



National Library
of Canada

Bibliothèque nationale
du Canada

Canadian Theses Service

Services des thèses canadiennes

Ottawa, Canada
K1A 0N4

CANADIAN THESES

THÈSES CANADIENNES

NOTICE

The quality of this microfiche is heavily dependent upon the quality of the original thesis submitted for microfilming. Every effort has been made to ensure the highest quality of reproduction possible.

If pages are missing, contact the university which granted the degree.

Some pages may have indistinct print especially if the original pages were typed with a poor typewriter ribbon or if the university sent us an inferior photocopy.

Previously copyrighted materials (journal articles, published tests, etc.) are not filmed.

Reproduction in full or in part of this film is governed by the Canadian Copyright Act, R.S.C. 1970, c. C-30. Please read the authorization forms which accompany this thesis.

AVIS

La qualité de cette microfiche dépend grandement de la qualité de la thèse soumise au microfilmage. Nous avons tout fait pour assurer une qualité supérieure de reproduction.

S'il manque des pages, veuillez communiquer avec l'université qui a conféré le grade.

La qualité d'impression de certaines pages peut laisser à désirer, surtout si les pages originales ont été dactylographiées à l'aide d'un ruban usé ou si l'université nous a fait parvenir une photocopie de qualité inférieure.

Les documents qui font déjà l'objet d'un droit d'auteur (articles de revue, examens publiés, etc.) ne sont pas microfilmés.

La reproduction, même partielle, de ce microfilm est soumise à la Loi canadienne sur le droit d'auteur, SRC 1970, c. C-30. Veuillez prendre connaissance des formules d'autorisation qui accompagnent cette thèse.

**THIS DISSERTATION
HAS BEEN MICROFILMED
EXACTLY AS RECEIVED**

**LA THÈSE A ÉTÉ
MICROFILMÉE TELLE QUE
NOUS L'AVONS REÇUE**

90

0-315-28279-7



National Library of Canada

Bibliothèque nationale du Canada

CANADIAN THESES ON MICROFICHE

THÈSES CANADIENNES SUR MICROFICHE

NAME OF AUTHOR/NOM DE L'AUTEUR Constance Irene Burns

TITLE OF THESIS/TITRE DE LA THÈSE SELF-INSTRUCTIONAL TRAINING AND STRESS INOCULATION TRAINING:
A REVIEW OF RESEARCH

UNIVERSITY/UNIVERSITÉ Simon Fraser University

DEGREE FOR WHICH THESIS WAS PRESENTED/
GRADE POUR LEQUEL CETTE THÈSE FUT PRÉSENTÉE Master of Arts (Education)

YEAR THIS DEGREE CONFERRED/ANNÉE D'OBTENTION DE CE GRADE 1984

NAME OF SUPERVISOR/NOM DU DIRECTEUR DE THÈSE Dr. B. A. Hiebert

Permission is hereby granted to the NATIONAL LIBRARY OF CANADA to microfilm this thesis and to lend or sell copies of the film.

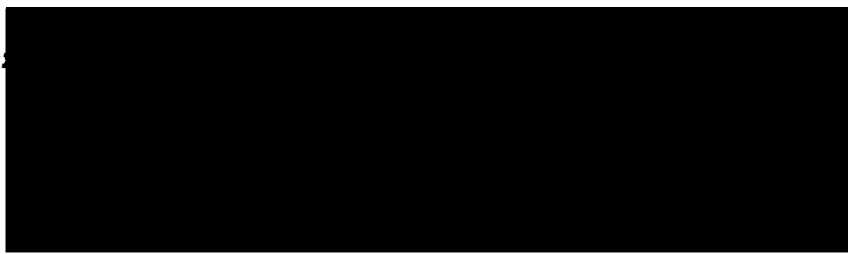
L'autorisation est, par la présente, accordée à la BIBLIOTHÈQUE NATIONALE DU CANADA de microfilmer cette thèse et de prêter ou de vendre des exemplaires du film.

The author reserves other publication rights, and neither the thesis nor extensive extracts from it may be printed or otherwise reproduced without the author's written permission.

L'auteur se réserve les autres droits de publication; ni la thèse ni de longs extraits de celle-ci ne doivent être imprimés ou autrement reproduits sans l'autorisation écrite de l'auteur.

DATED/DATE March 15, 1984 SIGNED/SIGNÉ _____

PERMANENT ADDRESS/RÉSIDENCE FI



**SELF-INSTRUCTIONAL TRAINING AND STRESS-INOCULATION TRAINING:
A REVIEW OF RESEARCH**

by

**Constance Irene Burns
B.A., Wells College, 1965**

**A THESIS SUBMITTED IN PARTIAL
FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF ARTS (EDUCATION)
in the Faculty
of
Education**

© Constance Irene Burns 1984

SIMON FRASER UNIVERSITY

March 1984

**All rights reserved. This work may not be
reproduced in whole or in part, by photocopy
or other means, without permission of the author.**

APPROVAL

Name: Constance Irene Burns
Degree: Master of Arts (Education)
Title of Thesis: Self-Instructional Training and Stress
Inoculation Training: A Review of Research

Examining Committee

Chairperson: Ronald W. Marx

B. A. Hiebert
Senior Supervisor

J. F. Martin
Associate Professor

A. Horvath
Instructor
Dept. of Counselling Psychology
University of British Columbia
External Examiner

Date approved

15/03/84

PARTIAL COPYRIGHT LICENSE

I hereby grant to Simon Fraser University the right to lend my thesis, project or extended essay (the title of which is shown below) to users of the Simon Fraser University Library, and to make partial or single copies only for such users or in response to a request from the library of any other university, or other educational institution, on its own behalf or for one of its users. I further agree that permission for multiple copying of this work for scholarly purposes may be granted by me or the Dean of Graduate Studies. It is understood that copying or publication of this work for financial gain shall not be allowed without my written permission.

Title of Thesis/Project/Extended Essay:

SELF-INSTRUCTIONAL TRAINING AND STRESS INOCULATION TRAINING:

A REVIEW OF RESEARCH

Author: _____

(signature)

Constance Irene Burns

(name)

March 15, 1984

(date)

ABSTRACT

In recent years, cognitive-behavioral training procedures, originally developed by Donald Meichenbaum, have been studied extensively by educators and psychologists in the areas of instructional, clinical, and counseling psychology. Experimental studies involving two of these procedures--self-instructional training and stress-inoculation training--are reviewed. Comparative analyses of the structures and functions of these two training procedures are reported. Results of these analyses are considered in relation to Meichenbaum's theory of cognitive-behavior modification. The review concludes that self-instructional training and stress-inoculation training are aspects of the same treatment procedure. Proposed structural differences between self-instructional training and stress-inoculation training typically are obscured in the implementation of these two training procedures in applied and experimental conditions. Functional differences noted in the review appear to be related to differences in the types of problems addressed by each training procedure as opposed to differences in the procedures themselves. Components contributing to the efficacy of stress-inoculation training are highly similar to those components already identified as effective in self-instructional training. At the same time, both

self-instructional training and stress-inoculation training appear to be well-founded in the general theory of cognitive-behavior modification proposed by Meichenbaum. Implications of these findings are discussed and areas for further research are elaborated.

v

DEDICATION

to

my grandfather

JOHN MALCOM MORAN

for generously sharing

his curiosity, joy of discovery, and love of knowledge

and

to

my husband

BARRIE G. E. VICKERS

for his support, encouragement, and commitment.

ACKNOWLEDGEMENT

The author acknowledges significant contributions of

DR. JACK MARTIN

especially his guidance, supportive feedback,
and facilitative instruction.

Dr. Martin served as Senior Supervisor
during all but the final stage of this thesis.

TABLE OF CONTENTS

Title Page.....	p. i.
Approval Page.....	p. ii.
Abstract.....	p. iii.
Dedication.....	p. v.
Acknowledgements.....	p. vi.
Table of Contents.....	p. vii.
CHAPTER I: PRESENTATION OF THE PROBLEM.....	p. 1.
The Development of Self-Instructional Training.....	p. 1.
The Development of Stress-Inoculation Training.....	p. 3.
Meichenbaum's Theory of Cognitive-Behavior Change.....	p. 6.
Overview of Paper.....	p. 10.
CHAPTER II: STRUCTURAL ANALYSIS.....	p. 11.
Structural Components of Self-Instructional Training.....	p. 11.
Structural Components of Stress-Inoculation Training.....	p. 14.
Structural Comparison (Components and Processes) of Self-Instructional Training and Stress-Inoculation Training.....	p. 18
CHAPTER III: FUNCTIONAL ANALYSIS OF SELF-INSTRUCTIONAL TRAINING AND STRESS-INOCULATION TRAINING--PART 1.....	p. 29.
General Effectiveness Studies.....	p. 34.
Self-Instructional Training Studies.....	p. 34.
Stress-Inoculation Training Studies.....	p. 55.

Conclusion.....p. 57.

Dismantling Studies.....p. 57.

Self-Instructional Training Studies.....p. 57.

 Modeling component studies.....p. 58.

 Rehearsal component studies.....p. 60.

 Conclusion.....p. 66.

Stress-Inoculation Training Studies.....p. 67.

 Cognitive strategies alone.....p. 70.

 Cognitive and behavioral coping strategies.....p. 76.

 In vivo application studies.....p. 96.

 Conclusion.....p. 104.

Conclusion: General Effectiveness and Dismantling
Studies.....p. 115.

CHAPTER IV: FUNCTIONAL ANALYSIS OF SELF-INSTRUCTIONAL TRAINING
AND STRESS-INCCULATION TRAINING: PART II.....p. 119.

 Comparative Outcome Studies.....p. 119.

 Self-Instructional Studies.....p. 119.

 Self-control studies.....p. 120.

 Cognitve performance studies.....p. 130.

 Conclusion.....p. 138.

Stress-Inoculation Training Studies.....p. 139.

 Conclusion.....p. 165.

Conclusion: Comparative Outcome Studies.....p. 166.

CHAPTER V: CONCLUSION.....p. 168.

 Summary of Structural Considerations.....p. 168.

 Summary of Functional Considerations.....p. 174.

 Summary of Theoretical Considerations.....p. 187.

