How effective are treatments for child and adolescent depression? A meta-analytic review

Article *in* Clinical Psychology Review · April 2002

Impact Factor: 7.18 · DOI: 10.1016/S0272-7358(01)00089-7 · Source: PubMed

2 authors, including:

Kurt D Michael
Appalachian State University
41 PUBLICATIONS **305** CITATIONS

SEE PROFILE

Michael, K. D., & Crowley, S. L. (2002). How effective are treatments for child and adolescent depression? A meta-analytic review. ***Clinical Psychology Review***, *22:2*, 247-269. Elsevier (ISSN: 0272-7358) March 2002. doi:10.1016/S0272-7358(01)00089-7

Keywords: Depression | Child | Adolescent | Treatment

How Effective are Treatments for Child and Adolescent Depression?: a Meta-Analytic Review

Kurt D. Michael and Susan L. Crowley

ABSTRACT

We located a comprehensive sample of studies (1980–1999) on the psychosocial and pharmacological treatment of child and adolescent depression through an extensive literature search. Articles that met the inclusionary criteria were subsequently analyzed. The outcome data from 38 studies were extracted and converted into effect sizes (ESs). Comparisons of main effects, demographic, and quality of study variables were conducted. The overall findings of this meta-analysis indicate that several different psychosocial interventions for child and adolescent depression produced moderate to large treatment gains that were clinically meaningful for many afflicted youth. However, in general, the vast majority of pharmacological interventions were not effective in treating depressed children and adolescents. Nonetheless, there is recent evidence that selective serotonin reuptake inhibitors (SSRIs) such as fluoxetine are efficacious, and will likely play an increased role in the management of affective illness in youngsters. The clinical implications and limitations of these data are discussed and suggestions for future research are provided.

ARTICLE

1. Introduction

Although childhood depression was not a recognized phenomenon until recently, it is now considered to be an important area of research in child psychopathology (e.g., Cytryn; Kovacs and Kovacs). Estimates of the prevalence of child and adolescent depression in the general population are substantial, ranging from 0.4% to 8.3% (Birmaher; Fleming and Lewinsohn). Furthermore, there are a number of negative outcomes associated with child and adolescent depression including: diminished self-esteem (Kazdin, 1988), poor physical health (Costello et al., 1988), family dysfunction (Kashani, Burbach, & Rosenburg, 1988), increased risk for substance abuse (Kovacs, Goldston, & Gatsonis, 1993), disrupted parent–child attachment (Kovacs, 1997), and a substantial risk for morbidity and mortality across the lifespan (Fleming and Harrington). There is also compelling evidence that children and adolescents who suffer from depression have a variety of problems in daily living such as unsatisfying and conflicted interpersonal relationships (Puig-Antich et al., 1985), noteworthy declines in academic performance (Fleming, Offord, & Boyle, 1989), and an increased risk for dropping out of school (Fleming & Offord, 1990). Another reason to be concerned about child and adolescent depression is the association between clinical mood disturbances and suicide (Kovacs and Rao).

Moreover, childhood depression is often persistent and leads to an increased risk of recurrence during adolescence and adulthood (Kovacs, Obrosky, Gatsonis, & Richards, 1997). In a number of investigations, up to 40% of the children originally identified with depressive symptoms remained symptomatic years later (e.g., DuBois; Fleming; Kovacs; Lewinsohn and Nolen). In summary, the data regarding the prevalence, negative outcomes, and persistence of child and adolescent depression offer ample justification for providing effective treatments early during the course of the illness. Indeed, several researchers and clinicians have developed and implemented various treatments for child and adolescent depression ranging from psychosocial interventions to pharmacological regimens. Thus, the purpose of the present investigation is to systematically review the overall effectiveness of psychosocial and pharmacological treatments for child and adolescent depression.

1.1. Review of reviews

1.1.1. Psychosocial treatment

Many of the attempts to synthesize the literature on the treatment of child and adolescent depression have been narrative in nature. For example, with respect to psychosocial interventions, a total of 13 narrative reviews were located, published between 1983 and 1998 (e.g., Birmaher; Cytryn; Kashani and Kaslow, N.J. and Thompson, M.P., 1998. Applying the criteria for empirically supported treatment to studies of psychosocial interventions for child and adolescent depression. Journal of Clinical Child Psychology 27, pp. 146–155. Full Text via CrossRef | View Record in Scopus | Cited By in Scopus (101)Kaslow). Unfortunately, the number of psychosocial treatment studies cited in the above-mentioned reviews were often small, and noninclusive, ranging from zero (Cytryn & McKnew, 1985) to 14 (Kaslow & Thompson, 1998). In terms of the substantive findings from the earlier reviews, they are often unclear and conflicting, and did not consider how outcomes covaried with theoretically important demographic variables (e.g., age). In perhaps the most systematic narrative review to date, Kaslow and Thompson (1998, p. 146) reviewed 14 psychosocial interventions for child and adolescent depression. In general, the authors suggested that "psychosocial interventions are effective at posttreatment and follow-up in reducing depressive symptoms/disorders in clinical and nonclinical samples of youth, regardless of treatment modality or extent of parental involvement."

Although the overall efficacy of psychotherapy with children and adolescents has been examined via large meta-analytic reviews (Casey; Kazdin and Weisz), none of these investigators specifically addressed the issue of treating child and adolescent depressive disorders or they collapsed "depression" studies into more broadly defined categories (e.g., internalizing, emotional problems), making the extraction of specific data regarding the efficacy of depression treatment problematic. Only one large published meta-analytic review was located that addressed the issue of treating child and adolescent depression. In a meta-analytic review of 150 outcome studies on child and adolescent psychotherapy, Weisz, Weiss, Han, Granger and Morton (1995) included six controlled outcome studies of child and adolescent depression and reported a standard mean difference effect size (ES) of 0.64.

In a more recent investigation, Reinecke, Ryan, and DuBois (1998) analyzed many of the same studies (i.e., four of the six) included by Weisz et al. (1995) and included two others (i.e., Lerner and Wood) in a highly focused meta-analytic review of controlled cognitive–behavioral interventions for depressed adolescents. Reinecke et al. (1998) reported a standard mean difference ES of 1.02. Although the findings from these investigations are important, Weisz et al. included only six studies and they did not specifically address how the outcomes of child depression studies might covary or interact with other variables (e.g., age, sex). In terms of the meta-analytic review by Reinecke et al., the sample of studies analyzed were not only similar to

a previously published meta-analysis, but the findings were limited in that only cognitive–behavioral interventions for adolescents were included.

In one other meta-analytic review, Black-Cecchini (1996) analyzed 13 outcome studies investigating the efficacy of group-based social skills interventions for depressed youth as part of an unpublished doctoral dissertation. Black-Cecchini reported that the social skills group interventions produced moderate to large effects (i.e., average ES 0.76) in terms of ameliorating depressive symptomatology in depressed children and adolescents primarily from school samples. In addition, Black-Cecchini found that "inferior" studies had the highest mean ESs when compared to the higher quality studies. In summary, the existing narrative and meta-analytic reviews of psychosocial depression treatments have provided clinicians and researchers with some important trends. However, to date, there has not been an attempt to collect and systematically compare a more comprehensive sample of depression treatment studies, including pharmacological interventions. Further, there is a need to examine whether there is differential effectiveness when other variables are taken into account (e.g., age).

1.1.2. Pharmacological treatment

The prescription of psychotropic medications for children and adolescents has become a widely accepted practice (Kaplan, Simms, & Busner, 1994) despite the fact that the Food and Drug Administration (FDA) has yet to approve a single psychotropic agent for the specific purpose of treating depressed youth up to the age of 17 years old (Physician's Desk Reference, 1999; Peter Jensen, personal communication, March 16, 1998; Sommers-Flanagan & Sommers-Flanagan, 1996). Moreover, the potential adverse impact that pharmacological interventions have on child development remains unclear (Antonuccio and Vitiello). There have also been some serious concerns raised about treating children with tricyclic antidepressants (TCAs) because of potentially noxious or lethal side effects (e.g., Riddle; Werry and Wilens). However, given the advent of selective serotonin reuptake inhibitors (SSRIs), which are known to have less noxious side effect profiles (e.g., limited anticholinergic and sedative effects) and are easier to administer (i.e., once per day) than most of the TCAs, a number of practitioners have opted to use these medications as a safer alternative to the TCAs for the treatment of child and adolescent depressive disorders (Birmaher et al., 1996).

