

A META-ANALYSIS OF PROZAC AND THREE PSYCHOTHERAPIES IN
THE TREATMENT OF UNIPOLAR MAJOR DEPRESSION

by

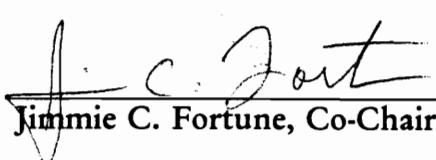
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Dissertation submitted to the Faculty of
Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

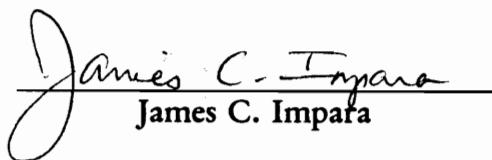
DOCTOR OF PHILOSOPHY

Educational Research and Evaluation

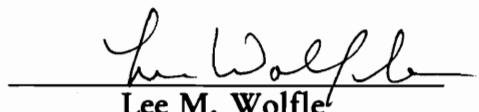
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ABSTRACT

Seventeen years have passed since Smith and Glass's paper "Meta-analysis of Psychotherapy Outcome Studies" (1977) influenced how researchers integrated cumulative knowledge. The problem is that no meta-analyses have been found which compare psychotherapeutic methods to the use of Prozac in the treatment of unipolar major depression. Prozac was chosen, specifically, due to its reputation as a new, very effective anti-depressant.

This study used a meta-analysis to compare three psychotherapies with medication: 1) cognitive therapy, 2) behavioral therapy, 3) cognitive-behavioral therapy, and 4) the prescription of Prozac. New methods of meta-analysis advocated by Rosenthal (1984) and Wolf (1986) were integrated with Smith and Glass's (1977) original approach to analyze the outcome research.

The results indicate that Prozac is more effective than psychotherapy in the treatment of unipolar major depression. Psychotherapy results were statistically significant ($p=.05$) for the subjects as own control condition, but not for the control condition. In the subjects as own control group, cognitive and cognitive-behavior

therapy were statistically significant ($p < .05$). The effectiveness of Prozac may have been caused in part by a selection bias of subjects or other factors outlined in the discussion.

Acknowledgements

The completion of this dissertation spanned a period of much personal transformation, and there are several people I want to acknowledge for their contribution. Many thanks to my committee, especially to Jimmie Fortune, David Hutchins, and Jim Impara. Their continual support and mentorship made this dissertation challenging and enjoyable. I would also like to express my appreciation to all of my family, immediate and extended, for their love and support, and the invaluable extra hours of care and love you gave to my son, without which I would have never made my deadlines. Thanks also to my son Jacob, age three, who kept life fun, new and adventurous during this process. And, heartfelt thanks to Steve, Janice, and Laurie, who in their unique way, helped me be successful.

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Chapter 1

Introduction

Purpose

The purpose of this study was to conduct a meta-analysis comparing three psychotherapeutic methods and Prozac used without psychotherapy for the treatment of unipolar major depression: 1) cognitive therapy, 2) behavioral therapy, 3) cognitive-behavioral therapy, and 4) the prescription of Prozac. Prozac was chosen, specifically, due to its reputation as a new, very effective anti-depressant with fewer side effects than other anti-depressants popularly prescribed. While this research was in process, another anti-depressant, Zoloft, was introduced to consumers. However, at the completion of this study, there was insufficient research available to consider inclusion in this meta-analysis.

Problem Statement

Seventeen years have passed since Smith and Glass's paper "Meta-Analysis of Psychotherapy Outcome Studies" (1977) influenced how researchers integrated cumulative knowledge. Several meta-analyses have been written since theirs targeting specific psychotherapeutic methods in counseling practice. A void exists in the literature in that no meta-analyses have been found which compare psychotherapeutic methods to the use of Prozac. Recent advances in the pharmacological treatment of unipolar major depression as well as in the methodology of conducting meta-analyses

generated new questions in psychotherapy research. Following are the research questions this investigator sought to answer.

Research Questions

Meta-analysis, as used by Smith and Glass (1977), is a technique for integrating cumulative research for the purpose of summarizing features and outcomes of a body of research. Another school of thought views meta-analysis as an approximation of data pooling for the purpose of establishing relationships (Rosenthal, 1984). This study used both of these techniques for the investigation of this body of research. The first three research questions seek to test hypotheses about the relative effectiveness of the different types of therapy, and the fourth research question seeks to draw conclusions and implications from the summary of research. Following are the research questions investigated:

1. What is the comparative effectiveness of cognitive, behavioral, cognitive-behavioral, and pharmacological treatment (i.e. the prescription of Prozac) in the treatment of unipolar major depression?
2. In comparing these three therapies to Prozac, which is most effective in treating unipolar major depression -- therapy or medication?
3. Among the three psychotherapies, which does the literature show to be the most effective?
4. Is it possible that the treatment of unipolar major depression with Prozac could obviate the need for therapy?

Delimitations

1. This study focused on the current trends in treating unipolar major depression as reflected by the literature.
2. This study used methods of meta-analysis from Smith and Glass's (1977) original meta-analysis of psychotherapeutic methods, with modifications from Wolf (1986) and Rosenthal (1984).

Limitations

1. In the instances where a complete data summary was not available, studies were omitted or analyses run on available data.
2. Due to the nature of the psychotherapy research contained in these studies, complete client histories and details of the studies themselves were not available. The conclusions reached as a result of this meta-analysis were based on the client and study information given (i.e. diagnosis, age, gender, length of treatment and type of treatment).
3. The meta-analytic studies focused on clients with a diagnosis of unipolar major depression. Since clinicians' diagnoses are subjective, the results of the original studies in this meta-analysis should be interpreted with caution.
4. Prozac is an anti-depressant medication popularly used to treat unipolar major depression. The anti-depressant also has negative side-effects which are not included in this meta-analysis.

5. Due to there being no clear way to chemically define unipolar major depression and how Prozac alters brain chemistry, it is not possible to state that the meta-analytic Prozac outcomes from this study are due solely to Prozac.

Chapter 2

Review of Literature

Meta-Analysis

Glass first described meta-analysis in 1976 as quantitative research review. In their 1977 landmark article "Meta-Analysis of Psychotherapy Outcome Studies," Smith and Glass state that meta-analysis is a less subjective and a more precise technique for the integration of cumulative knowledge than the conventional, qualitative literature review or the tallying of results in the box score method. Meta-analysis has been applauded for its utility in reviewing large sets of data, its criticism of poor practices in qualitative reviews, its ability to establish dependable generalizations, and its potential to offer clues to the explanation of findings (Shapiro & Shapiro, 1982). It is cautioned that meta-analysis does not obviate the need for "judgments about the definition of the area of investigation, the relevance of methodological and substantive characteristics of studies, and the appropriate meta-analytic tools to be used," and it can "lead to an unwarranted psychological sense of security if there is consistent replication of a relationship" (Cook & Leviton, 1980). Therefore, meta-analysis requires the assumption that its estimates are unbiased or the demonstration via subsidiary analyses that no bias exists from typically expected sources.

Meta-analysis, as used by Smith and Glass (1977), is a technique in which the result for each dependent variable is expressed as an effect size. These effect size scores are then averaged across studies and the impact of effect size across study characteristics is determined empirically. Smith and Glass differs from the more recent proponents of meta-analysis in that they suggest meta-analysts should interpret their findings conservatively, as reflecting available literature and not necessarily real effects. Meta-analysis according to Glass, is not meant to test a hypothesis but to summarize features and outcomes, according to Glass, of a body of research. The other school of thought views meta-analysis as an approximation of data pooling. This type of meta-analysis attempts to answer the same questions as primary research, using larger samples from multiple studies (Rosenthal, 1984).