 Implications of These Considerations.....p. 191.

References.....p. 198.

LIST OF TABLES

Table 1. Implementation of Components in Stress-Inoculation Training.....pp. 106a,b.

Table 2. Effective Components and "Active Ingredients" in Stress-Inoculation Training Dismantling Studies....p. 109.

Table 3. Proportions and Ratios of Components in Effective and Ineffective Treatments.....p. 113.



LIST OF FIGURES

- Figure 1. Stress-inoculation training: Procedural phases and treatment components.....p. 17.
- Figure 2. Comparison of components in self-instructional training and stress-inoculation training.....p. 19.
- Figure 3. Frequencies of components in effective treatments.....p. 111.

CHAPTER I: PRESENTATION OF THE PROBLEM

This paper examines self-instructional training and stress-inoculation training, terms used by Meichenbaum from 1970 to the present. Its purpose is to determine whether these two different names indicate conceptual and/or functional distinctions. An overview of Meichenbaum's research introduces self-instructional training and stress-inoculation training. Then, these procedures are compared structurally, in relation to component steps and processes; and functionally, in relation to learning outcomes. Finally, the paper bases its conclusions on points of similarity and difference between these two procedures and the conceptual foundations that underlie them.

The Development of Self-Instructional Training

Meichenbaum's doctoral dissertation (1969) provided a clue to the potential of self-instruction. Having taught schizophrenics to engage in "healthy talk," he observed that some individuals monitored and corrected themselves with audible self-instructions. Further research with impulsive children (Meichenbaum & Goodman, 1971) indicated that cognitive modeling, as developed in his dissertation, is a necessary but insufficient condition for behavioral change with impulsive children. However, when self-instructional rehearsal, consisting of practice using overt and covert verbalizations of performance relevant instructions, was used with these children, such

training succeeded in dealing "directly and explicitly with the self-regulatory deficit" (Meichenbaum, 1977a, p. 34).

Self-instructional training combines elements of social learning theory and self-regulatory aspects of language. Cognitive modeling research provides evidence that behaviors demonstrated by models are learned by observers (Bandura, 1969). To principles of social learning theory, Meichenbaum added verbal mediation, inspired from the work of Luria (1961) and Vygotsky (1962). Meichenbaum combined modeling and language mediation into a five-step learning process (1977a). An instructor or therapist models desired behaviors and accompanies actions with audible, descriptive, narrative references to internal thought processes. In this first step, cognitive modeling, an adult performs a task talking aloud while a client watches and listens. Next, following a model's instructions, a client performs the same task--overt, external guidance. Then a client performs the task repeating the instructions aloud--overt, self-guidance. In the next step, a client performs the task whispering instructions--faded, overt self-guidance. Finally, a client performs the task guided by internal speech--covert self-instruction.

Meichenbaum also applied self-instructional training to other populations (Asarnov & Meichenbaum, 1979; Meichenbaum & Cameron, 1973). Further research questions based on self-instructional training followed. Modifications frequently

were made, and additional research results emphasized the flexibility and individualization possible within this paradigm (Meichenbaum, 1977a). Meichenbaum (1974) hypothesized that self-instructional training could be effective with older persons who often exhibit "production deficits" (Flavel et al., 1966) in reasoning and problem solving. Recent research based on the production deficit hypothesis (Asarnow & Meichenbaum, 1979) has used self-instructional training with kindergarten children who are nonproducers and inconsistent producers of a verbal rehearsal strategy. Other applications of self-instructional training have included work with social isolates (Gottman, Gonso, & Rasmussen, 1972), adult schizophrenics (Meichenbaum & Cameron, 1973), phobic clients (Meichenbaum & Cameron, 1972a, 1974), and with college students to increase creativity (Meichenbaum, 1975a).

The Development of Stress-Inoculation Training

In their early work, Meichenbaum and Goodman (1971) had discovered the importance of using coping strategies in the face of possible failure and had developed systems of coping self-statements specific to this possibility. Their attempts to minimize disabling effects of fear and the experience of failure, highlighted in the work with social isolates (Gottman et al., 1972) based on Meichenbaum and Goodman's 1971 work, contained the germ of stress-inoculation training (Meichenbaum, 1977a, p. 56). However, the actual genesis of stress-inoculation training came

from an unexpected source. Research with phobic clients (Meichenbaum & Cameron, 1974) found that an inverted anxiety-relief condition, which punished coping self-statements, was as effective as an expanded anxiety-relief condition, which rewarded these statements.

An anxiety-relief paradigm pairs client thoughts with cessation of an unpleasant external event, such as electric shock. When a client says a specified word, such as "calm," shock is terminated. "Calm" becomes associated with relief which follows shock cessation. An expanded anxiety-relief condition makes shock termination contingent on subject verbalization of a set of coping self-instructions instead of a single word. In addition, shock onset is made contingent on subject verbalization of fear-engendering self-statements. Shock becomes both a "punishing" as well as an anxiety-relief stimulus. An inverted anxiety-relief condition reverses the verbalizations on which shock onset and termination are contingent. Shock onset becomes contingent on verbalization of coping self-instructions and termination on verbalization of fear-engendering self-statements.

When both expanded and inverted anxiety-relief conditions revealed similar behavioral outcomes, Meichenbaum and Cameron queried subjects who reported the use of coping self-statements in preparing for shock and who had relabeled the fear-engendering self-statements as instructions for shock termination. Subjects

in the inverted anxiety-relief condition seemed to view anxiety positively—as a cue to initiate coping self-statements (Meichenbaum, 1977a, p. 122). This discovery underscored the importance of individual perception of environmental events in determining behavior. The researchers hypothesized that "a set of coping skills that could be applied across situations" could be developed to teach clients to cope effectively in stressful situations (Meichenbaum, 1977a, p. 117). Stress-inoculation training was developed from this hypothesis.

In the rehearsal phase, a client learns coping skills and techniques for affecting actions and cognitions. Coping strategies mediate physical arousal and alter self-statements. A client is trained to monitor and to recognize negative self-statements and to interpret them as cues to produce incompatible coping self-statements. Coping skills, techniques, and strategies are tailored to individual requirements of each client.

After learning coping skills, a client prepares to test them in presence of a gradually increasing stressor. A therapist models self-instructions to demonstrate coping with a stressor. The client implements and practices coping techniques in a real-life, stressful situation in the application phase. Inoculation in stress-inoculation training refers to gradual doses of a stressor. Exposure to progressively more threatening

events during therapy gradually increases effectiveness of coping responses and may be responsible for generalizing and maintaining them beyond treatment and setting (Meichenbaum, 1977a).

Meichenbaum and Cameron compared self-instructional training and stress-inoculation training in their 1974 study. Their results indicated that self-instructional training and stress-inoculation training were equally effective in terms of behavioral outcomes. Differences were noted on the self-report measures; stress-inoculation training was interpreted as more efficacious overall because it produced changes on both behavior and self-report measures.

Meichenbaum's Theory of Cognitive-Behavior Change

In examining the processes of self-instructional training and stress-inoculation training, Meichenbaum theorizes that cognitive-behavior change involves three basic tasks: recognition and redefinition of maladaptive thoughts and behaviors; inducement of cognitive-behavior change; and maintenance of change through cognitive restructuring. In confronting the first task, therapist and client explore client behaviors and thoughts that lead to maladaptive responses. Jointly they develop a common conceptualization of the presenting problem and an agreement that client self-statements as well as behaviors need to be modified. Treatment targets include: (1) client behaviors and the responses they elicit; (2) client

internal dialogue before, during, and following behavior; and (3) client cognitive structures. Cognitive structures contain attributional, evaluative, and belief systems; they strongly influence evaluative content of internal dialogue. Meichenbaum believes that corresponding changes must take place in cognitive structures, inner speech, and behavior before a client can maintain and generalize new behaviors (Meichenbaum, 1977a, p. 225).

Behavior change occurs through a sequence of mediating process [sic] involving the interaction of inner speech, cognitive structures, and behavior and their resultant outcomes. (1977a, p. 218)

As a result of a joint conceptualization of the presenting problem, a client can alter cognitive belief structures. Altered cognitive structures allow a client to evaluate symptoms and behaviors differently. A client recognizes her¹ own contributions to maladaptive inner dialogue, consisting of negative self-statements or the absence of appropriate self-statements. A client learns to interpret maladaptive behavior as a signal to produce different self-statements. A

¹ Alternating use of both masculine and feminine personal pronouns have been used to denote that that a client could be either sex.

sense of potential self-efficacy, engendered from the joint conceptualization of the problem, also alters inner dialogue. The conceptualization is a powerful therapeutic tool. It provides a basis for new inner dialogue, for altered cognitive structures, for reinterpretation of symptoms as cues to cope, and it generates a sense of hope. Therapy works best when both therapist and client "redefine the problem in terms that are meaningful to both of them" (Meichenbaum, 1977a, p. 223).

With respect to the second task, inducing behavior change, a client learns new behaviors incompatible with maladaptive ones. A cyclical sequence of change in behaviors and cognitions becomes evident. Maladaptive behavior now cues use of new and altered internal dialogue. Altered self-statements initiate new behavior chains that interfere with maladaptive behavior. Altered inner speech modifies client perceptions of behaviors and affects cognitive structures. Perceptions and cognitive structures are reorganized to evaluate altered behaviors and cognitions in positive terms.

The refocusing of the client's attention, the alteration in appraisal, and the physiological reactions will help change the internal dialogue that the client brought into therapy. In turn, the internal dialogue comes to guide new behavior, the results of which have an impact upon the individual's cognitive structures. (Meichenbaum, 1977a, p. 224)

The final task in cognitive-behavior change involves the

maintenance of change through cognitive restructuring. Changed internal dialogue encourages a client to try out new behaviors and allows him to examine and evaluate their outcomes. To maintain behavior change, a client's cognitive structures must value the changed behaviors. Cognitive structures that do not value certain behaviors can undermine them even in the face of evidence of their efficacy.