Despite the aforementioned concerns, a number of controlled medication trials for child and adolescent depression have been conducted. In the only published meta-analytic review located,

Hazell, O'Connell, Heathcote, Robertson, and Henry (1995) analyzed 12 randomized, controlled trials comparing the efficacy of TCAs and placebo in depressed children between 6 and 18 years of age. The authors reported a standard mean difference ES of 0.35 for the active medication conditions vs. the placebo (control) conditions. Hazell et al. (1995, p. 899) concluded that "the small additional effect afforded by treatment in comparison with placebo is unlikely to be clinically important in most patients." However, according to the authors, they were only able to derive ESs from 6 of the 12 studies due to limited information contained in the articles. Thus, some authors have criticized the conclusions from this meta-analytic review on empirical grounds (e.g., Anderson, 1995). Furthermore, in a review of the drug trials for early-onset depression, Conners (1992, p. 11) cautioned that "various methodological problems limit the conclusions that can be drawn" regarding the efficacy of antidepressant medications. That is, the substantial differences in the measurements used, criteria for "improvement," selection procedures, and sample characteristics in the various studies render comparisons across the studies tenuous at best (Conners, 1992).

Overall, it is estimated that there are between 14 and 17 published studies investigating the efficacy of psychotropic medications (i.e., TCAs and SSRIs) for depressed youth. A more up-to-date meta-analytic review that integrates the recent studies (especially those in which SSRIs were used), and includes a systematic examination of some of the important variables associated with outcome might provide some answers to important questions related to the effectiveness of pharmacotherapy for child and adolescent depression. Furthermore, there is a paucity of data on the comparison of pharmacological and psychosocial interventions for depressed children and adolescents. Only one study was located that compared psychotherapy vs. pharmacotherapy in the treatment of early-onset depression. Dujovne (1993) treated six clinically depressed children between 8 and 11 years old with imipramine and cognitive–behavioral therapy in a multiple-baseline, crossover design. Dujovne reported that both treatments resulted in a significant reduction in depressive symptoms over the course of the study with a slight advantage to the cognitive–behavioral regimen and increased parental satisfaction of the nonpharmacological intervention (i.e., cognitive–behavioral therapy). Thus, it appears that several important questions remain regarding the comparison of psychosocial and pharmacological treatments for depressed youth. And while direct comparisons between the psychotherapy and pharmacotherapy are well beyond the scope of this study, a meta-analytic review of both literature bases within the same investigation may serve a useful purpose for clinicians and practitioners who are interested in a comprehensive snapshot of treatment outcomes for depressed children and adolescents.

1.2. Interaction of variables

1.2.1. Age

Several previously unconsidered variables may have an important impact on treatment outcomes include age, sex, and quality of study. No published studies were located that specifically addressed the potential interaction between age and the treatment of early-onset depression, i.e., adolescent vs. child samples. (For purposes of clarity, children are referred to as those who are between 6 and 12 years old, whereas adolescents are identified as those who are between the ages of 13 and 18).

The empirical findings on the relationship between a child's age and general psychotherapy outcome have been equivocal. For example, Weisz et al. (1987, p. 542) reported "therapy proved more effective for children (ages 4–12) than for adolescents (ages 13–18)." In contrast, Weisz et al. (1995, p. 461) completed another integrative review (150 different studies) of the effects of psychotherapy with children and adolescents and reported that "treatment outcomes were better for adolescents than for children." For children 11 and younger, the authors reported a mean ES of 0.48, whereas the mean ES was 0.65 for adolescents 12 and older. Thus, the relationship between age and outcome remains unclear, especially with respect to the treatment of child and adolescent depression.

1.2.2. Sex

The interaction between sex and treatment outcome has been investigated by several researchers who have conducted large meta-analytic reviews (e.g., Casey and Weisz). Taken together, the findings suggest that psychotherapy is generally more effective for females than males. Weisz et al. (1987) reported a mean ES of 1.11 for female majority groups and 0.80 for male majority groups. Weisz et al. (1995) reported similar findings, indicating that the mean ES for female majority samples was 0.71 as compared to 0.43 for male majority samples. In addition, the authors reported an Age×Sex interaction wherein the mean ES was 0.86 for adolescent female majority samples as compared to 0.37 for adolescent males. In contrast, the mean ESs for the male and female child samples (i.e., 11 and younger) were approximately equal. Thus, while there have been some interesting findings to date, more information is needed to better understand the relationship between sex and depression treatment outcome.

1.2.3. Quality of study

Various authors have suggested that the quality of a study can impact not only the findings from a particular study, but also the overall findings from an integration or meta-analytic review of several studies (e.g., Wilson and Wortman). Weiss and Weisz (1990, p. 639) examined the results from large meta-analytic studies to determine whether methodological factors impacted the magnitude of ESs. These researchers reported that "in general, increased experimental rigor was related to larger effect sizes." To add to this literature base, the quality of each psychosocial study included in the present analysis will be coded and evaluated to examine whether methodological factors impacted treatment outcome. Evaluating the quality of the pharmacological studies was not feasible, given the insufficient data contained within the articles to render a reasonable methodological assessment.

In summary, there are three primary questions that will be addressed in the current investigation. First, what is the overall effectiveness of psychosocial interventions for child and adolescent depression? Second, what is the overall effectiveness of pharmacological treatments for child and adolescent depression? Third, is there evidence of differential effectiveness for psychosocial and pharmacological treatments when age, sex, and quality of study are considered?

2. Method

2.1. Population and sample

The population for this investigation included empirical studies on the treatment of child and adolescent depression. The overall sample for this investigation included 38 psychosocial and pharmacological studies targeting child and adolescent depression published between 1980 and 1999. There were 24 psychosocial studies (38 separate treatments) and 14 pharmacological trials. Case reports and single-subject designs were not included. Of the 24 psychosocial trials, the majority (15/24; 63%) were between-subject studies with wait-list, placebo, or no-treatment control groups and included mostly nonreferred youngsters (13/15; 87%) with depressive symptoms who were treated predominantly in school-based group interventions. For a between-group study to be considered a controlled trial, random assignment to one of the various conditions was a requirement. The remaining nine psychosocial trials were pre/post studies, seven (78%) of which included clinically referred youngsters with depressive diagnoses who were treated predominantly in outpatient clinical settings. In essence, the majority of the controlled trials were "efficacy" studies (i.e., mostly recruited subjects treated in school-based settings) whereas most of the pre/post trials were "effectiveness" studies conducted primarily in

naturalistic clinic settings with referred subjects (see Hoagwood, Hibbs, Brent, & Jensen, 1995, for a clarification of the distinction between efficacy and effectiveness research). All of the 14 pharmacological studies were controlled trials with children who met diagnostic criteria for Major Depressive Disorder. The articles were located through a comprehensive search strategy including an extensive computer search of databases such as PsycLIT, ERIC, and Medline. Hand searches of the reference lists from the obtained articles were conducted in an effort to find additional articles and several authors were contacted to inquire about "in press" studies or unpublished manuscripts. Manual searches of a variety of peer-reviewed journals were completed as well, including but not limited to: the Journal of Consulting and Clinical Psychology, the Journal of the American Academy of Child and Adolescent Psychiatry, Behavior Therapy, Archives of General Psychiatry, School Psychology Review, Behavioral Psychotherapy, the Journal of Abnormal Child Psychology, the Journal of Clinical Child Psychology, and the Journal of Affective Disorders.

Finally, a comprehensive search of unpublished theses and dissertations via ProQuest Dissertation Abstracts was completed dating back to 1980. A total of 10 potentially relevant dissertations were located, all of which were ordered. Several of the dissertations ordered were not received (i.e., four) due to restrictive lending policies at the various institutions. Of the six dissertations received, two were deemed appropriate for coding and included in the final sample of studies.

For a study to be included in the investigation, the effects of a particular treatment on child and adolescent depression had to be examined. The following specific criteria must have been met as well: the study had to be a within- or between-subjects group design; the sample was targeted for intervention based upon "at-risk" status (i.e., secondary prevention), presenting depressive symptomatology, or a depressive diagnosis; the subjects targeted for intervention were between the ages of 5 and 18; the treatment was psychosocial or pharmacological in nature (e.g., group, individual, family, TCA, SSRI); and at least one depression outcome measure was administered once the intervention was completed.

2.2. Design and analysis

An integrative or meta-analytic design was used during the course of this study, whereby the results from related treatment studies are compared (Glass, 1977). In the present study, a standardized mean difference ES was calculated (Smith, Glass, & Miller, 1980). A comprehensive coding sheet was developed so that each of the treatment outcome studies was evaluated based on the identified variables (e.g., age, sex). The quality of each study was rated

based on: (a) potential threats to internal validity, and (b) the overall validity of the study. The potential threats included: maturation, history, testing, instrumentation, regression, selection bias, and experimental mortality. These threats to internal validity and the associated effects upon treatment outcomes have been described extensively in the literature (e.g., Campbell & Stanley, 1963). All of the aforementioned threats were evaluated based on a 0–3 scale (0=not a plausible threat; 1=minor threat; 2=plausible threat; 3=by itself could explain the findings), and these data were combined with an assessment of other methodological factors (i.e., sample size, selection procedures, methodological rigor, and measurement technology) to yield an overall score. A five-point Likert scale (5=excellent; 4=good; 3=fair; 2=inferior; 1=unacceptable) was used to evaluate the overall quality of each study.