Smith and Glass's (1977) Original Meta-Analysis

In their original study, Smith and Glass were very inclusive in the studies selected their meta-analysis. They were concerned that eliminating studies of poor quality would introduce researcher bias and would be a loss of important information. Smith and Glass used "standard research procedures to identify 1,000 documents: Psychological Abstracts, Dissertation Abstracts, and branching off of bibliographies of the documents themselves" (p. 752). Of the 1,000 documents identified, 500 were initially selected for inclusion in the meta-analysis. Smith and Glass's main inclusion criteria was that a study had to have at least one therapy group compared to a control group or to a different therapy group. "The rigor of the research design was not a

selection criterion but was one of several features of the individual study to be related to the effect of the treatment in that study" (Smith & Glass, 1977, p. 753). Smith and Glass used a definition of psychotherapy to select studies presented by Meltzoff and Kornreich (1970):

Psychotherapy is taken to mean the informed and planful application of techniques derived from established psychological principles by persons qualified through training and experience to understand these principles and to apply these techniques with the intention of assisting individuals to modify such personal characteristics as feelings, values, attitudes, and behaviors which are judged by the therapist to be maladaptive or maladjustive (p.6).

Studies in which the treatment did not meet Meltzoff and Kornreich's (1970) definition were excluded. Studies excluded involved treatments such as drug therapies, hypnotherapy, bibliotherapy, occupational therapy, milieu therapy, peer counseling, sensitivity training, marathon encounter groups, consciousness-raising groups, and psycho-drama.

Smith and Glass stated that:

The most important feature of an outcome study was the magnitude of the effect of therapy. The definition of the magnitude of effect--or 'effect size'--was the *mean difference between the treated and control subjects divided by the standard deviation of the control group, that is,*

$ES = (X_T - X_c)/Sc$. Thus, an 'effect size' of +1 indicates that a person at the mean of the control group would be expected to rise to the 84th percentile of the control group after treatment (p. 753). Smith and Glass calculated the effect size on any outcome variable the researcher chose to measure. An effect size was calculated for each outcome variable, the effect sizes of the separate studies becoming the "dependent variable" in the meta-analysis. The independent variables were 16 characteristics of the final 375 studies selected. These characteristics were described or measured in the following ways:

1. The type of therapy employed, for example, psycho-dynamic, client centered, rational-emotive, behavior modification, etc....
2. The duration of therapy in hours.
3. Whether it was group or individual therapy.
4. The number of years experience of the therapist.
5. Whether clients were neurotics or psychotics.
6. The age of the clients.
7. The IQ of the clients.
8. The source of the subjects, whether solicited for the study, committed to an institution, or sought treatment themselves.
9. Whether the therapists were trained in education, psychology, or psychiatry.
10. The social and ethnic similarity of therapists and clients.
11. The type of outcome measure taken.
12. The number of months after therapy that the outcomes were measured.
13. The reactivity or "fakeability" or the outcome measure.
14. The date of publication of the study.
15. The form of publication.
16. The internal validity of the research design. (Smith & Glass, 1977, p. 754).

Definitions and conventions were established by Smith and Glass to increase the reliability of the measures recorded and to assist in data estimation when data was not reported. Smith and Glass analyzed their data in four parts:

- 1) descriptive statistics for the body of data as a whole;
- 2) descriptive statistics for the comparison of therapy types and outcome types;
- 3) descriptive statistics for a subset of studies in which behavioral and nonbehavioral therapies were compared in the same study; and
- 4) regression analysis in which effect sizes were regressed onto variables descriptive of the study (p. 754).

Findings of Smith and Glass's (1977) Original Meta-Analysis

The findings of Smith and Glass meta-analysis depicted the average treatment effect across 375 studies. "On the average, clients 22 years of age received 17 hours of therapy from therapists with about 3 1/2 years of experience and were measured on the outcome variables about 3 3/4 months after the therapy." (Smith & Glass, 1977, p. 754).

The average study in Smith and Glass's meta-analysis showed an effect size of .68 a standard deviation superiority of the treated group over the control group. This means that the average client receiving therapy was better off than 75% of the untreated controls. In the comparison of the 10 classes of type of therapy, systematic desensitization (a type of behavior therapy) had the highest effect size of .91, rational-

emotive (a type of cognitive therapy) was second with an effect size of .77, and behavior modification and Adlerian therapy ranked third and fourth with effect sizes of .76 and .71, respectively. Implosion, a method of behavior therapy, ranked fifth with an effect size of .64 (Smith & Glass, 1977). The number of outcome measures computed into each effect size representing a type of therapy ranged from eight to 223. The resulting treatment therapy effect sizes were not weighted by sample size. Smith and Glass found no differences between types of therapies, though stated that "the results of research demonstrate the beneficial effects of counseling and psychotherapy" (p. 760).

Replications and Modifications of Smith and Glass's (1977) Work

The publication of Smith and Glass's work influenced the social science field in two major ways: 1) it introduced a new way to integrate research to produce cumulative knowledge, and 2) it combined nearly 375 controlled psychotherapy studies and drew conclusions about the outcomes yielded by ten types of, or approaches to, therapy. This precipitated the publication of a number of meta-analyses in education and in other fields.

In a review of the literature for replications of Smith and Glass's work two published papers were found. In 1981, Andrews and Harvey conducted a reanalysis of the 1977 Smith and Glass data and used only the studies of patients who sought treatment coded as having neuroses, true phobias, and emotional-somatic complaints.

Their rationale was to resolve whether or not the presence of many analogue studies and atypical patients confounded the results of the original study.

Andrews and Harvey (1981) used the same meta-analysis technique as Smith and Glass, statistically integrating 81 controlled trials from Smith and Glass's original meta-analysis. Consistent with the original study, the results supported the efficacy of psychotherapy. Reportedly, the condition of the treated patient was better than that of 77% of the untreated controls. Smith and Glass found that the typical therapy client is better off than 75% of untreated individuals. Though Smith and Glass found virtually no differences between the types of therapy, Andrews and Harvey found the behavioral and psychodynamic therapies to be superior (the point that most clients with neuroses were treated with these therapies was not lost on Andrews and Harvey). Other important findings of Andrews and Harvey's study included that the improvement produced was stable over time, and that more counseling sessions beyond one year of treatment were not strongly associated with greater benefit.

In 1982, Shapiro and Shapiro conducted a meta-analysis of psychotherapy outcome studies published between 1974 and 1979 in which two or more treatments were compared with a control group. Their meta-analysis included some studies from Smith and Glass, studies of a later date than Smith and Glass. Only Psychological Abstracts was searched for studies meeting Shapiro and Shapiro's (1982) inclusion criteria. Their intent was to replicate the Smith and Glass study and to incorporate revisions suggested by Kazdin and Wilson (1978) and Rachman and Wilson (1980).