Learning new behavioral skills is not sufficient for behavior change. A client's thoughts about his new behaviors and about their consequences determine his value of these behaviors and his continued production of them. For lasting change, a client must (1) learn new behavior skills, (2) alter inner dialogue, and (3) modify cognitive structures. Therapy must affect cognitive structures, inner speech, and behaviors and the interpretation of their impact. Meichenbaum's theory of cognitive-behavior change recognizes the influence of thoughts and cognitive structures on behavior. It interweaves a network of skills and attitudes that reciprocally support changed behaviors, cognitions, and cognitive structures. Success of therapy is directly related to "the degree to which a given conceptualization leads to specific behavioral changes that can be transferred to the real-life situation" (Meichenbaum, 1977a, p. 222). Meichenbaum stresses that effective therapy applies and tests changed behaviors, inner speech, and cognitive structures.

in real-life situations. In vivo application provides feedback on the process of therapy, opportunities to further modify behavioral or cognitive events, and gradual increase in effective use of skills that comes from practice and success.

Overview of Paper

This first chapter presented a brief review of Meichenbaum's research journey. His work developing a theory of cognitive-behavior change is highlighted through research in self-instructional training and stress-inoculation training. These two training procedures have different names, but whether or not they are substantively different is a focal question of this review. The second chapter examines and compares structural components and process of both procedures. The third and fourth chapters examine and compare outcomes of self-instructional training and stress-inoculation training in terms of reviewed studies; these studies cover the years 1971-1982 with two additional studies in 1983. The final chapter discusses structural and functional issues from both empirical and theoretical perspectives. Conclusions are synthesized from substantive issues presented in the preceding discussions. The paper concludes with suggestions for future directions within this area of research.

CHAPTER II: STRUCTURAL ANALYSIS

This chapter examines and compares the structural components of self-instructional training and stress-inoculation training as developed by Meichenbaum and his colleagues. This analysis first reviews the structural components of self-instructional training and those of stress-inoculation training; then, the content of the components of both training procedures is compared.

Structural Components of Self-Instructional Training

Self-instructional training combines elements of social learning theory (especially cognitive modeling) and self-regulatory aspects of language (including overt and covert rehearsal of speech). Combining cognitive and behavioral modeling with language mediation, Meichenbaum and Goodman (1971) developed a five-step training procedure as a treatment program for impulsive children. Goals of training were to provide a procedure by which these children could learn (1) to comprehend demands of a task; (2) spontaneously to produce self-instructions and plans; and (3) to use self-instructions, to guide, monitor, and control performance (Meichenbaum, 1977a).

Self-instructional training has two components: cognitive modeling and rehearsal of self-instructions. In the cognitive modeling component, a therapist overtly verbalizes self-guiding thought processes in the form of self-instructions. Meichenbaum and Goodman's research (1971) demonstrated that impulsive

children spontaneously do not produce verbalizations and behaviors such as those modeled by a therapist in the cognitive modeling component, even when they are capable of doing so. Therefore, Meichenbaum and Goodman added rehearsal of modeled self-instructions to the cognitive modeling component.

The rehearsal component contains four steps: overt guidance by a therapist or instructor; and overt, faded, and covert self-instructions. After modeling verbalizations and behaviors while performing a task---the cognitive modeling component, a therapist provides external, overt guidance while a client practices task behaviors. The therapist guides the client who performs the task following therapist instructions. The client then audibly repeats therapist instructions while performing required task behaviors; this second step is called overt self-guiding verbalization. Following this step, a client whispers self-instructions. Through a fading process, verbalizations are moved from overt to covert state. Self-instructions completely fade as task behaviors become proficient and verbalizations become inaudible. At this point, the client self-instructs internally, with verbalizations positively influencing behaviors. This process follows research evidence (Meichenbaum, 1977a) that private speech initially facilitates task performance and then disappears as task proficiency increases.

This training procedure teaches verbalizations that include instructions to: (1) define a problem (task demands), (2) focus attention and guide responses, (3) promote self-reinforcement, and (4) produce self-evaluative coping skills and error-correcting behaviors. These training instructions are presented in both cognitive modeling and rehearsal components across a variety of tasks that become progressively more cognitively demanding. Within each training session, a set of modeled instructions is rehearsed and learned in each of the four rehearsal component steps (from overt, external guidance through covert self-instructions). Task complexity is increased through response chaining (joining together of responses) and through successive approximation (differential reinforcement of responses that are closer and closer to desired responses). Self-instructional scripts are modeled and rehearsed over several sessions. Self-instructional training provides a package of self-instructions that is applicable to a variety of cognitive tasks. Research (Asarnow & Meichenbaum, 1979; Meichenbaum, 1972a, 1974, 1975a, 1975d; Meichenbaum & Cameron, 1972a, 1973, 1974) provides evidence that clients learn to understand what they have to do, to plan and respond spontaneously to task demands, and to use covert verbal mediation to guide, monitor, and correct their performances.

Structural Components of Stress-Inoculation Training

Meichenbaum's concern for treatment generalization led to the development of stress-inoculation training, which focuses on coping techniques and self-instructions. Unlike self-instructional training, stress-inoculation training is not a specific treatment program developed by Meichenbaum (1977a). While the cognitive modeling and rehearsal components in self-instructional training are needed to form a complete treatment, a stress-inoculation training treatment can be constructed from a subset of treatment components. Not all seven components are necessary for a successful treatment. In analyzing the literature on coping skills training, Meichenbaum (1977a) identified seven commonly implemented treatment components. He also noted that effective coping skills and techniques varied across experiments. His analysis suggested that different components were implemented in effective treatments and that as-yet unspecified processes recurred across those studies. From this analysis, Meichenbaum proposed a flexible set of treatment components from which effective treatments had been developed. Meichenbaum further suggested that a variety of coping strategies would be appropriate. In this sense, stress-inoculation training resembles a smorgasbord, because it offers a variety of coping techniques within several components.

Meichenbaum's analysis of coping skills training procedures (1977a, p. 147) identified seven treatment components. In Component 1, a therapist explains the role of cognitions in a problem situation. Component 2 teaches systematic self-observation and discrimination of self-statements and images that accompany maladaptive responses. Component 3, training in problem-solving procedures, contains problem definition, anticipation of consequences, evaluation of feedback, and self-reinforcement for having coped. Component 4 is modeling of new self-statements and images associated with behavioral and cognitive skills; these coping self-statements are developed to interrupt and to replace maladaptive cognitions. Component 5 includes modeling, rehearsal, and encouragement of self-instructions, coping and attention-focusing skills, and of positive self-evaluation. This component contains new, productive self-instructions for coping in problematic situations; these self-instructions include cognitive and behavior coping skills. Component 6 consists of behavior therapy procedures. The final component contains in vivo behavioral assignments performed under a variety of increasingly stressful conditions.

Meichenbaum described stress-inoculation training operationally as having educational, rehearsal, and application phases (1977a). In the educational phase, therapist and client

collaborate to generate a conceptual framework which becomes the basis for understanding the nature of a client's stressful reactions and/or maladaptive responses and for developing the treatment plan. In the rehearsal phase, sets of behavioral and cognitive coping skills are learned and rehearsed. These skills include direct action (e.g., relaxation techniques and information gathering) and cognitive coping skills. Cognitive coping skills influence a client to redefine and change processes of appraisal, expectancy, attribution, and self-perceptions (i.e., to modify cognitive structures). This redefinition of cognitive structures helps a client to formulate new self-statements. In the application phase, a client tests newly-learned coping skills in a variety of stressful situations. Self-instructional training is used in the application phase to demonstrate implementation of cognitive and behavioral coping skills. Stress-inoculation training derives its name from the process involved in the application phase. The gradual increase in stressor intensity across successive situations is analogous to an injection of a weakened virus in order to provide immunity against a virulent one. A goal of the application phase is consolidation, generalization, and maintenance of new cognitions and behaviors learned in the rehearsal phase. Figure 1 shows the relationships between phases and components in stress-inoculation training.

Procedural Phases	Treatment Components
1. Educational Phase	1. Teaching: role of cognitions in problem area 2. Teaching: systematic self-observations and discrimination of self-statements and images
2. Rehearsal Phase	3. Training: problem-solving procedures 4. Modeling of self-statements and images 5. Modeling and rehearsal of self-instructions 6. Training: behavior therapy procedures
3. Application Phase	7. <i>In vivo</i> application

Figure I. Stress-inoculation training: Procedural phases and treatment components.

Components and phases overlap and blend together; they are unlikely to be implemented in a linear sequence. Educational and application components generally correspond to phases with the same names. However, closer examination of the nature of the components and of their implementation reveals blurring of the distinctions between phases.

Tracing the role of self-statements in stress-inoculation training illustrates how the components merge across phases. In the educational phase, a client becomes aware of the role of

self-statements in a problem situation. Component 2, self-monitoring of self-statements and images, links educational and rehearsal phases. This learning is continued and extended in the rehearsal phase as new and facilitative self-statements and self-instructions are learned and used to compete with former maladaptive cognitions. A client's cognitions become signals to replace maladaptive cognitions with new, positive, coping self-statements and images. In the application phase, these new self-statements and self-instructions are tested and strengthened. With its use of self-instructions, stress-inoculation training contains similarities with self-instructional training. A comparison of the components of these two training procedures illustrates points of similarity and difference.

Structural Comparison (Components and Processes) of
Self-Instructional Training and Stress-Inoculation Training

A self-instructional theme occurs in both training procedures but the objectives of treatment differ. Self-instructional training teaches a client how to perform a task effectively by using self-guiding instructions; stress-inoculation training teaches a client how to handle difficult situations by using self-instructions to cope. Figure 2 compares the components of these two procedures.

Self-Instructional Training	Stress-Inoculation Training
	1. teaching: role of cognitions in problem area
	2. teaching: systematic self-observation and discrimination of self-statements and images
1. Cognitive modeling: problem definition attention focusing response guidance self-reinforcement self-evaluation coping skills error correction	3. training: problem-solving procedures, including: problem definition anticipation of consequences feedback evaluation
2. Cognitive and behavioral rehearsal of self-instructions: overt external guidance overt self-guidance faded self-guidance covert self-instruction	4. modeling of self-statements and images 5. modeling and rehearsal of self-instructions, including: positive self-evaluation coping skills attention-focusing skills
	6. training: behavior therapy procedures
	7. <i>in vivo</i> application using self-instructional training

Figure 2. Comparison of components in self-instructional training and stress-inoculation training.