All treatment studies were double-coded by the primary researcher and a PhD candidate in psychology, who underwent extensive training in specific coding procedures. Two formulas were used to calculate the interrater agreement. First, interrater agreement percentages were calculated by dividing the total number of congruent observations (CO) by the total number of observations (TO) and multiplied times 100. Second, Cohen's Kappa (Cohen, 1960) was calculated for each variable to compensate for the limitations in the first formula. Interrater agreement rates ranged from 88% to 100% with an average agreement of 95.3%. Kappa coefficients ranged from .76 to 1.00, with an average kappa reliability coefficient of .91. The kappa coefficients for the specific variables under study in the present investigation were 1.00 (age), .92 (percent female), and .76 (overall quality of study). Disagreements in the coding of any variables were reconciled through consultation and clarification among the coders.

The results and variables from the various treatment studies were analyzed by computing a number of ESs. The calculation of ESs for the psychosocial studies were based upon measures of depressive symptoms and depressive diagnoses (i.e., self-report measures, diagnostic interviews). In some cases, the investigators used more than one self-report measure or combined self-report data with interview findings. Of the 24 psychosocial studies, 9 used a single self-report measure to assess outcome, while 3 studies combined 2 self-report measures to determine outcome. The remaining 12 studies used a combination of self-report and interview data to assess outcome. In studies where more that one assessment device was included, the measures were collapsed to yield one overall ES for each study to avoid the potential limitation of unequal weighting of studies with multiple ESs (Glass, 1977).

ESs were calculated with the assistance of the DSTAT computer software program (Johnson, 1989) whereby the outcome data (i.e., means, standard deviations, sample sizes) were entered. In cases where the means and standard deviations were not provided, ESs were computed from

other data reported in the studies (e.g., F ratios or t statistics). Furthermore, in a large number of pharmacological studies, means, standard deviations, F ratios, or t statistics were not reported. Instead, the percentage of improvement in the treatment and placebo-control groups was reported. Treatment response in these studies was determined by whether the subjects met criteria for "improvement" (i.e., change observed on particular measures). However, the criteria for improvement and the measures utilized to determine change varied across the studies. Nonetheless, ES estimates were calculated by transforming the difference in proportions (percent improved) between the experimental and placebo-control group subjects. This procedure (probit transformation) has been used in a number of meta-analyses (e.g., Clum and Miller, 1977) and is described elsewhere (see Smith et al., 1980).

Although this procedure is far from ideal in calculating ESs, it is more effective and accurate than simply excluding the study from the analysis. One of the primary limitations of this procedure is the inevitable loss of information that takes place after the outcome data are transformed multiple times into an ES. Nonetheless, it addresses a criticism (Anderson, 1995) of a previous meta-analysis (Hazell et al., 1995) on the efficacy of using antidepressant medications in children and adolescents whereby ESs were calculated from only 6 of the 12 studies due to the limited data contained in the articles. For studies that did not report any data suitable for conversion to ESs, but were important to include in the final analysis to increase comprehensiveness (and to reduce selection bias), an ES estimate of zero was entered. Assigning an ES of zero is a conservative procedure designed to prevent an inflated overall ES estimate, when including important, albeit incomplete information from particular studies (Rosenthal, 1984). In the present study, an ES of zero was entered only when the data could not be converted to an ES and the authors reported nonsignificant differences between the active and placebo conditions. An ES of zero was entered for three of the pharmacological studies that reported nonsignificant differences between the active vs. the placebo conditions and the data in the articles were insufficient to compute ESs.

For between-subjects group designs, the traditional meta-analytic formula, first proposed by Glass (1977), was utilized whereby unweighted ESs are calculated by subtracting the control group mean from the treatment group mean, divided by the control group (Glass, 1977). However, in order to get the best and most stable estimate of the variance of untreated subjects, a pooled standard deviation was used as the denominator, wherein the standard deviations of the experimental and control groups at pretreatment and the posttreatment S.D. of the control group only were combined (see Cohen's D; Cohen, 1988). Thus, in every case, the computed ESs were based on the variance estimates of untreated subjects. For within-subjects group designs, unweighted ESs were calculated as well. However, in these studies, the ES was interpreted as the magnitude of change observed in the experimental group from the pretreatment to posttreatment

phases (i.e., intrasubject variance). As such, comparisons of within- and between-group ESs were inappropriate. However, pre/post ESs were calculated for the between-group designs to facilitate a useful comparison of treatments across the two designs.

3. Results

3.1. Descriptive statistics

A summary of the descriptive data for the reviewed psychosocial and pharmacological studies is presented in Table 1. As can be seen, the majority of psychosocial trials (15/24; 63%) were between-subject studies with wait-list, placebo, or no-treatment control groups and included mostly nonreferred youngsters with depressive symptoms who were treated predominantly in school-based group interventions. The remaining nine psychosocial trials were pre/post studies, seven of which included clinically referred youngsters with depressive diagnoses who were treated predominantly in outpatient clinical settings. The psychosocial studies were published or conducted between 1980 and 1999, with the vast majority of studies published after 1990 (i.e., 88%). There were 38 active treatments across all studies and 2 attention-placebo conditions. The modal treatment regimen was cognitive–behavioral group therapy (n=13), followed by nondirective, supportive individual therapy (n=3), social skills group therapy (n=3), cognitive–behavioral individual therapy (n=4), and relaxation group therapy (n=2). The remaining treatments included nondirective, supportive group therapy, residential treatment, behavioral group therapy, aerobic exercise, individual relaxation therapy, role playing, family therapy, interpersonal therapy, and various combinations (e.g., group CBT plus parent group or group CBT plus family therapy). There were 3 prevention studies, 11 studies in which the subjects were targeted based on depressive symptomatology, and 10 studies where the subjects were included based on a depressive diagnosis (i.e., Major Depressive Disorder and/or Dysthymic Disorder).

Table 1. Frequency and percentage of study characteristics

Characteristics	Frequency	Percentage
Total number of studies reviewed	55	100.0
Number excluded	18	32.7
Reasons for exclusion		
Single-subject or case report	8	44.5
Sample not at risk or depressed	3	16.7
No depression outcome measure	2	11.1
Insufficient data to compute ES	5	27.7
Total number of studies included	38	69.1
Type of study		
Psychosocial treatment	24	63.2
Between-subject (controlled)	15	62.5
Within-subject (pre/post)	9	37.5
Pharmacological treatment	14	37.8
Between-subject (controlled)	14	100.0
Within-subject (pre/post)	0	0.0
Severity of depression		
Psychosocial		
Depressive diagnosis	10	42.0
Depressive symptoms	11	46.0
Prevention study	3	12.0
Pharmacological		
Depressive diagnosis	14	100.0
Year of publication (psychosocial)		
1980–1984	1	4.1
1985–1989	2	8.3
1990–1994	8	33.0
1995–1999	13	54.1
Year of publication (pharmacological)		
1980–1984	3	21.4
1985–1989	2	14.3
1990–1994	6	42.9
1995–1998	3	21.4
Source of study		
Published study	35	92.1
Dissertation or thesis	2	5.2
Unpublished manuscript	1	2.6
Follow-up assessment (psychosocial)	15	58.3
1–8 weeks	5	33.0
9–16 weeks	1	6.6
>16 weeks	9	60.0

In the between-subject group studies, there were a total of 1108 subjects between the ages of 7 and 18 years old. The number of subjects in each of the controlled studies ranged from 7 to 152 (median=57.5). There were six (40%) controlled studies in which the average age of the subjects was above 13 years old, whereas nine (60%) studies included subjects with a mean age of below 13 years old. In the within-subject group designs, there were a total of 391 subjects between the ages of 5 and 18 years old. The number of subjects in each of the pre/post studies ranged from 8 to 107 (median=46). Of the nine pre/post studies, 6 (66%) included subjects with an average age above 13 years old, whereas three (33%) studies included subjects with a mean age below 13 years old. The average percentage of female subjects across all 23 studies was approximately 56%. However, only 3 of the 24 studies (12.5%) reported separate findings based on sex.