Following are the suggestions made by Kazdin and Wilson (1978) and Rachman and Wilson (1980):

1. Rachman and Wilson (1980) complained that many of the studies used by Smith and Glass contained no control group. Originally, control-referencing procedures were used to establish equivalence when simultaneous comparisons between behavioral and nonbehavioral methods were made. Although Shapiro and Shapiro stated that "the absence of an untreated control group does not invalidate an otherwise well-designed comparison between two active treatments," they deemed it cost-effective to consider only studies including untreated or minimally treated controls (1982, p. 582).
2. A related criticism of Smith and Glass was the excessive reliance on the aggregation of data from disparate studies. Rachman and Wilson (1980) stated that including studies of poor quality posed serious threats to the meta-analysis' validity. Glass and Kliegl (1983) counter that "meta-analysis treats methodological assumptions of object field studies as part of an object field in itself, that is, as *a posteriori*. This different point of view permits one to suspend judgements about studies that others might regard as '*a priori* bad.'" (Glass & Kliegl, 1983, p. 37). Though Shapiro and Shapiro (1982) believed that Smith and Glass used regression analysis and the elimination from a subanalysis of all

- studies not involving direct comparisons to achieve statistical and experimental control, they preferred to limit their investigation to studies making simultaneous comparisons between two or more treatments and a control group.
3. Smith and Glass omitted several behavioral studies considered important by Rachman and Wilson (1980). Rather than attempt an exhaustive search, Shapiro and Shapiro (1982) took as a representative sample all published, controlled comparisons between treatments found in Psychological Abstracts, 1975-1979.
 4. Rachman and Wilson also criticized the inclusion of unpublished doctoral dissertations in the original meta-analysis. Due to this criticism and the inaccessibility of the material, Shapiro and Shapiro (1982) excluded dissertations from the analysis.
 5. In an attempt to overcome Rachman and Wilson's objections to Smith and Glass's failure to differentiate between different kinds of outcome measurement and for their novel conclusion that behavioral methods tended to be assessed by more subjective outcome measures, Shapiro and Shapiro incorporated refinements in the categories and dimensions used to characterize outcome measurement. For example, the two codings used by Smith and Glass (1977) for "type of outcome measure" were replaced by a four-point coding scale, and "type of outcome

"measure" was renamed "domain" according to which area of functioning was being referenced (fear/anxiety, self-esteem, adjustment, work/school achievement, personality traits, social behavior, emotional/somatic disorders, and physiological stress) (Shapiro & Shapiro, 1982).

Shapiro and Shapiro found that, consistent with previous reviews, the mean of the 1,828 effect size measures obtained from the 414 treated groups approached one standard deviation unit, and the differences among treatment methods accounted for only 10% of the variance in effect size. Thus, the effects of different treatment methods were not, on the whole, impressively different from one another.

A third article by Eifert and Craill (1989) used meta-analysis to investigate outcome studies addressing the relationship between affect, behavior, and cognition in the behavioral and cognitive treatments of depression and phobic anxiety. The meta-analysis used for this study was completed in 1986 as Craill's graduate thesis. Craill used strict criteria for a study's inclusion in the meta-analysis: 1) only studies with strictly cognitive or behavioral treatments were used, 2) the studies had to be journal publications written in English with statistics that allowed for the calculation of effect sizes, and 3) the clients had to be 18 years of age or older and randomly assigned to the treatment conditions (1989). Eifert and Craill (1989) stated that these narrow criteria prevented the erroneous conclusions that lumping together different disorders and measures taken at different points in time can cause.

Eifert and Craill in their quantitative review of the relative efficacy of behavioral versus cognitive interventions in the treatment of unipolar depression and phobic anxiety, found that cognitive treatment was favored over behavioral treatment for depression, and behavioral methods were slightly favored over cognitive methods in treating phobic anxiety. Furthermore, the authors concluded that the relative effectiveness of these techniques depended on and pointed to the type of affect-behavior-cognition interface underlying the depression and phobic anxiety.

New Methods of Meta-Analysis

Glass first described meta-analysis in 1976 as a quantitative research review. He believed that meta-analysis should be used only to investigate outcomes of a body of research. Much of the criticism Glass received of his original meta-analysis was from researchers not recognizing the differences between outcome research and hypothesis testing. Since, several new approaches to meta-analysis have appeared in common use. A method of meta-analysis by James Kulik (1979) of the University of Michigan is similar to Smith and Glass's (1977) philosophically but differs methodologically in several important ways. Kulik carefully eliminates from his reviews any studies judged to have serious methodological flaws. Glass believes that this approach introduces a reviewer's biases and interferes with the study of how certain methodological features affect study outcomes (1983). Secondly, Glass calculates an effect size for every dependent variable while Kulik calculates only one effect size for every study. Kulik believed that the interdependency inherent in

Glass's method would complicate the application of statistical tests and the interpretation of the results (1979).

Light and Pillemer (1984) believe meta-analysis can be used for study of outcomes and testing of hypotheses, and emphasize the importance of clearly stating whether the purpose of a meta-analysis is to test a hypothesis or to explore an outcome. Each review should clearly state the criteria for selecting studies, and the implications of using said criteria. Light and Pillemer, Rosenthal (1978) and Glass and Kliegl (1983), suggest that including unpublished studies in a review far outweigh the disadvantages caused by their exclusion. Publication bias can seriously overestimate treatment effects and jeopardize the generalizability of the results.

Rosenthal believed that meta-analysis should be used to test hypotheses. Rosenthal and Rubin, in their 1986 article in Psychological Bulletin, introduced a more sophisticated procedure which uses a test of homogeneity of variance to compare the variance of the collected effect sizes to their sampling error. If the difference between the effect size variance and the sampling error is statistically significant, the effect sizes are regrouped according to study features. This solved the former problem of loss of information Rosenthal encountered when effect sizes were simply pooled and averaged without attending to individual study features. The drawback of this technique was that, in some cases, the test of homogeneity of variance was too sensitive and showed statistical significance for unimportant differences among effect sizes (Bangert-Drowns, 1985).

Bangert-Drowns (1985) advocates Schmidt's (1984) technique over Rosenthal's and Rubin's (1986) because it does not have the problem of over-sensitivity inherent in the test of homogeneity. Although Schmidt's (1984) approach has greater flexibility and precision in calculating sampling error, it requires fairly detailed information from the studies involved.

The Subjects from this Meta-Analysis

Since Smith and Glass's (1977) "Meta-Analysis of Psychotherapy Outcome Studies," no meta-analyses have been found which compare psychotherapeutic methods to the use of Prozac in the treatment of unipolar major depression. Unipolar major depression is defined by the DSM-III-R (1986) as the individual's experience of a specified set of symptoms effecting their social, vocational and psychological functioning for a duration of two months or more. These symptoms include significant weight loss or gain, the tendency to sleep too much or too little, loss of interest in usual activities, difficulty in personal and professional relationships, inability to concentrate, frequent tearfulness, and feelings of hopelessness and despair. "Unipolar" is used to denote that the mood change is toward the depressed end of the mania-depression continuum. Unipolar major depression differentiates itself from other diagnoses of depression such as dysthymia or affective depression by its longer duration and greater intensity of symptoms experienced.

Unipolar major depression is an Axis I diagnoses, meaning that the mental health professional has determined that unipolar major depression is the primary cause

of the client's decrease in adaptive functioning. If the client suffered from other symptoms such as psychosis stemming from the depression, these symptoms would be categorized as secondary Axis I diagnoses.

Prozac was chosen for this meta-analysis due to its reputation as a new, very effective anti-depressant with fewer side effects than other anti-depressants popularly prescribed. Research was first published about Prozac in 1985, and Prozac was introduced to the consumer market by Eli Lilly in 1988.

Prozac (generically called fluoxetine) is a serotonin reuptake inhibitor. Prozac works by blocking the reuptake of the neurotransmitter serotonin, thereby increasing the concentration of serotonin in the synaptic cleft (Stark, 1985; Lader, 1988). Prozac has been found to decrease symptoms of unipolar major depression without the intense side-effects of other tricyclic anti-depressants.

In Smith and Glass's (1977) original meta-analysis, ten types of therapy were compared for their treatment effect. For the purpose of this meta-analysis three major types of therapy represented in the literature -- cognitive, behavioral, and cognitive-behavioral -- were compared to each other and to the anti-depressant Prozac. Cognitive, behavioral, and cognitive-behavioral therapy were selected for this meta-analysis because they were identified in the largest number of studies published from 1985-1992, the time frame of this meta-analysis.