Many skills are common to both training procedures. The only stress-inoculation training components not represented in self-instructional training are educational and behavior therapy components. Educational components may be foreshadowed by the

cognitive modeling component. Cognitive modeling in self-instructional training presents therapist thoughts and actions that are necessary to complete a task; a therapist may also explain why these thoughts and actions are necessary. Cognitive modeling including such explanatory thoughts could contain the rudiments of an educational component. The concept underlying the second educational component, self-monitoring, is implicit in the cognitive modeling component of self-instructional training. A therapist models self-monitoring behaviors using performance guidance, error correction, self-evaluation, and coping techniques. A therapist deliberately makes mistakes, becomes aware of them, and changes them with corrective behaviors and coping cognitions. Throughout training, a client observes how a therapist monitors performance.

Three stress-inoculation training rehearsal components contain skills and concepts found in self-instructional training. Component 3, teaching problem-solving techniques, duplicates skills found in the cognitive modeling component of self-instructional training. However, the outcome of problem-solving techniques in each procedure differs. A client trained with a self-instructional procedure plans for task performance, while a client trained with a stress-inoculation procedure analyzes a problem and decides which coping strategies are most appropriate to use in the situation.

The cognitive modeling component in self-instructional training foreshadows Component 4, modeling of self-statements and images. Both training procedures focus on what clients say to themselves. In self-instructional training, self-statements are subsumed under self-instructions. Self-instructions initially are external statements modeled by a therapist; a client does not produce them spontaneously. After a therapist models thoughts and behaviors required to perform a task, a client repeats and progressively internalizes them. In stress-inoculation training, clients' spontaneous self-statements are a primary focus of therapy and are differentiated from self-instructions.

Stress-inoculation training, as opposed to self-instructional training, focuses on replacing maladaptive cognitions with more facilitative ones, while, in self-instructional training, task-oriented self-instructions are produced to overcome performance deficits rather than to compete with maladaptive cognitions.

Component 5 in stress-inoculation training teaches self-instructions. Some self-instructions in stress-inoculation training are similar to those contained in self-instructional training while others are more general. General self-instructions in stress-inoculation training guide and enhance specific, task-oriented self-instructions. Component 5 does not include the overt-to-covert rehearsal procedure of

self-instructional training.

Component 6, behavior therapy strategies, is exclusive to stress-inoculation training. Behavior strategies, such as relaxation, breathing, and biofeedback, provide coping skills that can be used in stressful situations. A client learns a repertoire of coping skills. A concept underlying self-instructional training suggests that behaviors are controlled by verbal instructions; thus, behaviors in self-instructional training receive less emphasis than do self-instructions.

Component 7 in stress-inoculation training is in vivo application of coping skills across stressful situations. A therapist or instructor utilizes self-instructional training in the application component to model use of coping skills in a stressful situation. The use of similar self-instructional scripts across situations to generalize training in self-instructional training suggests that a germ of the application component may be implied within this earlier training procedure. The difference between the generalizability of these two training procedures appears to depend on the type of problem that training addresses. Self-instructional training addresses production, comprehension, and mediation deficits in performance as targets of change. Stress-inoculation training focuses on cognitions and behaviors as targets of change; generalizability

is achieved through implementation of coping cognitions and behaviors across many unpleasant and/or difficult situations. By teaching coping strategies, stress-inoculation training provides sets of skills that can be deployed in disparate situations. Similarity between problem situations is viewed through client responses, not through similarity of task demands as in self-instructional training; self-instructions in stress-inoculation training provide a generalized coping approach. In contrast, self-instructional training emphasizes self-instructions leading to efficient task performance. Although coping self-instructions are included, they are limited within a problem-solving approach.

In summary, the cognitive modeling component in self-instructional training contains miniaturized components of stress-inoculation training: problem-solving, modeling of self-statements and images, and modeling of self-instructions. Likewise, in Component 5, the second component of self-instructional training is extended by rehearsal of self-instructions, coping skills, and problem-solving techniques. Self-instructional training contains nuclei of the rehearsal components in stress-inoculation training.

Examination of the relationship of stress-inoculation training components to Meichenbaum's theory of behavior change helps highlight similarities and differences between the two

training procedures. Cognitive and behavioral rehearsal of self-instructions is a core of both training packages. This core is embedded within stress-inoculation training Components 3, 4, and 5. Components 1 and 2 prepare clients to learn coping skills and self-instructions. These components are the educational phase of stress-inoculation training, which Meichenbaum emphasized as being a crucial part of a behavioral change process. Through educational components, a client's cognitive structures or belief systems become receptive to new self-instructions. A major difference between the two training procedures are education components which prepare for behavior change.

In addition to adding to and expanding self-instructions in stress-inoculation training, Meichenbaum distinguished between self-instructions and self-statements. Self-statements are private thoughts and speech. Self-instructional training primarily employs self-statements in the form of task-oriented self-instructions; other self-statements, such as self-reinforcements and self-evaluative coping self-statements, are also included in self-instructional training. These self-reinforcing and coping self-statements point toward a similar use of self-statements as found in stress-inoculation training. In stress-inoculation training, these two forms of private speech, self-instructions and self-statements, are

trained in separate components. In Component 4, clients learn new self-statements and images, while, in Component 5, they learn self-instructions. Self-statements, by influencing cognitive structures, determine whether or not a behavior will be implemented; self-instructions in self-instructional training, on the other hand, directly guide or change specific behaviors. In his theory, Meichenbaum stated that in order to change behaviors, change first must occur in underlying cognitive structures. Therefore, in order to change a client's maladaptive responses, thoughts and behaviors, cognitive structures must be modified. Self-statements become a change agent for cognitive structures. Once a client's self-statements harmonize with desired behaviors, self-instructions become a change agent for behaviors themselves. Changes in cognitions appear to precede lasting behavioral changes; therefore, it is expected that changed self-statements would precede effective self-instructions. This distinction between self-statements and self-instructions broadens the scope of stress-inoculation training. By influencing cognitive structures, changes in behaviors and cognitions are likely to be permanent and to generalize to other situations.

Similarities and differences are observed also in the training of coping skills. In self-instructional training, coping skills, modeled in the first component, are embedded within problem-solving and response-guiding self-instructions.

In contrast, stress-inoculation training focuses on training a variety of coping skills and techniques; clients learn coping skills in order to handle situations that are stressful, painful, or unpleasant. Coping, rather than task performance, is a primary objective of stress-inoculation training. Another aspect of this distinction is mastery vs. coping performance. Self-instructional training might be interpreted as training for masterful performance while stress-inoculation training explicitly trains for coping performance.

In the application component, coping skills are rehearsed and strengthened by implementation in a number of difficult situations. In contrast, self-instructional training concludes with covert self-instructions. Self-instructional training seems best suited to problems that can be defined by concrete task behaviors requiring highly similar cognitive demands. In contrast, stress-inoculation training is an appropriate intervention for a variety of maladaptive responses caused by cognitive and affective reactions to a perceived problem. A focus of therapy has changed from a self-instructional "How can I solve this problem?" to a stress-inoculation "What beliefs and thoughts do I need to modify and what coping skills do I need to use in this situation?"

In summary, both similarities and differences are found in these two training procedures. They share a theme of

self-instructions, and many specific skills are common to both procedures. Modeling and rehearsal are common learning processes. Self-instructional training itself is embedded within the application phase of stress-inoculation training.

Differences appear in the number, content, and complexity of components. Self-instructional training processes and content have been incorporated intact and in segments into stress-inoculation training. Components 3, 4, and 5 in stress-inoculation training contain modeling and rehearsal training processes and problem-solving, self-statement, and self-instruction content; both processes and content are found also in self-instructional training. Component 7 incorporates self-instructional training as a training process for application of coping skills in in vivo stressful experiences.

Differences in purpose, focus, and targets for change are evident. Self-instructional training was developed for clients with comprehension, production, or mediational deficiencies in task performance. It focuses on self-instructions as the change process and primarily addresses behaviors as targets for change. It teaches a client to self-instruct in order to perform a task effectively. In contrast, stress-inoculation training was developed for treatment generalization. Modification of a client's maladaptive coping mechanisms and reactions to stress is a paramount objective of treatment. Cognitive structures,

cognitions, and behaviors are targets for change. This procedure focuses on a client's reaction to stress, anxiety, pain, anger, or similar stress-produced reactions and responses rather than on specific task behaviors. Central foci of this training are self-statements and self-instructions. A client learns to handle stressful situations with both coping self-statements and self-instructions. Self-statements, which determine the nature of self-instructions, are changed prior to permanent changes in self-instructions and behaviors. Self-statements, which reciprocally influence cognitive structures, are necessary prerequisites for treatment maintenance and generalization.

Self-instructional training appears to have been incorporated into stress-inoculation training. Self-instructions occur within the stress-inoculation training treatment paradigm in both partial and complete forms. Stress-inoculation training appears to expand and to extend self-instructional training. By examining treatment outcomes, similarities and differences in function between these two training procedures can be analyzed. Chapters III and IV review research studies as a means of conducting a functional analysis of self-instructional training and stress-inoculation training.

CHAPTER III: FUNCTIONAL ANALYSIS OF SELF-INSTRUCTIONAL
TRAINING AND STRESS-INOCULATION TRAINING--PART I

This chapter will analyze the functional effects of self-instructional training and stress-inoculation training as documented in experimental research. A functional analysis provides information about the effects produced by processes or procedures--in this case, self-instructional training and stress-inoculation training. Experimental information is used to compare general and specific effects of each package and the relative efficacy of each package with respect to each other. To this end, research studies using self-instructional training and stress-inoculation training are reviewed. Self-instructional training and stress-inoculation training studies are examined separately. Experiments for each training package are grouped into four categories. These categories will provide a framework for analyzing the efficacy of the respective training procedures.

Different categories of experiments are distinguished by the kind of functional information they provide about self-instructional training or stress-inoculation training. Experiments of self-instructional training and stress-inoculation training reviewed in this paper were grouped according to the different research purposes addressed by the experimenter: (1) studies concerned with general effectiveness of a single treatment, (2) dismantling studies to determine effectiveness of

different components comprising a treatment, (3) theoretically-based studies, and (4) comparative outcome studies.