The number of therapy sessions in the controlled trials ranged from 8 to 27 (median=10.5) and the number of weeks for each treatment ranged from 2 to 12 weeks (median=8). The number of sessions in the pre/post studies ranged from 5 to 36 (median=11) and the number of weeks for each treatment ranged from 4 to 24 weeks (median=12). Of the 15 controlled studies, 10 (66%) included follow-up data, ranging from 1 month to 2 years posttreatment (median=7 weeks). Among the nine pre/post trials, five (55%) included follow-up data, ranging from 1 month to 1 year posttreatment (median=4 months).

All 14 pharmacological studies included in the analysis were controlled clinical trials with active medication and placebo conditions. All 14 studies included subjects based on a diagnosis of Major Depressive Disorder based on DSM criteria and information solicited from self-report measures, interviews, and observations. The pharmacological trials were published or conducted between 1981 and 1997 and 64% of studies were published after 1990. There were a total of 441 subjects between the ages of 6 and 19 years old. The number of subjects in each of the pharmacological trials ranged from 6 to 96 (median=30). There were seven (50%) studies in which the subjects were 12 years of age or younger, six (43%) studies in which the subjects were 13 years of age or older, and one (7%) study in which there were children and adolescents ranging from 7 to 17 years old (Emslie et al., 1997). The average percentage of female subjects across all pharmacological studies was approximately 42%. However, none of studies reported separate findings based on sex.

The types of medications used in the pharmacological trials included imipramine (Tofranil; n=4), amitriptyline (Elavil; n=3), desipramine (Norpramin; n=2), nortriptyline (Pamelor; n=2), fluoxetine (Prozac; n=2), and venlafaxine (Effexor; n=1). The number of weeks for each treatment ranged from 4 to 8 weeks (median=6). The outcome data in the pharmacological trials were reported at the end of the acute phase of pharmacotherapy (i.e., posttreatment). Follow-up

data were not included in the original articles.

3.2. Main effects: psychosocial studies

Summary data for the psychosocial studies are presented in Table 2. The overall mean difference ES at posttreatment was 0.72 (range=0.03–1.84; 95% CI 0.48–0.94). Of the eight controlled psychosocial studies that reported follow-up data (median=6.5 weeks), the mean ES was 0.64 (range=0.08–1.55; 95% CI 0.32–0.95).

Table 2. Overall mean effect sizes at posttreatment and follow-up

Parenthetical ES values reflect amount of change on the dependent measures that were observed in controlled studies using intrasubject (pre/post) variance estimates; the ES value of 0.19 for pharmacological trials includes the addition of three ES estimates of zero from studies that reported "nonsignificant" differences between active and placebo conditions, but did not include sufficient data to compute an ES.

Type of study	*n*	Mean ES	95% CI
Posttreatment			
Controlled psychosocial	15 (23 treatments)	0.72	0.48–0.94
Intrasubject treatment		(1.23)	
Intrasubject control		(0.37)	
Pre/post psychosocial	9 (15 treatments)	1.14	0.75–1.52
Pharmacological	14	0.19	−0.08–0.45
Follow-up			
Controlled psychosocial	8 (12 treatments)	0.64	0.32–0.95
Pre/post psychosocial	5 (8 treatments)	1.26	0.99–1.52
Pharmacological	14	–	–

With regard to the nine pre/post psychosocial studies, the overall mean ES at posttreatment was 1.14 (range=0.23–2.30; 95% CI 0.75–1.52). For the five studies that reported follow-up data, the mean ES at follow-up (median=36 weeks) was 1.26 (range 0.95–1.94; 95% CI 0.99–1.52).

In order to facilitate a useful comparison of the mean ES of the between- and within-subject group designs, pre/post ES were also calculated for the controlled studies. The overall mean ES

for controlled studies using intrasubject variance estimates was 1.23 (range=0.30–2.27; 95% CI 0.90–1.55), which was comparable with the average ES for the pre/post studies (i.e., ES=1.14). To gather an understanding of the amount of change that occurred without treatment, pre/post ESs were calculated for control group subjects only. The pre/post ES calculations for control group subjects yielded a mean ES of 0.37 averaged across the 15 studies. These data approximate the amount of change between the pretreatment and posttreatment phases that could not be explained by or attributed to the therapeutic interventions themselves.

In general, the positive main effects of the 38 psychosocial treatments (across 24 studies) remained strong even when the type and severity of depressive illness was taken into account (i.e., inclusion criteria of "at-risk," elevated symptoms, depressive diagnosis). Of the 23 controlled psychosocial treatments, 3 were determined to be prevention regimens with a mean ES of 0.17 (95% CI −0.17–0.52). There were 15 treatments based on depressive symptomatology that yielded an average ES of 0.81 (95% CI 0.49–1.11), whereas the remaining five treatments purported to address a diagnosis of Major Depressive Disorder and produced a mean ES of 0.84 (95% CI 0.29–1.38).

In terms of the 15 pre/post psychosocial interventions, 12 of the treatments focused on depressive diagnoses, 3 interventions targeted depressive symptomatology, and none were coded as prevention treatments. The pre-/posttreatments for Major Depressive Disorder produced a mean ES of 1.32 (95% CI 0.91–1.73), and the symptomatology-based interventions yielded an average ES of 0.72 (95% CI −0.21–1.66).

3.3. Main effects: pharmacological studies

Summary data for the pharmacological studies are presented in Table 2. The overall mean ES of the pharmacological studies at posttreatment was 0.19 (range −0.88–1.19; 95% CI −0.08–0.45). Follow-up data were not reported in the pharmacological studies.

3.4. Interaction of age and outcome

In order to facilitate a useful analysis of the potential interaction of age and treatment outcome, a false dichotomy was created whereby child studies were defined as having a mean age of 12 or younger and adolescent studies were characterized by a sample with a mean age of 13 or older (e.g., Emslie and Weisz; see Table 3). In the nine controlled psychosocial child studies, the mean ES was 0.65 (95% CI 0.34–0.95). In contrast, the five controlled adolescent studies yielded an

average ES of 0.93 (95% CI 0.36–1.49). In regards to pre/post psychosocial studies, the mean ES for child samples was 0.73 (95% CI 0.14–1.30), whereas the mean ES for the six adolescent studies was 1.35 (95% CI 0.83–1.85).

Table 3. Mean effect sizes based on average age and sex of sample

Type of study	*n*	Mean ES	95% CI
Age			
Controlled psychosocial			
Child studies	9	0.65	0.34–0.95
Adolescent studies	5	0.93	0.36–1.49
Pre/post psychosocial			
Child studies	3	0.73	0.14–1.30
Adolescent studies	6	1.35	0.83–1.85
Pharmacological			
Child studies	7	0.15	−0.12–0.42
Adolescent studies	7	0.28	−0.24–0.79
Sex			
Controlled studies			
≥60% female	9	0.90	0.42–1.38
<60% female	6	0.63	0.32–0.92
Pre/post studies			
≥60% female	5	1.20	0.55–1.84
<60% female	4	1.04	0.56–1.51

With regard to the pharmacological trials, there were six studies in which the average age was 12 or younger, seven studies in which the average age was 13 or older, and one study in which the ages ranged from 7 to 17 (Emslie et al., 1997). However, the authors stratified the sample by age (≤12 and ≥13) and reported no differences in outcome based on age. Therefore, age by treatment outcome data from this study was included in the child and adolescent analyses. For child pharmacotherapy trials, the mean ES was 0.15 (95% CI−0.12–0.42), whereas adolescent pharmacological studies yielded a mean ES of 0.28 (95% CI −0.24–0.79).

3.5. Interaction of sex and outcome

As shown in Table 3, when the data from psychosocial studies were analyzed by calculating ESs using different percentages of female subjects as criteria, there were some noteworthy findings. When the percentage of female subjects in controlled studies was 60% or greater (i.e., the majority), the mean ES was 0.90 (n=9; 95% CI 0.42–1.38), as compared to an ES of 0.63 (n=6; 95% CI 0.32–0.92) when the percentage of female subjects was below 60%. Similarly, in

pre/post studies, when the percentage of female subjects was 60% or greater, the average ES was 1.20 (n=5; 95% CI 0.55–1.84), whereas the mean ES was 1.04 (n=4; 95% CI 0.56–1.51) when the percentage of female subjects dropped below 60%.

3.6. Interaction of quality of study and outcome

The standard mean difference ES estimates were cross-tabulated with the overall validity ratings for each psychosocial study. The average ES for studies based on the assessment of quality were as follows: unacceptable (0.47), inferior (0.85), fair (0.73), good (1.33), and excellent (1.64). Further, a correlation coefficient was computed to determine the relationship between the quality of the study and the average ES and yielded a statistically significant positive correlation (.67, P<.0001), indicating that as the quality of study increased, so did the average ES.