Cognitive therapy was defined by Beck (1976) as "in the broadest sense, cognitive therapy consists of all of the approaches that alleviate psychological distress

through the medium of correcting faulty conceptions and self-signals" (p. 214). In cognitive therapy, as in all therapies, therapeutic collaboration between the therapist and client is important. The client and therapist must agree on the therapeutic issue, the goal of therapy, the methods to achieve the goal, and the duration of therapy (Patterson, 1986).

Cognitive therapy is often used to treat unipolar major depression. According to Beck (1976), depression includes "(a) the observable abnormal behavior or symptom, for example, easy fatigability, crying spells, suicidal threats; (b) the underlying motivational disturbances (if any), such as the wish to avoid activities or to escape from life; (c) underlying the motivation, a cluster of cognitions, such as the belief that striving toward a goal is futile, that there are no satisfactions ahead, and that he is defeated, deprived, and defective" (p. 265). Cognitive therapy as intervention attacks the underlying attitudes of the depressed client. Through challenging destructive thought patterns the therapist seeks to replace the destructive thought patterns with healthier, more functional thought pattern (Patterson, 1986).

Behavior therapy is "the use of experimentally established principles and paradigms of learning to overcome unadaptive habits" (Wolpe, 1982, p. 1). The therapist views the patient as the product of his or her genetic endowment and the learning that has taken place through exposure to stimuli in the environment, resulting in nonadaptive attitudes, thoughts, verbal behavior, and emotional behavior. Thus the therapist never blames or disparages the patient, but offers sympathy, empathy,

sensitivity, and objectivity. Gathering a complete background history and conducting a behavior analysis (where the therapist seeks to identify the environmental antecedents to the client's unadaptive behaviors) are important steps in behavior therapy. According to Wolpe (1982), behavior therapy is best used to treat cognitive disturbances such as anxiety, fear and depression. Behavioral techniques such as thought stopping, assertiveness training and systematic desensitization, help the client replace the faulty learning with correct information.

The third type of psychotherapy examined in this meta-analysis is cognitive-behavior therapy. Meichenbaum (1977) founded cognitive-behavior therapy because he believed that "the learning theory on which behavior therapy is based is not adequate to account for the cognitive aspect of behavior therapy" (Patterson, 1986, p. 204).

Cognitive-behavior therapy recognizes the importance of what people say to themselves and how that effects their behavior. The focus is on changing the client's "self-talk" which leads to maladaptive behaviors and emotional distress. In addition to the training, techniques used to modify clients' self-instruction (such as cognitive restructuring, and stress inoculation), can be used in addition to behavior therapy techniques (such as desensitization) to increase the effectiveness of the training techniques (Meichenbaum, 1977).

Many methodological and philosophical advances have been made in using meta-analysis as a research tool and in using psychotherapeutic methods to treat

unipolar major depression. Based on this literature review and the nature of the problems and questions asked, this meta-analysis was designed and conducted to test hypotheses and summarize research outcomes.

Chapter 3

Methodology

Based upon the premise of Kulik (Bangert-Drowns, 1985) and supported by Shapiro and Shapiro (1982) and Eifert and Craill (1989), the original study called for the use of narrowly defined inclusion criteria for studies in the meta-analysis.

Following are the original criteria upon which the present study was based.

Specifically, the investigator:

1. Obtained a comprehensive list of studies, published and unpublished, between January 1985 to June 1993 related to the treatment of depression meeting these criteria:
 - a. Only studies using strictly cognitive methods as defined by Ellis' rational emotive therapy or Beck's cognitive therapy (but not including other non-cognitive methods), behavioral methods defined as those requiring the client to physically participate in an activity (but not including other non-behavioral methods), and prescribing of Prozac and other drugs equivalent to Prozac were included.
 - b. All studies using random assignment of subjects to treatment and control groups. Subjects may not have been solicited.
 - c. Only studies written in English published or unpublished, with the available statistics for the calculation of effect sizes.

- d. Subjects were 18 years of age or older, and from an outpatient population.
- e. Subjects had an Axis I diagnosis of major depression, as defined by the DSM III-R, appropriate to treatment for depression. The diagnosis was made by a mental health professional. Subjects with accompanying confounding diagnoses, such as schizophrenia, were excluded.

Strict criteria for the inclusion of articles into the meta-analysis severely limited the qualifying articles to only fourteen, and did not provide a large enough sample size for proper analysis. Qualifying articles were reviewed in Psychological Abstracts and ERIC, and coded according to their characteristics (random assignment, control group design, type of therapy used in treatment, methods of obtaining subjects). Based on the results of this review, the inclusion criteria were changed in the following ways:

- a. The therapy "cognitive-behavioral" was included as a viable method of therapy, its definition being a combination of Ellis' cognitive therapy and the attention to and prescription of behavioral homework. This method was included to reflect the large number of studies addressing this therapy combination in the literature.
- b. The restrictions of a required control group and no solicitation of clients severely limited the studies available for the meta-analysis.

Consequently, solicited clients were included, and subjects as their own control when a pre-test was used were allowed (Rosenthal, 1984).

- c. Instead of the original age range of 18 years of age or older, the age range was capped at 65 years of age. This was to minimize the probability of including individuals with dementia related depression.
- d. An additional criterion was added that the subjects involved in therapy or Prozac could not be taking any other prescribed medication. This was added as a control against spurious results due to other medications, and because of the frequency of a concomitantly prescribed sleep inducing medication for clients taking Prozac. Table 1 illustrates the number of articles listed by therapy type under the new criteria.

Table 1. Table of Number of Studies by Therapy Category

Type of Therapy	Controlled or Subjects as Own Control	Number of Studies
Cognitive	Controlled	2
Behavior	Controlled	1
Cognitive-Behavior	Controlled	4
Prozac	Controlled	11
	Total	18
Cognitive	Subjects as Own Control	7
Behavior	Subjects as Own Control	1
Cognitive-Behavior	Subjects as Own Control	4
Prozac	Subjects as Own Control	7
	Total	19

Of the several methods of meta-analysis reviewed, this study used methods introduced by Smith and Glass (1977), while including extensions of this technique made by Rosenthal (1989), and Wolf (1986). Following is the methodology for the present study:

1. This meta-analysis was for the purpose of summarizing research outcomes (Smith and Glass, 1977) and to establish relationships to test important hypotheses in the body of research (Rosenthal, 1984).

2. To provide a sufficient pool of studies for the meta-analysis, studies without control groups were added. Smith and Glass (1977) included studies without a control group by providing estimates of the "missing" control group. Control group means were calculated by regressing the standard deviations of existing control groups on the standard deviations of studies without control groups. In this meta-analysis, studies without control groups were allowed if they had a pre- and post-test design. The pre-test was used as a baseline estimate of the control group, thus making it possible for the researcher to calculate an effect size (Rosenthal, 1984).
3. To test hypotheses, effect sizes were categorized in four groups: controlled psychotherapy studies, subjects as their own control psychotherapy studies, controlled Prozac studies, subjects as their own control Prozac studies.
4. Because the researcher wanted to weight each effect size according to sample size (Rosenthal, 1984), effect sizes were calculated with d-scores across dependent variables (in this case, the dependent variables are the psychological instruments used to measure major depression).
5. The pooled standard deviation in the calculation of effect size (Rosenthal, 1984) was used as opposed to the standard deviation of the control group as advocated by Smith and Glass (1977).
6. When effects were represented as a t, p, or z-score, these statistics were transformed to d-scores (Wolf, 1986).

7. Effect sizes were then tested for significance according to Rosenthal and Rubin (1982) and Wolf (1986).
8. Then it was determined if the variance in effect sizes across studies was due solely to statistical and measurement artifacts. If the hypotheses was rejected the observed variance of the effect sizes was greater than the variance expected from artifacts, it was concluded that the mean corrected effect size estimated the true effect size, and a general principle was established. The mean corrected effect size then incorporated and summarized the results of all previous studies (Rosenthal, 1984).