An experiment investigating general effectiveness compares a treatment (either self-instructional training or stress-inoculation training) to a control condition. The purpose of this experiment is to determine whether the treatment in question is able to produce a desired outcome. Dismantling experiments search for the "active ingredients" in a treatment by attempting to determine the relative contributions of various components comprising the treatment. A theoretically-based experiment contributes to or evaluates the theory that underlies a treatment. This type of experiment investigates questions related to why and how a treatment is effective. Because dismantling studies are really a subset of such studies, theoretically-based and dismantling studies will be discussed together. The fourth category is concerned with comparative outcome studies. These experiments investigate the efficacy of several treatments relative to one another.

By analyzing studies in these three groups, a framework for functional analysis is presented. The primary focus of the functional analysis in this and the next chapter is to determine similarities and differences between the experimental outcomes or effects produced by self-instructional training and

stress-inoculation training. Analysis of the general effectiveness studies should indicate the general effects produced by each training package. Dismantling and theoretically-based experiments may illuminate the role and effectiveness of different components in the treatments. Finally, in Chapter IV, comparative outcome studies will provide information about the comparative efficacy of the two treatment procedures.

Research experiments included in this review should contain those structural components of self-instructional training and stress-inoculation training described in the previous chapter. Self-instructional training experiments will contain (1) cognitive modeling and (2) self-instructional rehearsal components. Stress-inoculation training experiments, however, seldom contain all the components described by Meichenbaum (1977a): (1) teaching the role of cognitions in a problem area, (2) teaching systematic self-observation and discrimination of self-statements and images, (3) training in problem-solving procedures, (4) modeling of self-statements and images, (5) modeling and rehearsal of self-instructions, (6) training in behavior therapy procedures, and (7) *in vivo* application of coping skills. Separate criteria have been developed to include these studies; these criteria are discussed below. All the studies included in this review employed experimental designs.

Case studies are not reviewed but may be referenced in relation to the experimental studies discussed. Most of the studies have been published; however, a few unpublished manuscripts that meet the inclusion requirements are reviewed also.

After describing the treatment components of stress-inoculation training, Meichenbaum (1977a) discussed their relationship to educational, rehearsal, and application phases. Components of stress-inoculation training that teach the role of cognitions and systematic self-monitoring are included in the educational phase. The problem-solving skills component links educational and rehearsal phases. The components in the rehearsal phase contain modeling and rehearsal techniques for training coping self-statements and images, self-instructions, and behavior therapy procedures. The application component (the application phase) implements coping skills using self-instructional training in progressively more stressful situations. Because treatment components often overlap and may be repeated, the relationship between procedural phases and treatment components is not absolute.

Very few stress-inoculation training studies contained all seven treatment components. Another means of assessing the relationship of studies to Meichenbaum's (1977a) stress-inoculation training conceptualization was needed. Meichenbaum (1977a) used the three procedural phases described

above. However, researchers often omitted phases, particularly the *in vivo* application phase. Nevertheless, these studies, although not containing Meichenbaum's three procedural phases, appeared to be relevant to his conceptualization of stress-inoculation training. Such studies either referenced Meichenbaum's work and used training procedures and components very similar to those specified by Meichenbaum or actually labeled their treatment as "stress inoculation." The following three criteria have been developed for determining whether to include a study as an example of stress-inoculation training: (1) inclusion of all seven treatment components or all three phases of stress-inoculation training, (2) reference to Meichenbaum's work and inclusion of several components specified by Meichenbaum, or (3) a treatment called "stress inoculation, which also contained several components specified by Meichenbaum." These modified criteria permit discussion of a large number of studies that are relevant to the purpose of this review.

Chapter III is divided into two main sections: general effectiveness studies and dismantling studies. Chapter IV presents comparative outcome studies. Each of the three sections is organized further into two subsections: self-instructional training and stress-inoculation training.

General Effectiveness Studies

Self-Instructional Training Studies

Meichenbaum and Goodman's (1971) experiment training impulsive children in self-control is seminal to the topic of this review. Their paper contains two studies; the second, a dismantling study, will be discussed later. The purpose of the first study was to examine the efficacy of a cognitive self-guidance treatment for impulsive children. The experimenters wanted to determine whether: (1) subjects could be trained to self-instruct and to follow self-instructions appropriately; (2) mediational properties of inner speech could be strengthened; (3) verbal mediation could be used to overcome comprehension, production, and mediational deficits; and (4) subjects could be trained to self-reinforce appropriately.

Meichenbaum and Goodman chose eight girls and seven boys from a second grade "remedial" class. Children assigned to this class had behavioral problems or low scores on school administered IQ tests. Mean age was 8 years 2 months. Experimental assessment included performance on a variety of psychometric instruments frequently used to differentiate impulsive from nonimpulsive children and on measures of classroom behavior. Psychometric instruments were the Porteus Maze (Porteus, 1942); Matching Familiar Figures Test (Kagan, 1966); and three WISC (Wechsler, 1949) subtests: Picture Arrangement,

Block Design, and Coding. These subtests were combined to produce a prorated IQ score. Generalizability of treatment was assessed by classroom-based procedures: observations of attending behavior and a teacher questionnaire relating to classroom behavior of individual children.

Following preassessment, five children were assigned to each of three treatment conditions. Treatments included cognitive training (self-instructional training), attention control, and assessment control. The experimental condition employed cognitive modeling and overt to covert rehearsal of self-instructions. Training tasks varied from simple sensorimotor to problem-solving tasks. Task difficulty increased across the four 1/2-hour training sessions held over a 2-week period. Training tasks were similar to those employed on assessment instruments.

Attention control subjects met with the same experimenter for the same number of times. They were exposed to the same materials and engaged in the same activities; the only difference was absence of self-instructional training. Social reinforcement occurred for both groups. The attention control condition was used to assess change due to exposure to materials, activities, the experimenter, and demand characteristics. Assessment control subjects received pretreatment, posttreatment, and follow-up assessments.

Results were analyzed using a Lindquist (1953) Type 1 ANOVA to determine the relative efficacy of self-instructional training. One-tailed multiple t -comparisons were used for posteriori analytic purposes. The WISC Picture and Coding subtests revealed treatment x trials effects that approached statistical reliability, each favoring the self-instructional training group. The subtest combination (prorated IQ) showed a reliable treatment x trials effect; multiple t -comparisons for treatments on this measure revealed that the experimental group was reliably different from control groups, but that the control groups were not reliably different from each other.

The Matching Familiar Figures test revealed a reliable treatment x trials interaction on latency scores. There were no statistically reliable group differences in error scores on this test, but the data pointed toward greater effectiveness of self-instructional training in reducing errors. On the Porteus Maze, a treatments x trials interaction showed that both cognitive and attention groups made reliably fewer errors on the posttest than did assessment controls. No reliable differences were observed on classroom measures. This lack of generalization may have been caused by limited number of training sessions or by insensitivity in assessment measures.

At a 1-month follow-up, the cognitively trained group demonstrated statistically reliable superiority to control groups

on the Picture Arrangement subtest, the WISC prorated IQ, and latency scores from the Matching Familiar Figures test. Both self-instructional and attention groups had maintained their performance edge over the assessment control group on the Porteus Maze.

This study indicated that impulsive children could be trained to use verbal mediation and self-instructions to change their performance and behaviors. The authors pointed toward new directions in behavior modification studies.

In conclusion, a heuristic assumption underlying the present line of investigation has been that symbolic activities obey the same psychological facts as do overt behaviors and that private speech is teachable. Thus, behavior modification techniques which have been used to modify overt behaviors may be applied to cognitive processes. Only future research will indicate the validity of this assumption, but the by-products, in terms of the development of new treatment techniques, will be sizable. (Meichenbaum & Goodman, 1971, p. 125)

Meichenbaum and Goodman's (1971) study was followed by self-instructional training studies focusing on increasing self-control in: impulsive, hyperactive, and/or distractible children (Argulewicz, Elliott, & Spencer, 1982; Bornstein & Quevillon, 1976; Douglas, Parry, Marton, & Garson, 1976; Friedling & O'Leary, 1979; Kendall & Finch, 1978); in aggressive children (Camp, Blom, Hebert, & Van Doorninck, 1977; Williams & Akamatsu, 1978); and in adult schizophrenics (Margolis &

Shemberg, 1976; Meichenbaum & Cameron, 1973). Another topic of investigation was the use of self-instructional training to increase academic performance of low achieving children (Malamuth, 1979; Whitman & Johnston, 1983). These studies with the exception of Friedling and O'Leary (1979) and Margolis and Shemberg (1976) supported Meichenbaum and Goodman's (1971) work.

Bornstein and Quevillon (1976) used self-instructional training to increase on-task behavior in three, 4-year-old boys identified as being disruptive and/or distractible by their Head Start teachers. An 8-day observation preceded treatment in this multiple baseline design experiment. Two 50-minute training periods were separated by a 20-minute interval. Training was individual; each child received either self-instructional training or a placebo procedure (exposure to materials and tasks with instruction to attend to the experimenter) to control for expectancy effects and to keep other personnel blind to which child had received treatment on which day. Eight-day intervals separated training sessions.

The modeling component in this study was similar to that used by Meichenbaum and Goodman (1971), but the rehearsal component varied as experimenter and subject performed parallel self-instructed tasks. First, the experimenter self-instructed aloud while both the experimenter and the subject performed the task. Next, the subject self-instructed aloud which the

experimenter self-instructed in a whisper. Initially, M&M's were used to increase subjects' attention, but these were quickly phased out in favour of social reinforcers. Training tasks were from the Stanford-Binet (Terman & Merrill, 1973), WISC (Wechsler, 1949), or the McCarthy Scales for Childrens' Abilities (McCarthy, 1972). Tasks increased in complexity from sensorimotor to problem-solving items. On-task classroom behavior was recorded twice daily for 2 weeks by trained observers naive to the design of the experiment. On-task behavior increased for all subjects from pretreatment to posttreatment. Increases were maintained at follow-up, 22 1/2-weeks following the beginning of the experiment.