4. Discussion

The three research questions that were posed in this investigation addressed: (1) the overall efficacy of psychosocial interventions for child and adolescent depression; (2) the overall efficacy of pharmacological treatments for child and adolescent depression; and (3) whether there was evidence of differential efficacy for psychosocial and pharmacological treatments when age, sex, and quality of study were considered. The results of this comprehensive review indicate that overall, psychosocial treatments for early-onset depression lead to a substantial reduction in depressive symptoms in children and adolescents regardless of whether the experimental design was a between- or within-group study. The overall mean difference ES for controlled studies (0.72) indicates that the average child who received treatment for depression was better off than approximately 76% of the children who did not. According to Cohen's (1988) guidelines for interpreting the magnitude of ESs, an ES of 0.72 would be considered to be in the upper end of the “moderate” range [ES between 0.20 and 0.49 (small); ES between 0.50 and 0.79 (moderate); ES of 0.80 or greater (large)]. Furthermore, the treatment effects were durable over a brief period of time (median=6.5 weeks). These findings mirror global reviews of psychotherapy with children whereby the treated youngsters fared much better than wait-list or no-treatment control subjects at posttreatment and follow-up (Casey; Kazdin; Weisz and Weisz). These data were also convergent with the findings from more circumscribed meta-analytic reviews that support the efficacy of social skills interventions for depressed youth (Black-Cecchini, 1996), cognitive–behavioral therapy for adolescents (Reinecke, M.A., Ryan, M.A. and DuBois, D.L., 1998. Cognitive–behavioral therapy of depression and depressive symptoms during adolescence: a review and meta-analysis. Journal of the American Academy of Child and Adolescent Psychiatry 37, pp. 26–34. Abstract | Full Text via CrossRef | View Record in Scopus | Cited By in Scopus (124)Reinecke et al., 1998), and a smaller sample of depression treatments (Weisz et al., 1995).

In regard to the pre/post psychosocial studies, the overall mean ES at posttreatment was 1.14, indicating that the treated subjects experienced significant reductions in depression at posttreatment. These findings were also durable over time (median=36 weeks), with a mean ES of 1.26 for the studies in which follow-up data were reported. The overall mean ES for controlled studies using intrasubject variance estimates was 1.23, similar to the mean ES for pre/post studies (1.14).

Given these roughly commensurate values, a case could be made that the treatments in pre/post studies led to equally substantial reductions in depressive symptoms despite the methodological limitation of not having wait-list or no-treatment control group comparisons. Therefore, although the overall ES for pre/post studies was inflated because there were no wait-list or control group comparisons, the similar pre/post values across methodological designs augment the overall findings that psychosocial interventions are effective in the treatment of child and adolescent depression. Moreover, it appears that psychosocial interventions for depressed youth were effective regardless of whether the children were treated based on depressive symptomatology or a diagnosis of Major Depressive Disorder. In contrast, the mean ES of the controlled prevention studies was substantially lower. This finding was expected, based on the intuitive assumption that the children in at-risk studies were less depressed than the subjects in symptom- or diagnosis-based trials. Further, in prevention studies, the failure to detect elevated levels of depression is not only expected, but it is an artifact of measurement limitations (i.e., floor effect, limited sensitivity to low levels of depression). The lack of treatment effect in prevention studies does not diminish their importance. Indeed, it is difficult to assess when something did not happen! At the same time, it illustrates the need to follow at-risk samples longitudinally in comparison to no-treatment controls.

With respect to pharmacological treatments, the results of this meta-analytic review indicate that in general, pharmacotherapy did not lead to a substantial reduction in depressive symptoms in children and adolescents. The overall mean ES at posttreatment was 0.19, suggesting that the average subject who was administered the active medication moved to the 58th percentile in the distribution of subjects who took a pharmacologically inert placebo. It is unclear whether these effects were maintained over time as follow-up data were not reported in the pharmacological studies. Further, the average placebo response rate across all of the studies was high (43%; range 17–68%), indicating that much of derived benefits from pharmacotherapy were produced by the children's expectations of the treatment as opposed to the active medication itself.

In comparison to the only other meta-analytic review located on the efficacy pharmacotherapy for depressed youth (Hazell et al., 1995), these findings were somewhat more discouraging but roughly commensurate, suggesting that antidepressant medications are not substantially superior to placebo in treating depressed youth. This is in contrast to finding that psychotropic medications are efficacious with adult populations (e.g., Elkin, 1994).

However, a number of important points must be made about the interpretation of the pharmacological findings. First, as Conners (1992) aptly pointed out, "various methodological problems limit the conclusions" of pharmacological studies since there are substantial differences in the criteria for improvement, instrumentation, and selection procedures. Thus, in the present investigation, the pharmacological findings represent a synthesis of data that was based on potentially divergent definitions of "improvement" and differences in instrumentation. Nonetheless, these data certainly reveal some important trends about the efficacy of pharmacological treatments for depressed youth and the findings are congruent with most, if not all of the qualitative interpretations presented within each of the studies. Second, as a number of researchers have suggested (Anderson; Birmaher and Kye), firm conclusions about the efficacy of antidepressants in young people cannot be made until a larger body of literature is accumulated whereby some of the methodological limitations are addressed in future studies. Furthermore, of the 14 pharmacological studies included in the present analysis, only two controlled trials (14%) were located that utilized an SSRI (Emslie and Simeon). The vast majority of the trials (n=11) used TCAs (86%). Thus, the negative main effects regarding medication for depressed youth are attributable primarily to a lack of TCA efficacy, not necessarily pharmacotherapy overall. Although an ES of zero was entered in for the study conducted by Simeon et al. (1990) given the reported null findings and insufficient data to calculate an ES, the calculated ES for the study conducted by Emslie et al. (1997) was 0.59, indicating that the average treated subject (i.e., who took Prozac) was better off than approximately 72% of the subjects who took a placebo. Thus, it appears that there is some emerging evidence that SSRIs might be more effective than TCAs in treating child and adolescent mood disturbance.

Results from the present investigation suggest that both psychosocial and pharmacological interventions were more effective for adolescents than for children. With psychosocial interventions, the mean ES for adolescent samples were higher than the mean ES for child samples, regardless of experimental design. Similarly, the interaction between age and pharmacotherapy indicated that medication was more effective for adolescents than for children. Indeed, the mean ES was almost twice as large for adolescents (0.28) than it was for children (0.15). Based on the descriptive data, the modal psychosocial treatment was cognitive–behavioral therapy in group, individual, or family formats. Thus, the overall findings, which

consist of a predominance of CBT interventions, might favor older subjects with the assumption that they have better developed cognitive skills and derive increased benefits from the cognitively oriented interventions (Weisz et al., 1995). With regard to the modest differential effects based on age in pharmacological studies, these findings might be attributable, in part, to the predominance of TCA trials and the empirical data that indicate that younger children may not respond favorably to TCAs since their noradrenergic systems are not fully developed until late adolescence and early adulthood (Murrin, Gibbens, & Ferrer, 1985).

Psychosocial interventions for depression were somewhat more efficacious when the average percentage of female subjects was 60% or greater. These findings are consistent with the data from other reviews that lend support to the trend of differential efficacy in favor of female subjects (Casey and Weisz). However, these findings were far from compelling given the difficulties with coding and the magnitude of the difference between ES estimates. Nonetheless, more information is needed to better understand the relationship between sex and the treatment of child and adolescent depression, especially given that the female-to-male ratios for depressive illness begins to approximate the base rates for adult depressive disorders (i.e., approximately 2:1) during middle to late adolescence. A possible explanation for the differential outcomes based on sex might be related to the fact that societal expectations, especially during adolescence, tend to promote more emotional expressiveness and awareness for females when compared to their male counterparts, which might, in turn, provide an advantage for girls and women in the context of most therapeutic regimes that tend to cherish these expectations (Weisz et al., 1995).

In terms of the relationship between the quality of study and the mean ES for the psychosocial studies, it appears that as the quality increases, so does the mean ES. This finding was contrary to the hypothesis proposed by Wilson and Rachman (1983), but consistent with the findings reported by Weiss and Wiesz (1990). Therefore, these data provide evidence that methodological factors should be carefully considered during the development and implementation of experimental treatments for child and adolescent depression. At the same time, it appears less likely that studies with more limited controls will dangerously skew the findings.