The methods for analyzing the effect sizes used original techniques by Smith and Glass (1977), with extensions by Rosenthal (1984), Rosenthal and Rubin (1982), and Wolf (1986). Following are the formulae used for the meta-analysis of four psychotherapeutic methods for the treatment of unipolar major depression. The spreadsheet program Quattro Pro was used to organize and analyze data for the meta-analysis.

9. An effect size of +1.00 indicates that a person at the mean of the control group would be expected to rise one standard deviation above the mean of the control group, or to the 84th percentile of the control group after treatment (Smith & Glass, 1977).

Calculation of effect size for each dependent variable:

Cohen's d

$$d = \frac{\bar{x}_1 - \bar{x}_2}{sd \text{ pooled}}$$

(Rosenthal, 1984)

When converting t to Cohen's d: $d = \frac{2t}{\sqrt{df}}$

(Wolf, 1986)

When converting a p-value (proportion) to Cohen's d:

p is transformed via z, and the following estimate of d is used:

$$d = z \sqrt{1/n + 1/n}$$

The resulting Cohen's d-score was then weighted (d') according to sample size:
w, the estimated variance of d, is calculated

$$w = \frac{N}{1 - d'^2}$$

(Rosenthal, 1984)

Cohen's d is then weighted:

$$d' = \frac{\sum w_j d'_j}{\sum w_j}$$

(Wolf, 1986)

Weighted Cohen's average d (\bar{d}') is then calculated:

$$\bar{d}' = \frac{\sum w_j d'_j}{\sum w_j}$$

(Rosenthal, 1984)

The heterogeneity of d' was then tested by this equation (Rosenthal & Rubin also used this as a test of significance):

$$\sum w_j (d' - \bar{d}')^2 \quad \text{is distributed approximately as with } K-1 \text{ df. (Rosenthal & Rubin, 1982)}$$

A second test of significance was also done:

$$d' = \frac{\sum z}{\sqrt{\sum k_j}} \quad \text{is distributed approximately as } z. \text{ (Rosenthal, 1984)}$$

Through combining these methods a meta-analysis of all published and unpublished psychotherapy outcome studies meeting the inclusion criteria were conducted comparing the cognitive, behavioral, cognitive-behavioral and pharmacological treatment (Prozac) of unipolar major depression. The diagnosis of unipolar major depression was based upon assessment made by a mental health practitioner and defined by the DSM III-R.

As Glass has suggested, meta-analysis alone cannot furnish all the answers to the perennially vexing and complex questions surrounding the impact of psychological treatments. The integration of data from diverse studies is fraught with difficulties, and the quality of the data is only as good as the study from which it originates. It was hoped that, in the spirit of Smith and Glass's (1977) original work, important information related to the treatment of unipolar depression would be gained.

Chapter 4

Results

Meta-analyses can be analyzed several ways. In this meta-analysis, the dependent variables are the instruments and rating scales used to quantify each client's depression. Most meta-analyses calculate only one effect size per study or an effect size for several independent variables. For the purposes of the study, an effect size was calculated for each dependent variable within each study. For each of the four groups, in both treatment conditions, cognitive therapy, behavioral therapy, cognitive-behavioral therapy, and treatment with Prozac, the effect sizes for like dependent variables were combined and averaged. Each measure of depression has an effect size indicating how that instrument measured treatment effect for that group.

Each dependent measure was represented by a weighted mean d-score. Table 2 shows the average effect sizes across the 8 groups defined by the control conditions. Table 3 shows the average effect sizes of the psychotherapy groups defined by type of psychotherapy treatment. Tables 4-7 contain the findings for control and subjects as own control conditions for using Prozac, cognitive therapy, behavior therapy, and cognitive-behavior therapy for treating unipolar major depression for various dependent variables. The tables depict the average effect sizes for the control and subjects as own control groups across 37 studies and 57 dependent variables.

Table 2. Average Weighted Effect Sizes Across Type of Therapy and Control

Type of Therapy	Type of Control Group	Number of Dependent Variables Per Treatment Condition	Average Weighted [△]
Psychotherapy	Controlled	15	0.201
Psychotherapy	Subject as Own Control	14	* 1.700
Prozac	Controlled	15	* 3.076
Prozac	Subject as Own Control	13	* 4.353

Note: * $P = .05$ significance, z distribution

The average effect size for the 15 controlled dependent variables measuring treatment of unipolar major depression with Prozac was 3.076. This was a very high effect size. These results indicate that, when compared to control groups, clients treated with Prozac for unipolar major depression improved in their condition by more than three standard deviations above the mean. An even higher average effect size of 4.353 was shown for the thirteen measures in studies using subjects as own control when they were treated for unipolar major depression with Prozac (Table 2).

Table 3. Average Weighted Effect Sizes Across Type of Psychotherapy and Control

Type of Psychotherapy	Type of Control Group	Number of Dependent Variables Per Type of Psychotherapy	Average Weighted Δ
Cognitive	Controlled	11	0.378
Behavior	Controlled	8	0.020
Cognitive-Behavior	Controlled	15	0.157
Cognitive	Subjects as Own Control	10	* 1.614
Behavior	Subjects as Own Control	3	2.189
Cognitive-Behavior	Subjects as Own Control	7	* 1.860

Note: * $P = .05$ significance, z distribution

Table 4. Findings of Controlled Studies of Fluoxetine (Prozac) Treatment of Unipolar Major Depression

Type of Therapy	Dependent Variable	Number of Studies	Weighted Δ
Prozac	Hamilton Rating Scale for Depression (HRSD) (total)	17	* 11.344
Prozac	Motor Retardation Subscale	11	* 3.607
Prozac	Anxiety Subscale	10	* 3.556
Prozac	Cognitive Disturbance Subscale	6	* 2.028
Prozac	Sleep Disturbance Subscale	7	* 1.986
Prozac	Raskin Depression Scale	8	* 2.947
Prozac	Physician Global Improvement	7	* 2.595
Prozac	Client Global Improvement (CGI) (total score)	8	* 9.439
Prozac	CGI Severity (subscale CGI)	7	* 1.933
Prozac	CGI Improvement (subscale CGI)	6	* 1.962
Prozac	Covi Anxiety Scale	7	* 2.582
Prozac	Symptomatic Checklist--58	1	.662
Prozac	Efficacy Ratio	1	.458
Prozac	Efficacy Index: Therapeutic Effect	1	.604
Prozac	Efficacy Index: Side Effects	1	.435

Note: * $P = .05$ significance, z distribution

Table 5. Findings of Subjects as Their Own Control Studies of Fluoxetine (Prozac) Treatment of Unipolar Major Depression

Type of Therapy	Dependent Variable	Number of Studies	Weighted [△]
Prozac	Hamilton Rating Scale for Depression (HRSD) (total)	8	* 5.337
Prozac	Motor Retardation Subscale (HRSD)	1	7.867
Prozac	Anxiety Subscale (HRSD)	1	6.714
Prozac	Cognitive Disturbance Subscale (HRSD)	1	5.214
Prozac	Sleep Disturbance Subscale (HRSD)	1	3.176
Prozac	Physician Global Improvement	2	2.975
Prozac	Client Global Improvement (CGI) (total score)	2	4.775
Prozac	CGI Severity (subscale CGI)	5	* 5.356
Prozac	CGI Improvement (subscale CGI)	4	* 5.422
Prozac	Montgomery & Asberg Depression Rating Scale	1	2.844
Prozac	Covi Anxiety Scale	3	2.384
Prozac	Hamilton Anxiety Rating Scale	1	1.682
Prozac	Hamilton Depression Rating Scale (depression subscale)	1	2.837