This study differed from Meichenbaum and Goodman's (1971) on: age of subjects, massed or spaced practice, use of material reinforcers (M&M's), and training tasks assigned by classroom teachers. The authors hypothesized that covert rehearsal of teacher assigned tasks would increase generalization and transfer of training and that this factor may influence the efficacy of self-instructional training.

Friedling and O'Leary (1979) attempted to replicate Bornstein and Quevillon's (1976) work. They selected seven boys and one girl from a clinical university school. There were four children each from grades 2 and 3, with a mean age of 7 years 7 months. These unmedicated, hyperactive children were selected on

the basis of mean scores on Conners' Abbreviated Teacher Rating Scale (1973) and on the Conduct Factor of the Peterson Quay Behavior Problem Checklist (Quay, 1975). Two children from each grade were assigned to each condition. Chance determined which condition received the experimental treatment.

Dependent measures were on-task behavior and scores from reading and arithmetic. Subjects were matched on reading and math achievement, on-task behavior, and accuracy on classroom reading tasks. Self-instructional training procedures were similar to those used by Bornstein and Quevillon (1976), with modification in length of training session, materials, and tasks. Absence of self-instructional training differentiated control from experimental conditions.

When classroom observations following treatment revealed no behavior changes, a second training sequence was applied. Self-instructional training II, consisting of two 40-minute sessions on consecutive days, was based on subjects' "hard" reading. Training proceeded as in the first condition. Stickers were used to cue self-instructions. No self-instructional training nor instructions for use of stickers were implemented in the control condition. Following this treatment, classroom behavior was observed for a further 8 days.

Dependent measures were selected to examine generalization of training to the classroom. Accuracy, quantity, and completion

scores for "hard" and "easy" math and reading were reported. Teacher attention, defined as approval, disapproval, and suggestion directed to a child, was monitored. On-task behavior was observed and rated. Interobserver reliability was recorded and checked weekly. Baseline measures were taken 2 weeks prior to training, and 2-week observations followed each training sequence.

Experimental data were analyzed by ANOVA's. No treatment effects were observed. Even though accuracy scores for the experimental group had increased reliably following the first self-instructional training sequence, subjects had not been matched on math performance. Therefore, a regression explanation for this result could not be eliminated.

Because of disappointing results, tokens were used to reinforce on-task behavior. Following a 1-week baseline, each child was awarded points over a 2-week period for on-task behavior during experimental worktime. The token treatment showed a main effect for on-task behavior but had no effect on academic work. Instances of teacher approval and disapproval decreased as a result of the token treatment.

Friedling and O'Leary were unable to replicate Bornstein and Quevillon's (1976) work. Possible causes for this included differences in children's ages across the experiments, absence of subject matching on math performance in the Friedling and O'Leary

study, and differences in teachers' behavior assessments. Areas identified for future research included: (1) subject commitment to behavior change, (2) identification and modification of maladaptive self-statements, (3) training for appropriate implementation of self-control programs, (4) experimental procedures to verify subject use of self-instructions, and (5) investigation of which deficit (performance or production) is more effectively treated by self-instructional training.

Argulewicz et al. (1982) reported an experiment to modify the inattentive behavior of a grade 4 boy; a classmate with exemplary attending skills served as a control. Dependent measures were three attending behaviors; these were assessed by a trained observer. Training took place in four sessions spread over 6 days, for a total of 50 minutes. The treatment had two training procedures: direct instruction of attending behaviors and self-instructional training following Meichenbaum and Burland's (1979) model. Self-instructional training was used to focus the boy's attention on appropriate tasks, such as silent reading. The boy's attending behavior rose from a pretraining 26% to a posttraining 76%. The control boy's attending behaviors were 78%. Thus, the attending behaviors of the trained boy had become very similar to those of the exemplary student. The teacher also reported general improvement in academic and social behaviors. The results were interpreted cautiously because the

experimental design did not assess social or academic behaviors nor the relative contributions of the two training procedures.

Douglas et al. (1976) investigated the efficacy of self-instructional training with hyperactive boys using a treatment modeled on Meichenbaum and Goodman (1971). Contingency management techniques and consultations with parents and teachers were added to the experimental treatment condition. Parents and teachers were encouraged to assist the children in implementing new self-controlling, self-monitoring, and self-reinforcing behaviors.

In this study, 29 boys, matched on age, IQ, and measures of hyperactivity and impulsiveness, were assigned to experimental and control groups, 18 and 11 in each, respectively. Dependent measures included Conners' Rating Scale (1969) and psychoeducational tests. Results demonstrated statistically reliable differences on all variables. Trained boys improved from pre- to posttest on 9/10 variables, while controls improved on only one variable. These results, which remained stable at a 3-month follow-up, were interpreted as substantial support for the efficacy of cognitive training with impulsive children.

Kendall and Finch (1978) investigated the efficacy of self-instructional training combined with response cost contingency. A response cost was administered contingent on the child's performance during training. The child was given points

exchangeable for a reward at the end of the training session; the child was told that a point would be taken by the experimenter for each error. Twenty in-patients at a psychiatric hospital for emotionally disturbed children were selected on the basis of their scores on Matching Familiar Figures (Kagan, 1966). Mean ages were 10.2 years for the experimental group and 11.1 years for the control. Sixteen white and four black children participated. Two girls and 8 boys were assigned randomly to each condition. The experimental treatment combined self-instructional training and response cost contingency. The control condition presented the same materials and tasks, without self-instructional training and response cost contingency. Training consisted of six 20-minute sessions.

Dependent measures were latency and error scores on Matching Familiar Figures, self-report scales, and rating scales. Subjects completed an impulsivity scale (Sutton-Smith & Rosenberg, 1959) and Impulse Control Categorization Instrument (Matsushima, 1964); teachers and staff completed an Impulsive Classroom Behavior Scale (Weinreich, 1975) and Locus of Conflict Scale (Armentrout, 1971) for each child. These measures were used at pretest, posttest (1 month following pretest), and at a 2-month follow-up.

Experimental data were analyzed by ANOVA's and by posteriori *t*-comparisons. Results showed that groups were

similar at pretest but were reliably different at posttest and follow-up. Performance on Matching Familiar Figures revealed statistically reliable effects for treatments, periods, and treatment x period interactions on both latency and error scores. Self-report instruments revealed no statistically reliable results. Data from the Impulsivity Classroom Behavior Scale showed a reliable treatment x period interaction. At pretest, experimental subjects had been reliably more impulsive than controls. At posttest, these subjects were less impulsive than controls, but this difference only approached statistical reliability. Reliable group differences were reached at follow-up: experimental subjects had maintained decreased classroom impulsiveness while controls had continued to increase in impulsiveness. Teacher ratings on the Locus of Conflict scale showed a reliable effect for periods but not for treatments. Correlational analysis suggested that the more frequently a response cost contingency occurred during training, the greater the classroom improvement.

Results were interpreted as support for self-instructional training combined with response cost contingency. Generalization of behavior to the classroom was attributed to psychoeducational training tasks. It was not possible to determine the relative contributions of modeling, self-instructions, and response cost components in this experiment.

Camp et al. (1977) and Williams and Akamatsu (1978) examined the use of self-instructional training with aggressive, impulsive children. In a study designed to increase self-control in young, aggressive boys, Camp et al. added interpersonal problem-solving tasks to an experimental treatment based on that of Meichenbaum and Goodman (1971). Grade 2 boys who scored 2 standard deviations above the mean on the School Behavior Checklist (Miller, 1972) were assigned randomly to aggressive-experimental and aggressive-control groups. Then 12 boys, matched for age and SES, were assigned to a normal-control group. Training took place daily, in 30-minute sessions over 6 weeks.

Dependent measures included psychoeducational tasks, a problem-solving task (Shure & Spivack, 1974), and the School Behavior Checklist (Miller, 1972). Results were analyzed to provide information about changes over time and differences between the aggressive groups at posttest. On performance measures, subjects in the aggressive-experimental group were reliably different from those in the aggressive-control group; trained boys outperformed controls. At pretest, the two aggressive groups had been reliably different from the normal-control group; at posttest, the aggressive groups were reliably different from each other, but the aggressive-experimental group did not differ reliably from the

normal-control group. On teacher ratings of aggression, subjects in both aggressive conditions improved reliably more than controls. Prosocial behavior of the trained boys was reliably different from that of the untreated boys. However, the experimental treatment failed to channel the trained boys' increased verbalization into new and alternative responses to their usual aggressive behaviors. Results were interpreted as providing support for cognitive training with young, aggressive children, even though these experimental results could be attributed, at least in part, to individual attention given during training.

Williams and Akamatsu (1978) assessed the applicability of self-instructional training as a treatment for juvenile delinquents. Thirty subjects were selected and randomly assigned to: self-instructional training, attention control, or assessment control. Self-instructional training was modeled on Meichenbaum and Goodman's (1971) paradigm. An attention control group received the same materials and practice opportunities without self-instructional training. An assessment control group received pre- and posttests. Training took place in two sessions, 1 week apart. Matching Familiar Figures (Kagan, 1966), the WISC-R Picture Arrangement subtest (Wechsler, 1974), and a delay of gratification task were dependent measures.

Preassessment scores showed that groups were equivalent

before treatment. Scores on the Matching Familiar Figures and Picture Arrangement measures were in the predicted directions. On Matching Familiar Figures, the scores of the self-instructional training and attention control groups were reliably different from those of the assessment control group, but not from each other. On the Picture Arrangement subtest, both training groups performed reliably better than assessment controls. Boys were reliably different from girls, but there was no sex x treatment interaction. Only the self-instructional training group demonstrated reliable improvement from pre- to posttest. No reliable results were found on the delay of gratification measure.

The authors explained their results in terms of subject characteristics, training, and methodological aspects of the experiment. The efficacy of self-instructional training on the Picture Arrangement subtest was interpreted as support for the applicability of this treatment as cognitive training for delinquents.