The clinical implications of these findings suggest that there are a number of controlled studies with mostly nonreferred children and adolescents suffering from depressive symptoms, who derive substantial benefit from school-based interventions. Moreover, there are a large number of pre/post studies with predominantly clinically referred children and adolescents suffering from depressive diagnoses, who benefit greatly from outpatient treatments. Thus, given the recent emphasis in the literature (e.g., Clarke and Hoagwood) regarding the application and

generalization of lab studies (efficacy trials) to naturalistic clinical settings (effectiveness research), the implications of combining the roughly commensurate outcome findings (i.e., controlled and pre/post ES estimates) across study types are promising since these data are not simply based on analogue samples or mildly depressed youth. Finally, given the data regarding the effectiveness of psychosocial interventions, coupled with the paucity of findings to support pharmacotherapy for depressed youth, clinicians should consider psychosocial treatments to be first-line interventions until there are more definitive answers regarding the efficacy and safety of antidepressant medications for treating child and adolescent depression. Furthermore, although it is true that recent results from pharmacological trials have shown increased efficacy (e.g., Emslie et al., 1997), one should remain mindful of the fact that psychosocial interventions produce moderate to large treatment effects without the possibility of noxious side effects or an adverse impact on child development.

Of course, the present findings must be considered in light of the limitations of the study. Perhaps the most compelling limitation of the present investigation is the fact that the vast majority of the 38 psychosocial and pharmacological studies (30; 79%) were published after 1990. Thus, this is a relatively new and quickly expanding body of literature. As such, it was a challenge to keep up with all of the new developments regarding the treatment of child and adolescent depression and it is likely that some important findings were not included in the present analysis (i.e., "file drawer" problem). Another limitation is the fact that a number of important variables (e.g., age, sex, quality of study) could not be evaluated thoroughly or completely due to the limited information contained in the articles. Thus, it was not possible to make firm conclusions regarding the interaction between these variables and treatment outcome.

Given the overall findings and these limitations, there are several important recommendations regarding future empirical efforts to investigate the effectiveness of treatments for child and adolescent depression. First, future researchers should explicitly report findings based on age and sex, in light of the limited interactional data that could be obtained regarding these important variables. Second, more consistent "improvement" criteria should be developed for pharmacological trials to facilitate more useful comparisons across studies. Third, researchers should attend closely to methodological variables when developing future outcome trials given the positive correlation between experimental rigor and ES. Finally, similar to adult studies, large controlled clinical trials examining the efficacy of psychotherapy and medication for child and adolescent depression should be developed and implemented to provide additional insights into this vital health-care issue.

In sum, there is substantial evidence that child and adolescent depression is prevalent, persistent, and leads to a number of negative outcomes. However, it appears that there are a number of effective treatments that should be implemented expeditiously to ease the suffering of a considerable number of young people.

5. Literature reviewed

Boulos et al., 1991
Brent et al., 1997
Brown, Welsh, Labbe´, Vitulli, & Kulkarni, 1992
Butler, Miezitis, Friedman, & Cole, 1980
Clarke et al., 1995
Clarke, Rohde, Lewinsohn, Hops, & Seeley, 1999
Curry & Wells, 1998
Fine, Forth, Gilbert, & Haley, 1991
Geller et al., 1992
Geller, Cooper, Graham, Marsteller, & Bryant, 1990
Gillham, Reivich, Jaycox, & Seligman, 1995
Hickman, 1994
Hughes et al., 1990
Jaycox, Reivich, Gillham, & Seligman, 1994
Kahn, Kehle, Jenson, & Clark, 1990
Kashani, Shekim, & Reid, 1984
King & Kirschenbaum, 1990
Kramer & Feiguine, 1981
Kutcher et al., 1994
Lewinsohnm, Clarke, Hops, & Andrews, 1990
Lewinsohn, Clarke, Rohde, Hops, & Seeley, 1996
Liddle & Spence, 1990
Mufson & Fairbanks, 1996
Mufson et al., 1994
Petti & Law, 1982
Preskorn, Weller, Hughes, Weller, & Bolte, 1987
Puig-Antich et al., 1987
Rawson & Tabb, 1993
Reed, 1994
Reivich, 1996
Reynolds & Coats, 1986
Stark, Reynolds, & Kaslow, 1987
Vostanis, Feehan, Grattan, & Bickerton, 1996
Wagner, Kilcrease-Fleming, Fowler, & Kazelskis, 1993
Weisz, Thurber, Sweeney, Proffitt, & LeGagnoux, 1997

References

Anderson, I., 1995. Place of tricyclics in depression of young people is not proved. British Journal of Psychiatry 310, pp. 897–901.

Antonuccio, D.O., Danton, W.G. and DeNelsky, G.Y., 1995. Psychotherapy versus medication for depression: challenging the conventional wisdom with data. Professional Psychology: Research and Practice 26, pp. 574–585.

Birmaher, B., Ryan, N.D., Williamson, D.E., Brent, D.A. and Kaufman, J., 1996. Childhood and adolescent depression. A review of the past 10 years. Part II. Journal of the American Academy of Child and Adolescent Psychiatry 35, pp. 1575–1583.

Birmaher, B., Ryan, N.D., Williamson, D.E., Brent, D.A., Kaufman, J., Dahl, R.E., Perel, J. and Nelson, B., 1996. Childhood and adolescent depression. A review of the past 10 years. Part I. Journal of the American Academy of Child and Adolescent Psychiatry 35, pp. 1427–1439.

Black-Cecchini, T. (1996). A meta-analytic review of child and adolescent depression interventions. Unpublished doctoral dissertation. Utah State University, Logan, UT.

Boulos, C., Kutcher, S., Marton, P., Simeon, J., Ferguson, B. and Roberts, N., 1991. Response to desipramine treatment in adolescent major depression. Psychopharmacology Bulletin 27, pp. 59–65 Reviewed Study.

Brent, D.A., Holder, D., Kolko, D., Birmaher, B., Baugher, M., Roth, C., Iyengar, S. and Johnson, B.A., 1997. A clinical psychotherapy trial for adolescent depression comparing cognitive, family, and supportive therapy. Archives of General Psychiatry 54, pp. 877–885 Reviewed Study.

Brown, S.W., Welsh, M.C., Labbé, E.E., Vitulli, W.F. and Kulkarni, P., 1992. Aerobic exercise in the psychological treatment of adolescents. Perceptual and Motor Skills 74, pp. 555–560 Reviewed Study.

Butler, L., Miezitis, S., Friedman, R. and Cole, E., 1980. The effect of two school-based intervention programs on depressive symptoms in preadolescents. American Education Research Journal 17, pp. 111–119 Reviewed Study.

Campbell, D.T. and Stanley, J.C., 1963. Experimental and quasi-experimental designs for research, Houghton-Mifflin, Boston.

Casey, R.J. and Berman, J.S., 1985. The outcome of psychotherapy with children. Psychological Bulletin 98, pp. 388–400.

Clarke, G.N., 1995. Improving the transition from basic efficacy research to effectiveness: methodological issues and procedures. Journal of Consulting and Clinical Psychology 63, pp. 718–725.

Clarke, G.N., Hawkins, W., Murphy, M., Sheeber, L.B., Lewinsohn, P.M. and Seeley, J.R., 1995. Targeted prevention of unipolar depressive disorder in an at-risk sample of high school adolescents: a randomized trial of a group cognitive intervention. Journal of the American Academy of Child and Adolescent Psychiatry 34, pp. 312–321 Reviewed Study.

Clarke, G.N., Rohde, P., Lewinsohn, P.M., Hops, H. and Seeley, J.R., 1999. Cognitive–behavioral treatment of adolescent depression: efficacy of acute group treatment and booster sessions. Journal of the American Academy of Child and Adolescent Psychiatry 38, pp. 272–279 Reviewed Study.

Clum, G.A., Clum, G.A. and Surls, R., 1993. A meta-analysis of treatments for panic disorder. Journal of Consulting and Clinical Psychology 61, pp. 317–326.

Cohen, J., 1960. A coefficient of agreement for nominal scales. Educational and Psychological Measurement 20, pp. 37–46.

Cohen, J., 1988. Statistical power analysis for the behavioral sciences (2nd ed.),, Erlbaum, Hillsdale, NJ.

Conners, C.K., 1992. Methodology of antidepressant drug trials for treating depression in adolescents. Journal of Child and Adolescent Psychopharmacology 2, pp. 11–22.

Costello, E.J., Edelbrock, C., Burns, B.J., Dulcan, M.K., Brent, D. and Janiszewski, S., 1988. Psychiatric disorders in pediatric primary care. Archives of General Psychiatry 45, pp. 1107–1116.

Curry, J. F., & Wells, K. C. (1998, August). Treating comorbid depression and substance abuse in adolescents. Paper presented at the Annual Convention of the American Psychological Association, San Francisco, CA. Reviewed Study.

Cytryn, L. and McKnew, D.H., 1972. Proposed classification of childhood depression. American Journal of Psychiatry 129, pp. 149–155.

Cytryn, L. and McKnew, D.H., 1985. Treatment issues in childhood depression. Psychiatric Annals 15, pp. 401–403.