Note: * $P = .05$ significance, z distribution

Table 6. Findings of Controlled Studies of Psychological Treatment of Unipolar Major Depression

Type of Therapy	Dependent Variable	Number of Studies	Weighted Δ
CT	Hamilton Rating Scale for Depression (HRSD) (total)	2	2.047
CBT		2	.282
CT	Beck Depression Inventory	3	.648
BT		1	.725
CBT		4	.199
CBT	Global Assessment Scale	2	-.038
CT	Symptomatic Checklist--90	2	.040
CBT		2	.311
CT	Automatic Thoughts Questionnaire	1	.298
BT		1	-.447
CBT		1	.633
CT	Cognitive Scale	1	-.864
BT		1	-.407
CBT		1	-1.034
CT	Recalled Cognitions Exercise	1	1.198
BT		1	.521
CBT		1	1.172
CT	Self Evaluated Social Skills	1	.545

Type of Therapy	Dependent Variable	Number of Studies	Weighted Δ
BT		1	.384
CBT		1	-.039
CT	Pleasant Events Schedule	1	.062
BT		1	-.583
CBT		1	.167
CT	Behavior Scale	1	-.743
BT		1	-.267
CBT		1	-.305
CT	Observer--Evaluated Social Skills	1	.487
BT		1	.235
CBT		1	-.227
CBT	MMPI-D (depression scale)	1	-.050
CBT	Self-Rating of Depression	1	.169
CBT	Clinician Rating of Depression	1	.023
CBT	Significant Other Rating of Depression	1	1.084
CT	Social Adjustment Scale	2	0.327

Note: *CT* = Cognitive Therapy; *BT* = Behavior Therapy; *CBT* = Cognitive-Behavior Therapy; *Z* distribution

Table 7. Findings of Subjects as Their Own Control Studies of Psychological Treatment of Unipolar Major Depression

Type of Therapy	Dependent Variable	Number of Studies	Weighted Δ
CT	Hamilton Rating Scale for Depression (HRSD)(total)	5	1.887
BT		2	2.591
CBT		7	* 2.997
CT	Beck Depression Inventory	8	* 1.823
BT		2	3.316
CBT		8	* 2.316
CBT	Global Assessment Scale	5	* 3.224
CT	MMPI-D (depression scale)	1	4.281
CT	MMPI-total	1	2.649
CBT	Affects Balance Scale (ratio)	2	1.506
CBT	Affects Balance Scale (positive)	2	.846
CBT	Affects Balance Scale (negative)	2	1.197
CT	Dyadic Adjustment Scale	2	.735
BT		2	.661
CBT		2	.935
CT	Dysfunctional Attitude Scale	1	.804
CT	Global Severity Index	1	.823
CT	Attributional Styles Questionnaire	1	.562
CT	Automatic Thoughts Questionnaire	1	1.597
CT	Hopelessness Scale	1	.978

Note: CT = Cognitive Therapy; BT = Behavior Therapy; CBT = Cognitive-Behavior Therapy; *P = .05 significance, Z distribution

Interpretation of effect sizes' practical and statistical significance should be done with caution. Statistically, an effect size approaching one standard deviation above the mean of the control group is significant. Although this cannot be quantified as to exactly how the unipolar major depression has improved, it can be said that the average client receiving therapy was better off than 84% of the untreated controls. In terms of practical significance, it seems safe to say that an effect size of one standard deviation indicates that the clients experienced some improvement in their unipolar major depression. For example, in the Prozac treatment the effect sizes were three and four standard deviations above the mean. This indicates substantial improvement statistically and practically, though the practical significance should be interpreted with caution.

The average effect sizes for each dependent variable for the controlled Prozac condition did not indicate fluctuations in effect size related to the dependent variable. All average effect sizes for the 15 dependent variables were significant ($p < .05$) except for the Symptomatic Checklist -- 58, and the Efficacy Ratio scale and its two subscales (Table 4). Of the 13 dependent variables for the subjects as own control Prozac condition, three were statistically significant ($p < .05$) (Table 5). The remaining 10 variables had high effect sizes, but were not significant due to having very low sample sizes.

For the controlled therapy condition, the results were quite different. The overall average effect size for the 15 dependent variables was only .203, representing

a reduction in depression by two-tenths of a standard deviation from the mean. Similar results were shown by the three psychotherapy methods. Cognitive therapy yielded an effect size of .368, behavior therapy of .02, and cognitive-behavior therapy of .157 (Table 6). The behavior therapy condition is the least well represented therapy because only two studies could be found. This undoubtedly impacted the low effect size of .02 that was received. These overall results are in sharp contrast to the effect sizes received from both control conditions with Prozac treatment. There were no statistically significant effect sizes for dependent measures using controlled psychotherapy treatment. Important to note are the two therapy conditions which had results in the negative direction, meaning that clients responded to the dependent measure as being more depressed after treatment than before treatment. On the Cognitive Scale, the cognitive and cognitive-behavior therapy conditions were in the negative direction yielding effect sizes of -.864 and -1.033. These results were not statistically significant.

The subjects as own control condition for the psychotherapy treatment showed higher effects for treatment of unipolar major depression. The average effect size for the 14 dependent variables was 1.7, an improvement of more than one and a half standard deviations from the mean (Table 2). Of the three psychotherapy treatments, behavior therapy had the highest effect size of 2.189; but was not statistically significant. Cognitive-behavior therapy showed a reduction in depression on dependent measures with an effect size of 1.86 ($p < .05$), and cognitive therapy had

an effect size of 1.614 ($p < .05$)(Table 3). Four dependent measures, three measuring for treatment effects of cognitive-behavioral therapy, and one for cognitive therapy, were statistically significant ($p < .05$) (Table 7).

The results of this study showed a wide range of total mean effect sizes for the four treatments, ranging from .201 for the controlled psychotherapy condition to 4.353 for the subjects as own control Prozac condition. While these results indicated differences between the four treatments, factors which may have contributed to the inflation or deflation of effect sizes should be examined. In Table 4, unusually high effect sizes were obtained from the Hamilton Rating Scale for Depression (11.344) and for the Client Global Improvement scale (9.439). Since each scale score is independent of the other scale scores, removal of these scales from the analysis would have no effect on the remaining scale scores. While these results indicated differences between the four treatments, factors which may have contributed to the inflation or deflation of effect sizes are examined in Chapter 5.

Chapter 5

Discussion and Implications for Further Research

Discussion

Meta-analysis is an excellent tool for studying outcomes of cumulative research. Smith and Glass's (1977) original work, followed by Rosenthal's (1984) and Wolf's (1986) contributions, has made it possible to integrate results from a wide variety of studies. Since no meta-analyses on Prozac or comparing Prozac to psychotherapy have been found, the comparison of this study to past meta-analyses can be done only across types of psychotherapy. The psychotherapy component of this meta-analysis, in general, agrees with meta-analytic findings of the past.

Discussion of Statistical Results

As stated in Chapter 1, the following research questions were investigated:

- 1) What is the comparative effectiveness of cognitive, behavioral, cognitive-behavioral, and pharmacological treatment (i.e. the prescription of Prozac) in the treatment of unipolar major depression?
- 2) In comparing these three psychotherapies to Prozac, which is most effective in treating unipolar major depression -- therapy or medication?
- 3) Among the three therapies which does the literature show to be the most effective? and

- 4) Is it possible to that the treatment of unipolar major depression with Prozac could obviate the need for therapy?