Self-instructional training has been applied to adult schizophrenics as a means of improving their functioning by focusing their attention. Meichenbaum and Cameron (1973) had encouraging results; Margolis and Shemberg (1976), however, were unable to replicate the former study. Meichenbaum and Cameron used self-instructional training to determine whether

schizophrenics could be trained to self-instruct and to improve their performance on attentional, cognitive, and language tasks. Their first study showed promising results, and a second study extended and refined the original findings. The second study selected 10 medicated, hospitalized, male schizophrenics representative of the hospital population. They were assigned randomly to self-instructional training or control conditions. Self-instructional training took place in eight, 45-minute individual sessions spread over 3 weeks. Experimental subjects were yoked to controls. Control subjects met for the same number of sessions and received the same practice as experimental subjects but received neither modeling nor self-instructional training.

Dependent measures included a structured interview, Parallel Proverbs Tests (Kaufman, 1960), Auditory Distraction Digit Recall Test (Chapman & McGhie, 1962), and Inkblot Tests (Holtzman et al., 1961). Both groups had equivalent scores on the dependent measures prior to treatment; both groups showed improvement over the course of the study. The trained group showed reliably greater improvement than the control group on all but one measure. Trained subjects emitted 42% less "sick-talk" in the structured interviews. Improvement was maintained at follow-up 3 weeks following treatment. The experimental subjects gave reliably more abstract proverb interpretations and more

integrated inkblot explanations than did controls. On the digit recall in presence of distraction task, the self-instructional training group showed reliably greater improvement.

These results were interpreted as support for the effectiveness of self-instructional training in modifying the behavior of schizophrenics. The researchers also discussed (1) the importance of training subjects to discriminate appropriate settings for the use of self-instructional training; (2) the experimental modification of subjects' perceptions, evaluations, and reactions through self-instructional training; and (3) the importance of individually tailored self-instructions.

Margolis and Shemberg (1976) attempted to replicate Meichenbaum and Cameron's research. They chose 32 hospitalized schizophrenics, 16 reactive and 16 process, based on scores on the Ullmann and Giovannani (1964) scale and assigned them to one of four experimental conditions. Subjects in each diagnostic category were assigned to a self-instructional training or a control group. Control subjects were yoked to experimental subjects for time spent with the experimenter and exposure to trials and materials. Dependent tasks were digit recall tasks (Brown, 1969; Chapman & McGhie, 1962) and a Trail Making test (Halstead, 1947). Training took two 1/2-hour sessions.

The data were analyzed using ANOVA's. Scores on pretests were similar to those obtained by Meichenbaum and Cameron but had

more variability. None of the hypothesized main effects or interactions were reliable. The results of this study did not confirm Meichenbaum and Cameron's findings. Margolis and Shemberg suggested possible reasons for this failure to replicate: (1) different groupings of subjects; (2) variability on dimensions relative to task performance; (3) subject reluctance to self-instruct and apparent failure to self-instruct on the posttest; and (4) the possibility that self-instructional training is highly task specific.

Malamuth (1979) and Whitman and Johnston (1983) applied self-instructional training to student performance on school tasks. Malamuth investigated the efficacy of self-instructional training in enhancing reading in low-achieving, normal children. Subjects were selected by scores on a reading pretest. All subjects were reading two or more years below grade level. Black children, 21 boys and 12 girls from grade 5, were divided into three reading levels and then assigned randomly to self-instructional training or a modeling control condition. Self-instructional training was similar to Meichenbaum and Goodman's (1971) treatment. In the modeling condition, the experimenter modeled task-oriented behaviors without training the children to perform them. Both groups were exposed to the same materials and tasks. Two 30-minute training sessions were held weekly for 2 weeks. Six trainers and two raters (four of each

sex) were trained and were kept blind to the nature of the experiment. Assessment administrators were not blind to the experiment. Peer confederates, trained for a peer-teaching task, were blind to the purpose of the peer-teaching task.

Dependent reading measures were a story and a sentence completion test. Attention was assessed through errors of omission and commission on an audiovisual-checking task. To measure generalization of training, subjects were asked to teach a perceptual task to a peer. Data on student distractibility was obtained from teacher questionnaires.

Results were analyzed by ANOVA's. Reading measures approached reliability in favor of self-instructional training. On the attention assessment measure, reliable differences for treatment were observed; the performance of control subjects systematically deteriorated over the testing period. On this measure, reliable differences in errors of commission suggested that self-instructional training can inhibit "false-alarm"-type errors. On the peer-teaching task, the experimental subjects used task clarification, cognitive rehearsal, guiding statements, and overt to covert [verbalizations]; controls used cognitive rehearsal only.

The results of this study supported self-instructional training as an effective treatment for improving reading and attention for low-achieving, normal children. Reading scores

increased, and attention was sustained longer with fewer errors. The author suggested that motivational aspects (e.g., reinforcement and coping with errors) might need to be trained specifically to ensure treatment effects. He concluded that further research was needed to examine which elements of a self-instructional training treatment should be retained and to determine the precise role of different components.

Whitman and Johnston (1983) investigated the effectiveness of self-instructional training in teaching mathematic skills to groups of educable mentally-retarded children. Three groups of three children per group, nine children, selected by their teachers, were subjects in this multiple baseline experiment. Mean age of the seven boys and two girls was 11 years and 10 months. Mean IQ (from WISC-R, Wechsler, 1974) was 65.5. Training took place daily for 10 weeks, in 50 sessions of 30 minutes' duration. Training was modeled on Meichenbaum and Goodman's (1971) treatment with modification for small group application.

Dependent measures were rate and accuracy scores for math problems completed, use of self-instructional training, and taped verbalizations during training. Use of self-instructional training was evaluated by rating tapes of each child's verbalization while solving problems. All children learned the self-instructional training sequence to 100% criterion. The

degree to which it was used by the children varied considerably. Academic data revealed that all children completed fewer problems over the course of the training and that 8 out of 9 children increased their accuracy rate to or beyond 75% for problems completed on the last five days of treatment. Treatment generalized to math problems that were not trained. Research results were interpreted as support for self-instructional training as an effective treatment for increasing math problem-solving skills in educable mentally-retarded children in small groups. The authors suggested that operant procedures in self-instructional training (shaping, prompting, reinforcement, and fading) may make important contributions to the efficacy of this training procedure.

The general effectiveness studies reported in this section of Chapter III appear to support the use of self-instructional training. This training procedure has been used successfully with impulsive, hyperactive, and distractible children whose ages ranged from 4 years to preadolescence. Self-instructional training also was an effective treatment for aggressive children, both at the primary school level and in adolescence. Like impulsive children, schizophrenics' behaviors cause them difficulty. The results of self-instructional training studies with this clinical population, although encouraging, were less convincing. Finally, self-instructional training was effective

in improving specific academic behaviors. Taken together, self-instructional training has been supported as an effective treatment for a variety of problems.

Stress-Inoculation Training Studies

One general effectiveness study applied stress-inoculation training to anger management in abusive parents. Nomellini and Katz (1983) investigated the effectiveness of stress-inoculation training in reducing abusive parents' angry, impulsive behaviors. Four parents, a father and mother, and two single mothers, took part in this multiple baseline experiment.

Stress-inoculation training involved six to eight 90-minute sessions. The stress-inoculation training procedure, as described by Meichenbaum (1977a) was implemented. Subjects learned how anger influences thinking and were trained to self-monitor for physiological cues associated with anger arousal. They learned cognitive coping skills, e.g., replacing anger-producing thoughts with more appropriate cognitions and self-statements. Relaxation, self-reinforcement, and self-instructions were taught as coping, self-control skills. A problem-solving approach was incorporated to provide alternative responses to anger-arousing situations. Parents developed anger hierarchies from anger-producing situations that they found particularly difficult. Subjects practiced applying coping skills as they role-played these scenes from their hierarchies.

Trained observers rated aversive and positive parent and child behaviors during in-home observations. The Novaco Anger Scale (1976a) and self-monitoring of "angry urges" were additional dependent measures. Follow-up occurred at different times, ranging from two to six months.

Results showed decreased aversive behavior and a trend toward increased positive behaviors for parents. Parents' "angry urges" decreased. On the anger scale, scores were reduced between 31% and 43%. Children's aversive behaviors also decreased, but there was less change in their positive behaviors. Decreases in aversive behaviors were maintained at follow-up. The effectiveness of stress-inoculation training was supported by these results, and further evidence was cited in the parents' responses to their children's increased anger during the experiment. As parents decreased their attention to children's aversive behaviors, their children's aversive behaviors increased. In spite of this potentially provocative response, the parents were able to maintain their improvement.

The results of this general effectiveness study applying stress-inoculation training to anger management was encouraging. One study cannot produce a compelling body of data, but it does encourage further research using stress-inoculation training in anger management and other problem areas.

Conclusion

The self-instructional training studies reviewed point toward the general effectiveness of this training procedure. Self-instructional training has been used successfully with impulsive, hyperactive, and distractible children; aggressive children; low-achieving school children; and schizophrenics. In all but the Friedling and O'Leary (1979) and Margolis and Shenberg (1976) studies, subjects in the self-instructional training condition demonstrated greater behavior change than controls. Most of these studies were modeled closely on Meichenbaum and Goodman's (1971) self-instructional training paradigm, and results generally supported those of Meichenbaum and Goodman. Nomellini and Katz's (1983) study provided some support for stress-inoculation training as an effective treatment for anger management. In summary, the studies reviewed demonstrated the general effectiveness of self-instructional training and potential effectiveness of stress-inoculation training. Frequently, the authors recommended further research to determine the contributions of particular components of these procedures. Dismantling studies, which address this question, are discussed in the next section.

Dismantling Studies

Self-Instructional Training Studies

To be included in this section, studies had to be concerned

with assessing the contributions made by the two components of self-instructional training to the overall effectiveness of self-instructional training per se. Studies reviewed have included both modeling and overt to covert rehearsal of self-instructions.

Modeling component studies. Genshaft and Hirt (1979) and Meichenbaum and Goodman (1971) investigated effects of the modeling component on self-instructional training. Meichenbaum and Goodman examined the inclusion of modeling with self-instructional training. Genshaft and Hirt investigated the effects of different model characteristics on the efficacy of self-instructional training. Both studies used impulsive primary school children chosen by performance on Matching Familiar Figures (Kagan, 1965, 1966). Dependent measures for both experiments were latency scores and errors on the Matching Familiar Figures. Genshaft and Hirt also used the Picture Arrangement subtest of the WISC-R (Wechsler, 1974). Meichenbaum and Goodman randomly assigned 15 subjects, five each to: modeling alone, modeling and self-instructional training, and attention control conditions. The 60 children in the Genshaft and Hirt study were matched and assigned, 10 each, to four self-instructional training conditions and to two control conditions: (1) black model-black subject, (2) black model-white subject, (3) white model-black subject, (4) white model-white

subject, (5) black control, and (6) white control.