DuBois, D.L., Felner, R.D., Bartels, C.L. and Silverman, M.M., 1995. Stability of self-reported depressive symptoms in a community sample of children and adolescents. Journal of Clinical Child Psychology 4, pp. 386–396.

Dujovne, V. F. (1993).Comparison of cognitive–behavioral to pharmacological treatment of depression in prepubertal children. Unpublished dissertation. University of Kansas, Lawrence, KS.

Elkin, I., 1994. The NIMH Treatment of Depression Collaborative Research Program: where we began and where we are. In: Bergin, A.E. and Garfield, S.L., Editors, 1994. Handbook of psychotherapy and behavior change (4th ed.),, Wiley, New York, pp. 114–139.

Emslie, G.J., Rush, A.J., Weinberg, W.A., Kowatch, R.A., Hughes, C.W., Carmody, T. and Rintelmann, J., 1997. A double-blind, randomized, placebo-controlled trial of fluoxetine in children and adolescents with depression. Archives of General Psychiatry 54, pp. 1031–1037 Reviewed Study.

Fine, S., Forth, A., Gilbert, M. and Haley, G., 1991. Group therapy for adolescent depressive disorder: a comparison of social skills and therapeutic support. Journal of the American Academy of Child and Adolescent Psychiatry 30, pp. 79–85 Reviewed Study.

Fleming, J.E., Boyle, M.H. and Offord, D.R., 1993. The outcome of adolescent depression in the Ontario Child Health Study follow-up. Journal of the American Academy of Child and Adolescent Psychiatry 32, pp. 28–33.

Fleming, J.E. and Offord, D.R., 1990. Epidemiology of childhood depressive disorders: a critical review. Journal of the American Academy of Child and Adolescent Psychiatry 29, pp. 571–580.

Fleming, J.E., Offord, D.R. and Boyle, M.H., 1989. The Ontario Child Health Study: prevalence of childhood and adolescent depression in the community. British Journal of Psychiatry 155, pp. 647–654.

Geller, B., Cooper, T.B., Graham, D.L., Fetner, H.H., Marsteller, F.A. and Wells, J.M., 1992. Pharmacokinetically designed double-blind placebo-controlled study of nortriptyline in 6- to 12-

year-olds with major depressive disorder. Journal of the American Academy of Child and Adolescent Psychiatry 31, pp. 34–44 Reviewed Study.

Geller, B., Cooper, T., Graham, D., Marsteller, F.A. and Bryant, D.M., 1990. Double-blind, placebo-controlled study of nortriptyline in depressed adolescents using a “fixed plasma level” design. Psychopharmacology Bulletin 26, pp. 85–90 Reviewed Study.

Gillham, J.E., Reivich, K.J., Jaycox, L.J. and Seligman, M.E.P., 1995. Prevention of depressive symptoms in schoolchildren: two-year follow-up. Psychological Science 6, pp. 343–351 Reviewed Study.

Glass, G.V., 1977. Integrating findings: the meta-analysis of research. Review of Research in Education 5, pp. 351–379.

Harrington, R.C. and Vostanis, P., 1995. Longitudinal perspectives and affective disorder in children and adolescents. In: Goodyer, M., Editor, , 1995. The depressed child and adolescent: developmental and clinical perspectives, Cambridge Univ. Press, Cambridge, England, pp. 311–334.

Hazell, P., O'Connell, D., Heathcote, D., Robertson, J. and Henry, D., 1995. Efficacy of tricyclic drugs in treating child and adolescent depression: a meta-analysis. British Journal of Psychiatry 310, pp. 897–901.

Hickman, K. A. (1994). Effects of social skills training on depressed children attending a behavioral day treatment program. Unpublished doctoral dissertation. Hofstra University, New York, NY. Reviewed Study.

Hoagwood, K., Hibbs, E., Brent, D. and Jensen, P., 1995. Introduction to the special section: efficacy and effectiveness in studies of child and adolescent psychotherapy. Journal of Consulting and Clinical Psychology 63, pp. 683–687.

Hughes, C.W., Preskorn, S.H., Weller, E., Weller, R., Hassanein, R. and Tucker, S., 1990. The effect of concomitant disorders in childhood depression on predicting treatment response. Psychopharmacology Bulletin 26, pp. 235–238 Reviewed Study.

Jaycox, L.H., Reivich, K.J., Gillham, J. and Seligman, M.E.P., 1994. Prevention of depressive symptoms in school children. Behaviour Research and Therapy 32, pp. 801–816 Reviewed Study.

Johnson, B.T., 1989. DSTAT: software for the meta-analytic review of research literatures, Erlbaum, Hillsdale, NJ.

Kahn, J.S., Kehle, T.J., Jenson, W.R. and Clark, E., 1990. Comparison of cognitive–behavioral, relaxation, and self-modeling interventions for depression among middle-school students. School Psychology Review 19, pp. 196–211 Reviewed Study.

Kaplan, S.L., Simms, R.M. and Busner, J., 1994. Prescribing practices of outpatient child psychiatrists. Journal of the American Academy of Child and Adolescent Psychiatry 33, pp. 35–44.

Kashani, J., Shekim, W. and Reid, J., 1984. Amitriptyline in children with major depressive disorder: a double-blind crossover pilot study. Journal of the American Academy of Child and Adolescent Psychiatry 23, pp. 348–351 Reviewed Study.

Kashani, J.H., Burbach, D.J. and Rosenburg, T.K., 1988. Perception of family conflict resolution and depressive symptomatology in adolescents. Journal of the American Academy of Child and Adolescent Psychiatry 27, pp. 42–48.

Kashani, J.H. and Cantwell, D.P., 1983. Etiology and treatment of childhood depression: a biopsychosocial perspective. Comprehensive Psychiatry 24, pp. 476–486.

Kaslow, N.J. and Thompson, M.P., 1998. Applying the criteria for empirically supported treatment to studies of psychosocial interventions for child and adolescent depression. Journal of Clinical Child Psychology 27, pp. 146–155.

Kazdin, A.E., 1988. The diagnosis of childhood disorders: assessment issues and strategies. Behavioral Assessment 10, pp. 67–94.

Kazdin, A.E., Bass, D., Ayers, W.A. and Rogers, A., 1990. Empirical and clinical focus of child and adolescent psychotherapy research. Journal of Consulting and Clinical Psychology 58, pp. 729–740.

King, C.A. and Kirschenbaum, D.S., 1990. An experimental evaluation of a school-based program for children at risk: Wisconsin early intervention. Journal of Community Psychology 18, pp. 167–177 Reviewed Study.

Kovacs, M., 1989. Affective disorders in children and adolescents. American Psychologist 44, pp. 209–215.

Kovacs, M., 1997. Depressive disorders in childhood: an impressionistic landscape. Journal of Child Psychology and Psychiatry and Allied Disciplines 38, pp. 287–298.

Kovacs, M., Feinberg, T., Crouse-Novack, M., Paulauskas, S.L., Pollack, M. and Finkelstein, R., 1984. Depressive disorders in childhood: II. A longitudinal study of the risk for subsequent major depression. Archives of General Psychiatry 41, pp. 643–649.

Kovacs, M., Goldston, D. and Gatsonis, C., 1993. Suicidal behaviors and childhood-onset depressive disorders: a longitudinal investigation. Journal of the American Academy of Child and Adolescent Psychiatry 32, pp. 8–20.

Kovacs, M., Obrosky, S., Gatsonis, C. and Richards, C., 1997. First-episode major depressive and dysthymic disorder in childhood: clinical and sociodemographic factors in recovery. Journal of the American Academy of Child and Adolescent Psychiatry 36, pp. 777–784.

Kramer, A. and Feiguine, R., 1981. Clinical effects of amitriptyline in adolescent depression. Journal of the American Academy of Child and Adolescent Psychiatry 20, pp. 636–644 Reviewed Study.

Kutcher, S., Boulos, C., Ward, B., Marton, P., Simeon, J., Ferguson, H.B., Szalai, J., Katic, M., Roberts, N., Dubois, C. and Reed, K., 1994. Response to desipramine treatment in adolescent depression: a fixed-dose, placebo-controlled trial. Journal of the American Academy of Child and Adolescent Psychiatry 33, pp. 686–694 Reviewed Study.

Kye, C. and Ryan, N., 1995. Pharmacologic treatment of child and adolescent depression. Child and Adolescent Psychiatric Clinics of North America 4, pp. 261–277.

Lerner, M. and Clum, G., 1990. Treatment of suicide ideators: a problem-solving approach. Behavior Therapy 21, pp. 403–411.

Lewinsohn, P.M., Clarke, G.N., Hops, H. and Andrews, J., 1990. Cognitive–behavioral treatment of depressed adolescents. Behavior Therapy 21, pp. 385–401 Reviewed Study.