The statistical results of this meta-analysis indicate that Prozac is more effective than cognitive therapy, behavior therapy, or cognitive-behavior therapy in treating unipolar major depression. In the subjects as own control condition, cognitive and cognitive-behavioral therapies were more effective than behavior therapy. In the control condition, Prozac had an average weighted effect size of 3.076 (Table 4), and in the subjects as own control condition Prozac had an average weighted effect size of 4.353 (Table 5). What immediately draws attention in the Prozac conditions are the very high effect size scores for the Hamilton Depression Rating Scale (HDRS). The HDRS is a 17-item scale developed in 1960. Hamilton, the author of the HDRS, designed the scale to be delivered by a skilled psychiatrist. There is no standardized interview for the administration of the scale, and it is "unsuitable for use by non-psychiatrically trained personnel as its completion requires a considerable exercise of clinical skill" (Thompson, 1989, p. 94). Furthermore, the concurrent validity of the instrument, although reportedly .88 - .90, is highly questionable since the instrument it was compared to is not named in the literature (Thompson, 1989).

Several other reasons may account for the abnormally high effect sizes received in the control and subjects as own control Prozac conditions. Many clients were recruited for the studies in this meta-analysis. Clients' knowledge of being

included in a study testing an antidepressant may have contributed to unusually high scores. This is an example of the Hawthorne effect, and can be a threat to instruments' validity.

Secondly, clients who seek a psychiatrist for depression treatment do so with different expectations than clients who seek psychological treatment. Clients see psychiatrists with the expectation that medication will be recommended and prescribed. Client's belief that medication will help them is reinforced by the psychiatrist. Many clients who see psychiatrists have had previous experiences with medication and already have a well established belief system about how they can be helped by medication.

Another factor contributing to these unusually high effect sizes may be lack of adequate client contextual information. In each of these studies, subjects were treated and tested as if they were all the same. This is not likely to be true. Although all subjects were diagnosed with unipolar major depression, this diagnosis has a broad etiology and a continuum of multiple symptoms.

Another contributor to spurious effect sizes may be clinicians' lack of test administration skill and knowledge. Especially in the administration of the Client Global Improvement scale where clients rate their improvement on a 10-point interval scale, inaccurate scores can result if the scale is not adequately explained to the client.

A further contributor may be the patient-psychiatrist interaction in the Prozac condition. It is possible that a patient -- especially a "cognitive-oriented" one--could

receive a therapeutic benefit from contact with the psychiatrist who later prescribes Prozac. This therapeutic benefit would interact with the Prozac to decrease overall unipolar major depression, yet with the measures used, it is not possible to partial out the variance attributed to the medication and the variance attributed to the therapeutic contact. Also, there is no way to guarantee that clients in the Prozac conditions were not involved in therapy either during or immediately prior to the research data collected for these meta-analytic studies.

There is an important final factor which definitely impacted the large effect sizes received for the two Prozac conditions. A majority of the Prozac studies in this meta-analysis included information pertaining to the negative side-effects of Prozac. A majority of these meta-analytic studies also took patients out of the study who did not respond to Prozac or had serious side-effects to Prozac. Patients not responding to or having serious side-effects to Prozac included individuals who experienced suicidal ideation, hallucinations, acute nausea, dizziness, severe headaches, or a worsening of their depression. This is the juncture at which responsible and ethical mental health professionals and research design did not meet.

In all the Prozac studies in this meta- analysis, when the patient experienced any serious Prozac-related difficulty, the psychiatrists/researchers discontinued Prozac treatment for those individuals. In doing this, the psychiatrists/researchers were acting in a professionally responsible, ethical manner. Discontinuing these patients was always followed with administration of an alternative treatment for their unipolar

major depression. To not have responded to these patients in this responsible manner could have been disastrous. Though the psychiatrists / researchers had no other ethical choice but to discontinue these patients, the result was a subject pool of patients who only responded positively to Prozac. This fact, no doubt, contributed greatly to the very large effect sizes received for the Prozac conditions.

The control psychotherapy effect size of .201 and the subjects as own control psychotherapy effect size of 1.7 were significantly lower than the effect sizes for both Prozac conditions. Instruments created by the author's study and not tested for reliability or validity, may have contributed to deflated effect sizes. In Table 6, the controlled psychological treatment condition, eight of the sixteen instruments used were created by the researchers from a single study. Problems with validity and reliability aside, independence of objectivity did not exist since the authors created and administered the instruments. The controlled psychological treatment condition was the only condition which included instruments designed by a study's researchers, and it also had the lowest average effect size (.201) of the four treatment conditions. Another reason for this low effect size for the controlled psychotherapy treatment may be the absence of a "true" control group.

There are several possibilities why differences were only found between the psychotherapeutic techniques of cognitive and cognitive-behavioral therapy for the subjects as own control condition. As stated at the beginning of this chapter, no meta-analyses comparing Prozac to therapy have been found, and the comparison of

this study to past meta-analyses can be done only across types of psychotherapy. Eifert and Craill (1989) used meta-analysis to investigate outcome studies addressing the relationship between affect, behavior, and cognition in the behavioral and cognitive treatments of depression and phobic anxiety. They found that cognitive therapy was favored over behavioral therapy for depression, and behavioral therapy was favored over cognitive therapy for treatment of phobic anxiety. Most importantly, Eifert and Craill (1989) concluded that the relative effectiveness of these techniques depended on and pointed to the type of affect-behavior-cognition interface underlying the depression and anxiety. They suggested that much of the dispute surrounding cognitive and behavior therapies was more a result of differing definitions of affect and emotion than of the therapies, themselves, and how, if at all, affect and emotion interacted with behavior and cognition (Eifert & Craill, 1989). They further hypothesized that since it was unknown which part of the interface model should be the focus of treatment for depression, it is difficult to determine which technique accesses which part of the model most easily. They stated that current cognitive dominance theories disregard more integrative approaches to the problem (Eifert & Craill, 1989, p. 97). The results of Eifert and Craill's (1989) meta-analysis suggest that no narrowly defined type of therapy may best treat depression, and that a more "integrative approach" is called for.

Finally, it is important to address statistical versus practical significance in any study of human behavior. A major question in this study may be how much statistical

significance equals a practical, positive change in the clients' major depression? In the previous chapter it was suggested that one standard deviation effect size would indicate notable client improvement. The statistically significant effect sizes less than one standard deviation are important. The same is true for effect sizes of three and four standard deviations above the mean.

Discussion of Methodology Used in this Meta-Analysis

Following Smith and Glass's (1977) original framework for meta-analysis and incorporating extensions by Rosenthal (1984) and Wolf (1986), the methodology used for this research has allowed the integration of studies that would not have been included under any single method. The most apparent of these extensions of methodologies was the incorporation of studies with subjects as their own control (Rosenthal, 1984). This extension alone expanded the meta-analysis by 19 studies, and added information to the meta-analysis that otherwise would have been lost.

Weighting effect sizes by sample size (Rosenthal, 1984) further allowed for the integration of studies with large differences in sample size. In this research, the psychotherapy sample sizes were typically small, whereas the Prozac sample sizes were typically large. Though weighting may be seen in some ways as an information loss, this method compensates for the small loss of information with the advantage of enabling comparisons of studies with large disparities in sample size. This also applies to the pooling of each study's standard deviation (Rosenthal, 1984). Smith and Glass (1977) recommend the use of the control group standard deviation for the

calculation of effect sizes, yet Rosenthal's (1984) method was chosen because the pooled standard deviation tended to provide a better estimate of the population standard deviation when the sample sizes were equal and the population assumed to be distributed normally. Wolf's formulae (1986) were used in transforming the studies expressed in the statistics of t, Z, or p. This also allowed for the inclusion of several studies that would have been excluded because the data would have otherwise been unavailable.

The researcher made several methodological changes in the meta-analysis inclusion criteria as the study progressed. As explained in Chapter 3, the inclusion criteria were relaxed to increase the study's sample size based on a review of the body of literature. Several changes in inclusion criteria, such as capping the client age at 65 years old and excluding any studies which allowed concomitant drug prescription, were made to reduce problems with extraneous variables.

