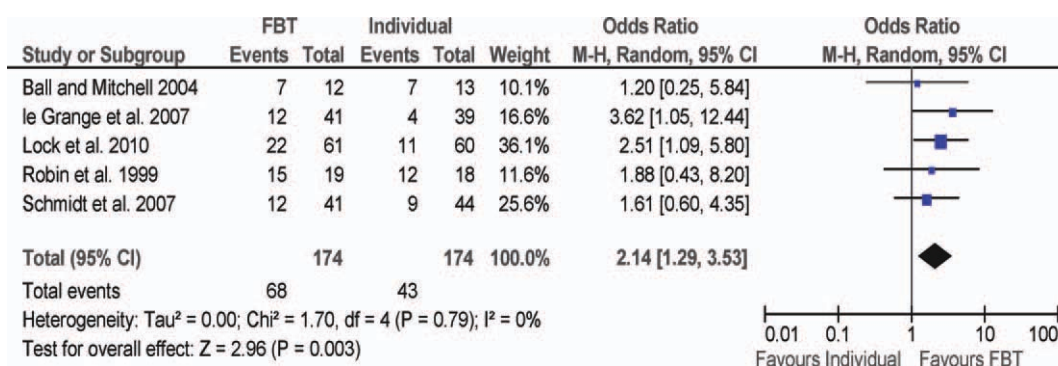
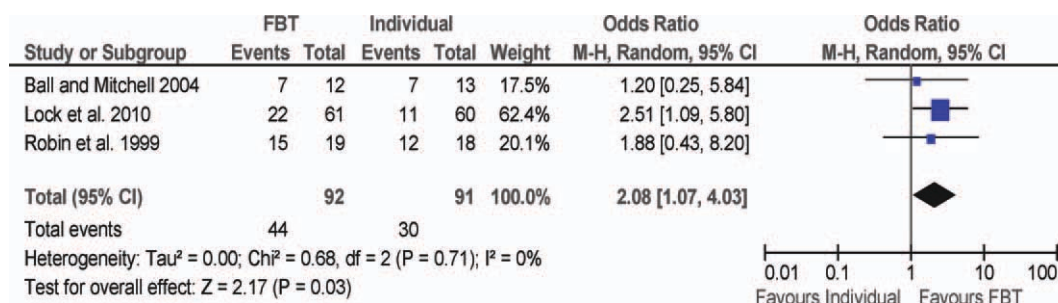
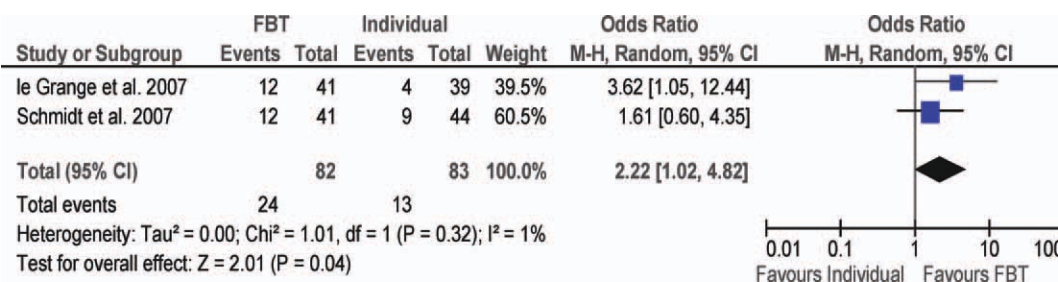
FIGURE 5. Funnel plot of six studies. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]



the help of their families, while those who underwent individual treatment do not continue to make gains. Perhaps both of these scenarios are at play at the 6–12 month follow-up, thereby widening the gap between the FBT and individual groups at this

time point. It could be argued that the follow-up period is an even better indication of recovery as more time has passed.

The limitations of this review and meta-analysis include the paucity of available studies in the area of family therapy for eating disorders. Only 12 randomized trials could be located, six of these comparing family to individual treatment, and only three of these followed the rigorous principles of allocation concealment, intent to treat analysis and assessor blinding. Thus, our results are limited by the availability of high quality studies in adolescents with eating disorders. In addition, the sample sizes within each of these studies are small. Moreover, we combined studies involving adolescents with AN, BN, and EDNOS. Although this could be a more heterogeneous group, there is also literature indicating that the vast majority of adolescents are diagnosed within the NOS category and that little difference in severity exists between these diagnostic groups.^{23,24} In fact, combining these groups improves the generalizability of these results. Outcomes were carefully reviewed to determine whether other outcomes could be combined, such as weight, or binge purge frequency. However, out-

FIGURE 6. Outcomes at 6-12 month follow-up, more inclusive approach. [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]**FIGURE 7.** Subgroup analysis at 6-12 month follow-up (AN only). [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]**FIGURE 8.** Subgroup analysis at 6-12 month follow-up (BN only). [Color figure can be viewed in the online issue, which is available at wileyonlinelibrary.com.]

comes were reported in such a diverse way that no other synthesis of outcome data was possible. This issue of disparate reporting of outcomes has been identified previously as a major problem within this field of research.²⁵ In addition, some treatments were six months in duration and some were 12 months. Generally, therapy for BN is shorter than for AN, but perhaps a more similar duration of treatment would be more desirable for combining results using meta-analysis. In addition, a standard follow-up time would enhance this consistency. Furthermore, there may be a confounding effect of

other treatments during the follow-up period. Two studies explicitly examined this and found no differences in the proportion of those receiving additional therapy,^{20,22} however, the other studies did not comment on this.

Conclusion

This review and meta-analysis indicates that behaviorally based family therapy (FBT or "Maudsley

Family Therapy”) for adolescents with eating disorders is superior to individual therapy at 6–12 month follow-up, although there is no difference at end of treatment. This treatment is superior to individual therapy at follow-up for both adolescents with AN, and BN. Family therapy focusing on symptom interruption of eating disordered behaviors should be recommended as the first line of treatment for adolescents with eating disorders. Given the growing evidence base for FBT for adolescents with eating disorders, it would be prudent to study implementation strategies and effectiveness of this treatment in the community.

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