Lewinsohn, P.M., Clarke, G.N., Rohde, P., Hops, H. and Seeley, J., 1996. A course in coping: a cognitive–behavioral approach to the treatment of adolescent depression. In: Hibbs, E.D. and Jensen, P.S., Editors, 1996. Psychosocial treatments for child and adolescent disorders: empirically-based strategies for clinical practice, American Psychological Association, Washington, DC, pp. 109–135 Reviewed Study.

Lewinsohn, P.M., Clarke, G.N., Seeley, J.R. and Rohde, P., 1994. Major depression in community adolescents: age at onset, episode duration, and time to recurrence. Journal of the American Academy of Child and Adolescent Psychiatry 33, pp. 809–818.

Liddle, B. and Spence, S.H., 1990. Cognitive–behavioral therapy with depressed primary school children: a cautionary note. Behavioral Psychotherapy 18, pp. 85–102 Reviewed Study.

Miller, T. I. (1977). The effects of drug therapy on psychological disorders. Unpublished doctoral dissertation. University of Colorado, Boulder, CO.

Mufson, L. and Fairbanks, J., 1996. Interpersonal psychotherapy for depressed adolescents: a one-year naturalistic follow-up study. Journal of the American Academy of Child and Adolescent Psychiatry 35, pp. 1145–1155 Reviewed Study.

Mufson, L., Moreau, D., Weissman, M.M., Wickramaratne, P., Martin, J. and Samoilov, A., 1994. Modification of interpersonal psychotherapy with depressed adolescents (IPT-A): phase I and II studies. Journal of the American Academy of Child and Adolescent Psychiatry 33, pp. 695–705 Reviewed Study.

Murrin, L., Gibbens, D. and Ferrer, J., 1985. Ontogeny of dopamine, serotonin, and spirocecanone receptors in the rat forebrain: an autoradiographic study. Developmental Brain Research 23, pp. 91–109.

Nolen-Hoeksema, S., Girgus, J. and Seligman, M., 1992. Predictors and consequences of childhood depressive symptoms: a 5-year longitudinal study. Journal of Abnormal Psychology 3, pp. 405–422.

Petti, T. and Law, W., 1982. Imipramine treatment of depressed children: a double-blind pilot study. Journal of Clinical Psychopharmacology 2, pp. 107–110 Reviewed Study.

Physician's Desk Reference (1998). Madison, WI: Conney Safety Products.

Preskorn, S.H., Weller, E.B., Hughes, C.W., Weller, R.A. and Bolte, K., 1987. Depression in prepubertal children: dexamethasone nonsuppression predicts differential response to imipramine vs. placebo. Psychopharmacology Bulletin 23, pp. 128–133 Reviewed Study.

Puig-Antich, J., Lukens, E., Davies, M., Goetz, D., Brennan-Quattrock, J. and Todak, G., 1985. Psychosocial functioning in prepubertal major depressive disorders: I. interpersonal relationships during the depressive episode. Archives of General Psychiatry 42, pp. 500–507.

Puig-Antich, J., Perel, J., Lupatkin, W., Chambers, W., Tabrizi, M., King, J., Goetz, R., Davies, M. and Stiller, R., 1987. Imipramine in prepuberal major depressive disorders. Archives of General Psychiatry 44, pp. 81–89 Reviewed Study.

Rao, U., Weissman, M.M., Martin, J.A. and Hammond, R.W., 1993. Childhood depression and risk of suicide: a preliminary report of a longitudinal study. Journal of the American Academy of Child and Adolescent Psychiatry 32, pp. 21–27.

Rawson, H.E. and Tabb, L.C., 1993. Effects of therapeutic intervention on childhood depression. Child and Adolescent Social Work Journal 10, pp. 39–52 Reviewed Study.

Reed, M.K., 1994. Social skills training to reduce depression in adolescents. Adolescence 29, pp. 293–302 Reviewed Study.

Reinecke, M.A., Ryan, M.A. and DuBois, D.L., 1998. Cognitive–behavioral therapy of depression and depressive symptoms during adolescence: a review and meta-analysis. Journal of the American Academy of Child and Adolescent Psychiatry 37, pp. 26–34.

Reivich, K. (1996). The prevention of depressive symptoms in adolescents. Unpublished doctoral dissertation. University of Pennsylvania, Philadelphia, PA. Reviewed Study.

Reynolds, W.M. and Coats, K.I., 1986. A comparison of cognitive–behavioral therapy and relaxation training for the treatment of depression and adolescents. Journal of Consulting and Clinical Psychology 54, pp. 653–660 Reviewed Study.

Riddle, M., Geller, B. and Ryan, N., 1993. Another sudden death in a child treated with desipramine. Journal of the American Academy of Child and Adolescent Psychiatry 32, pp. 792–797.

Rosenthal, R., 1984. Meta-analytic procedures for social research, Sage, Beverly Hills, CA.

Simeon, J., Dinicola, V., Ferguson, H. and Copping, W., 1990. Adolescent depression: a placebo-controlled fluoxetine treatment study and follow-up. Progress in Neuropsychopharmacology and Biological Psychiatry 14, pp. 791–795 Reviewed Study.

Smith, M.L., Glass, G.V. and Miller, T.L., 1980. Benefits of psychotherapy, Johns Hopkins Univ. Press, Baltimore.

Sommers-Flanagan, J. and Sommers-Flanagan, R., 1996. Efficacy of antidepressant medication with depressed youth: what psychologists should know. Professional Psychology: Research and Practice 27, pp. 145–153.

Stark, K.D., Reynolds, W.M. and Kaslow, N.J., 1987. A comparison of the relative efficacy of self-control therapy and a behavioral problem-solving therapy for depression in children. Journal of Abnormal Child Psychology 15, pp. 91–113 Reviewed Study.

Vitiello, B. and Jensen, P.S., 1997. Medication development and testing in children and adolescents: current problems, future directions. Archives of General Psychiatry 54, pp. 871–876.

Vostanis, P., Feehan, C., Grattan, E. and Bickerton, W.L., 1996. A randomised controlled out-patient trial of cognitive–behavioural treatment for children and adolescents with depression: 9-month follow-up. Journal of Affective Disorders 40, pp. 105–116 Reviewed Study.

Wagner, W.G., Kilcrease-Fleming, D., Fowler, W.E. and Kazelskis, R., 1993. Brief term counseling with sexually abused girls: the impact of sex of counselor on clients' therapeutic involvement, self-concept, and depression. Journal of Counseling Psychology 40, pp. 490–500 Reviewed Study.

Weiss, B. and Weisz, J.R., 1990. The impact of methodological factors on child psychotherapy outcome research: a meta-analysis for researchers. Journal of Abnormal Child Psychology 18, pp. 639–670.

Weisz, J.R., Thurber, C.A., Sweeney, L., Proffitt, V.D. and LeGagnoux, G.L., 1997. Brief treatment of mild-to-moderate child depression using primary and secondary control enhancement training. Journal of Consulting and Clinical Psychology 65, pp. 703–707 Reviewed Study.

Weisz, J.R., Weiss, B., Alicke, M.D. and Klotz, M.L., 1987. Effectiveness of psychotherapy with children and adolescents: a meta-analysis for clinicians. Journal of Consulting and Clinical Psychology 55, pp. 542–549.

Weisz, J.R., Weiss, B., Han, S.S. and Granger, D.A., 1995. Effects of psychotherapy with children and adolescents revisited: a meta-analysis of treatment outcome studies. Psychological Bulletin 117, pp. 450–468.

Werry, J., 1995. Cardiac arrhythmias make desipramine an unacceptable choice in children. Journal of the American Academy of Child and Adolescent Psychiatry 35, pp. 1239–1241.

Wilens, T.E., Biederman, J., Baldessarini, R.J., Geller, B., Schleifer, D., Spencer, T.J., Birmaher, B. and Goldblatt, A., 1996. Cardiovascular effects of therapeutic doses of tricyclic antidepressants in children and adolescents. Journal of the American Academy of Child and Adolescent Psychiatry 35, pp. 1491–1501.

Wilson, G.T. and Rachman, S.J., 1983. Meta-analysis and the evaluation of psychotherapy outcome: limitations and liabilities. Journal of Consulting and Clinical Psychology 51, pp. 54–64.

Wood, A., Harrington, R. and Moore, A., 1996. Controlled trial of a brief cognitive–behavioral intervention in adolescent patients with depressive disorders. Journal of Child Psychology and Psychiatry 37, pp. 737–746 Reviewed Study.

Wortman, P., 1983. Evaluation research: a methodological perspective. Annual Review of Psychology 34, pp. 223–260.