Limitations of Meta-Analysis and Implications for Further Research

A major criteria for inclusion in this meta-analysis is the axis I diagnosis of unipolar major depression. Studies were excluded if they contained extraneous variables such as accompanying psychosis, concomitant drug use, and secondary axis I diagnosis. The diagnosis of unipolar major depression describes a specific set of symptoms which origins may be organic or environmental. Some research supports Prozac as more effective in treating organic major depression (which is caused by a chemical in the body) than environmental depression (which is caused by situational

stressors). The origin of a client's depression cannot be hypothesized without a client history, thus the importance of client contextual information in testing hypotheses in therapy and anti-depressant research is critical.

Incorporating client history into future research studies would help answer many of the questions which have arisen as a result of this meta-analysis. Another question is whether there is a relationship between a client's origin of depression and whether they choose a psychiatrist for medication, a therapist for counseling, or are referred to a psychiatrist by a health professional. Depression which originates from intense or prolonged trauma may be alleviated short-term with medication, but long-term benefits might only be achieved with therapy or a combination of therapy and medication. Contextual information included in a study would aid researchers in answering these difficult questions.

Research involving doctor/patient or therapist/client interaction naturally involves many variables that are difficult to define and measure. Factors such as the doctor's or therapist's training, ability to administer tests, professional manner and gender impact the client's response to that professional, just as a client's history, personality style and social resources effect their ability to heal. Smith and Glass (1977) controlled for these variables by coding each study, when information was available, on an exhaustive list of variables. Given more client background, this may be the best solution for controlling for extraneous variables, though expense and time prohibitive for the purposes of this study.

Suggestions for future research relate to the all important inclusion criteria, which is the foundation upon which a meta-analysis is built. The argument that strict criteria introduces researchers' bias continues, yet remains subject to the researchers' judgment coupled with what the researchers are trying to accomplish by using meta-analysis. In relation to the criteria for this meta-analysis, it is possible that future meta-analyses about Prozac would benefit from allowing sleep inducers when taken for Prozac-related insomnia. No research exists about how sleeping aids effect individuals taking Prozac, and it would be difficult to ascertain whether the insomnia was Prozac- or depression-related. Also, being more rested by itself, may tend to reduce depression. However, this is worthy of examination. This meta-analysis excluded many articles due to sleep inducers accompanying the prescription of Prozac.

There is much research in the field of psychiatry about the negative side-effects of Prozac, yet this information is sometimes not included in studies prescribing Prozac. Individuals with severe side-effects, such as severe headaches, suicidal ideation, or nausea, were dropped from the studies. However, other side-effects such as mild headaches, mild nausea, impotence or anorgasmia may have been experienced by the client and attributed to the depression instead of to Prozac. Constant vigilance and record keeping of duration, frequency and intensity of side-effects would help better determine the benefits of Prozac.

A final suggestion for future research relates to researching therapies, and how the types of therapies used in a meta-analysis are chosen. In this study, meta-analysis included cognitive, behavioral, and cognitive-behavioral therapy. This decision was made based on a thorough search of the body of literature and on the time and scope this project allowed. Several other types of therapy that were prominent in the literature were eclectic and client-centered therapies. Also, the nature of different approaches to psychotherapy is continually shifting. As an example, Albert Ellis, the developer of Rational Emotive Therapy, has recently begun to call his approach "Rational Emotive Behavior Therapy" to more fully emphasize the behavioral components which actually occur in treatment (Grieger & Woods, 1993). It is strongly recommended that future researchers review the literature for popularity of types of therapy and trends in the publishing field as well as specific aspects of treatment associated with different approaches. It is not reasonable to suggest that every meta-analysis about therapy be all inclusive, but if researchers are going to choose certain therapies and eliminate others, they need to be able to justify their decisions.

Meta-analysis can serve two purposes: to test hypotheses or to study the outcomes of a body of research. This outcome research suggests that results should be evaluated in terms of practical and statistical significance, and that variables should be well defined so that outcomes may be interpreted as completely as possible. It is important to remember that the results be considered in context of the body of

literature. In this way, meta-analysis can tell us what research is being done and what trends are taking place. Most importantly, hypotheses may be tested to provide valuable information to researchers and health professionals.

Appendix

Meta-Analysis Studies Used in the Research

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EDUCATION:

Ph.D., Educational Research, Double Major in Counselor Education and Student Personnel Services, May 1994
Virginia Polytechnic Institute and State University, Blacksburg, VA
June 1988 - Present

M.S., Education, December 1983
Virginia Polytechnic Institute and State University, Blacksburg, VA
September 1981 - December 1983

B.A., Communications, Major in Journalism, June 1981
Virginia Polytechnic Institute and State University, Blacksburg, VA
September 1977 - June 1981

EXPERIENCE:

VPI & SU College of Education, May 1993 - Dec. 1993
Graduate Intern for Wise County Public Schools evaluation project

- Responsible for entering and coding data from outcome measures Iowa Test of Basic Skills (ITBS), the Self-Esteem Index (SEI), the Multi-Dimensional Self Concept Scale (MSCS), and several other measures incorporating Likert scales and essay response.
- Responsible for collaborating with project directors on best method of statistical analysis.
- In charge of writing a portion of the final evaluation report for Wise County Public Schools.

VPI & SU College of Education, Jan 1993 - May 1994
Graduate Assistant for the Technical Assistance Centers (TAC) for Individuals with Mild and Moderate Disabilities

- Respond to and complete information requests made to research library by public schools and private individuals.
- Major organizer in designing and implementing May 1993 conference on inclusion, "Beyond Mainstreaming," for public school personnel in Southwest Virginia.
- Represented TAC as guest speaker at Radford University undergraduate class on "Recognizing Depression in Children."
- Responsible for update and maintenance of computer library system for three TACs, as well as acquiring updated materials to expand research library.

EXPERIENCE: (continued)

Centerpoint Counseling, Jan. 1993 - Aug. 1993

Graduate Clinical Intern

- Counseled individuals in personal and vocational issues.

Mental Health Services of the New River Valley, Oct. 1984 - Dec. 1992

Therapist Oct 1990 - Dec 1992

- Counseled individuals, families and groups in a variety of personal, social, educational, and professional issues.
- Worked collaboratively with parents, Social Services and Montgomery County School counselors on parenting skills with students with learning disabilities, and on diagnosis and treatment with students suffering from depression.
- Worked with young adults on issues of school performance, choice of major, and vocational preparation.

Emergency Services Clinician Oct. 1987 - Oct. 1990, full-time and relief staff

- Responsible for mental status assessment and referral.

Counselor and After Care Counselor Oct. 1984 - Oct. 1987

- Responsible for vocational, educational and recreational programming and ongoing assessment for individuals with severe mental disabilities.

VPI & SU College of Education, Aug. 1988 - May 1990, and

Sept. 1981 - June 1983

Graduate Teaching Assistant

- Responsible for teaching courses in modern, jazz and ballet dance, gymnastics, and weight training.

VPI & SU College of Education, Oct. 1983 - Sept. 1984

Research Associate

- Coordinated a federally supported grant for the training of students to work with individuals with multi-handicaps in recreational settings.
- Directed grant activities and supervised a staff of seven graduate students.
- Instructed graduate course on "Recreation Programming for the Multi-handicapped."
- Was successful in securing subsequent funding from Department of Education via writing grant continuum.
- Responsible for networking with community in obtaining student internships.
- Responsible for national presentation and dissemination of grant research and activities.

PROFESSIONAL ORGANIZATIONS:

American Educational Research Association (A.E.R.A.)

National Council for Measurement in Education (N.C.M.E.)

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