Genshaft and Hirt's training involved daily, hour-long sessions for 2 weeks. Experimental subjects received self-instructional training. Control subjects, exposed to the same materials and tasks, received neither modeling nor rehearsal of self-instructions. Meichenbaum and Goodman provided a 20-minute training session. In the modeling condition, an experimenter verbalized cognitive strategies typical of a reflective child. No overt to covert rehearsal of self-instructions accompanied the cognitive modeling, and subjects practiced the tasks unassisted. In modeling with self-instructional training, overt to covert rehearsal of self-instruction was added. Attention control subjects were exposed to materials and tasks with neither modeling nor self-instructional training.

No statistically reliable differences between groups were observed on any dependent measure before treatment in the Meichenbaum and Goodman study. Both training groups increased latency scores, but only subjects receiving modeling with self-instructional training demonstrated statistically reliable improvement on the error measure. This improvement in performance and a statistically reliable difference relative to the other two conditions were maintained at follow-up. Three of the five subjects in the combined experimental treatment

spontaneously self-instructed at follow-up. These results supported the inclusion of overt to covert rehearsal of self-instructions as a necessary component in the self-instructional training paradigm.

The Genshaft and Hirt study also revealed statistically reliable results. A models x Matching Familiar Figures latency scores effect revealed reliable improvement for both black and white subjects trained by white models. A model x race interaction revealed reliable changes from pre- to posttest when subjects were trained by models of their own race. These results suggested that change could not be attributed only to treatment, because subjects trained by white models improved more than those trained by black models.

The Genshaft and Hirt (1979) and Meichenbaum and Goodman (1971) studies investigated the modeling component in self-instructional training. Modeling alone was found insufficient for behavior change; to modify behavior, modeling needed to be combined with overt to covert rehearsal of self-instructions. Genshaft and Hirt's examination of model characteristics demonstrated an influence of racial identify on behavior change. Together these studies suggest that modeling is a necessary but insufficient component in the self-instructional training paradigm.

Rehearsal component studies. Other studies have examined

the rehearsal component of self-instructional training: different verbalization conditions for instructions (Bender, 1976); self-reinforcement instructions (Nelson & Birkimer, 1978); overt, covert, and combined overt to covert self-instructions (Fry, 1978); and specific and general self-instructions (Kendall & Wilcox, 1980). Because these studies investigate different aspects of the rehearsal component, they are discussed separately.

Bender (1976) investigated the relative efficacy of different verbalization conditions for instructions in modifying impulsiveness by controlling children's verbalizations of general and specific strategies. Grade 1 children, 35 girls and 35 boys, were chosen by scores on Matching Familiar Figures (Kagan et al., 1964) and assigned randomly to conditions. The five conditions were (1) self-instructional training with specific strategies, (2) self-instructional training with general instructions, (3) modeling condition with specific strategies but no overt to covert rehearsal by the child, (4) assessment control, and (5) no-treatment control. The two self-instructional training conditions differed from each other only in terms of strategies: containing either specific directions indicating how the child was to perform the task or general directions about what response was required and admonitions to go slowly. Self-instructional training followed Meichenbaum and Goodman's (1971) paradigm. The

modeling condition with specific strategies consisted of the same modeling component as in the self-instructional training with specific strategies but did not contain a rehearsal component; the child only responded by pointing or saying "Yes" or "No." The assessment control condition provided no self-instructional training; the child was asked only to look at the material. The children in the no-treatment condition received only pre- and posttests. Training took place on four consecutive days in sessions lasting 10 to 25 minutes, depending upon the condition.

Dependent measures were from Matching Familiar Figures (Kagan, 1965) and lesson posttests which used materials suited to each lesson that were similar to the Matching Familiar Figures materials. On the lesson posttests, children in the self-instructional training conditions made reliably fewer errors and increased latency scores than children in the other conditions. The specific strategy affected only latency scores. Post hoc comparisons revealed that the self-instructional training with specific strategies was reliably more effective in increasing latency than all other conditions and that the modeling condition with specific strategies was reliably more effective than the two control conditions. There were no reliable differences between groups on the Matching Familiar Figures test but a trend in error scores favored the superiority of self-instructional training with specific strategies over the

other conditions. These results were interpreted as support for self-verbalizations. Support for self-verbalizations and the greater efficacy of self-instructional training with general strategies combine to provide evidence for the contributions of the rehearsal component to self-instructional training. The results suggested that explicit, specific strategies are somewhat more effective than implicit, general strategies within the self-instructional training paradigm.

Nelson and Birkimer (1978) investigated the influence of self-reinforcement instructions in training impulsive children. Treatment conditions were: self-instructions without self-reinforcement, self-instructional training with self-reinforcement, a no self-verbalization control, and an assessment control. Treatment conditions manipulated the presence and absence of self-verbalization and self-reinforcement. Assessment control subjects had pre- and posttests only. Subjects in the other conditions received the same tasks, presented in the same sequence, and with the same number of trials.

Latency error scores from Matching Familiar Figures (Kagan, 1966) were dependent measures. Results showed that self-instructional training with self-reinforcement reliably decreased error responses and reliably increased response latency. These results were viewed as support for

self-reinforcement within self-instructional training; self-instructional training without self-reinforcement was an ineffective treatment for impulsive children in this study.

Fry (1978) investigated the relative efficacy of overt, covert, and combined overt-to-covert self-verbalization in a resistance to temptation task. Dependent measures were the number of minutes spent reiterating a behavior-inhibiting rule and latency to first transgression. Seventy-eight primary children scoring in the mid-range of a locus of control scale (Epstein & Komorita, 1971) were assigned randomly to three self-verbalization training conditions: overt, covert, or combined overt to covert. In the overt condition, self-verbalizations were modeled and practiced aloud. In the covert procedure, inaudible self-verbalizations accompanied by distinct lip movements were modeled and practiced. In the combined condition, overt followed by covert self-verbalizations identical to those in the two single conditions were modeled and practiced. Two trained female observers recorded subject self-verbalization behavior during the resistance to temptation task.

When subjects were grouped into high and low verbalizers based on pretest verbalization, statistically reliable main effects for treatment, for duration of self-verbalization, and for a treatment x duration interaction were found. High

verbalizers in the combined overt to covert condition showed reliably increased latencies in resistance to temptation. Mean latency scores suggested that high verbalizers had high latency scores across treatments. A relationship influencing response latency was noted between duration of verbalization and overt to covert training. Further research is needed to tease out the effects of this interaction.

Kendall and Wilcox (1980) investigated the differential effectiveness of concrete and conceptual training of self-instructions. Thirty-three impulsive elementary children were assigned to three conditions using a randomized block procedure. Self-instructional training was combined with a response cost contingency. In the concrete condition, self-instructions specific to the task were trained; in the conceptual condition, general approach self-instructions were trained. A control condition used the same materials and tasks. Six 1/2-hour lessons were held over 3 weeks. Dependent measures included Matching Familiar Figures (Kagan, 1966), the Porteus Maze (Porteus, 1955), and three rating scales.

Groups were equivalent before treatment. All groups showed statistically reliable improvement over time on the Matching Familiar Figures, the Porteus Maze and the Self-control in Children Rating Scale (Kendall & Wilcox, 1979). Posteriori t-tests showed that the concretely trained group demonstrated

reliable improvement on the posttest and that the conceptually trained group maintained reliable improvement to follow-up. Scores from the conceptually trained group were reliably different from those obtained in other conditions. Analysis of Conners' (1969) scale for hyperactivity revealed a reliable period effect. Results were interpreted as providing support for the relative superiority of conceptual training.

Conclusion. The dismantling studies demonstrated the utility of the training procedures used by Meichenbaum and Goodman (1971) in both components of self-instructional training. The Genshaft and Hirt (1979) and Meichenbaum and Goodman (1971) studies provided evidence that modeling is a necessary but insufficient component in self-instructional training. Modeling alone was found insufficient for behavior change; to modify behavior, modeling needed to be combined with overt to covert rehearsal of self-instructions. Genshaft and Hirt's examination of model characteristics demonstrated an influence particular models can have on treatment outcomes. Studies on the rehearsal component also supported Meichenbaum and Goodman's (1971) conceptualization of self-instructional training. Bender's (1976) research supported the inclusion of the rehearsal component in self-instructional training. It also suggested that explicitly modeled strategies may be more effective than implicit, or not modeled, strategies in focusing attention with

impulsive children. The Kendall and Wilcox (1980) study further supported the problem-orienting and problem-solving approach in self-instructional training. Although specific tasks were used for instructional purposes, the training emphasis remained on learning strategies rather than specific task behaviors. Fry's (1978) investigation of the relative efficacy of overt, covert, and combined overt to covert self-instructions also confirmed Meichenbaum and Goodman's training procedures. Another ingredient in self-instructional training, self-reinforcement instructions, was shown to increase efficacy of self-instructional training in the Nelson and Birkimer (1978) study. The dismantling studies reviewed in this section support Meichenbaum and Goodman's (1971) conceptualization of self-instructional training and provide evidence of the efficacy and necessity of both training components.

Stress-Inoculation Training Studies

While self-instructional training has two treatment components, stress-inoculation training has seven. Dismantling studies assess contributions of different treatment components to treatment outcomes. In order to isolate each component's contribution to treatment results, different experimental conditions are composed of different treatment components and combinations of treatment components. Relative efficacies of individual components may be assessed using a limited number of

experimental conditions. However, to assess fully the contributions of a component or a combination of components to the outcome of a stress-inoculation training treatment, all stress-inoculation training components would need to be included as experimental conditions. Few comprehensive dismantling studies using all components have been conducted in stress-inoculation training research.

Criteria for including stress-inoculation training studies were developed in the introduction to Chapter III. Three criteria were described: (1) inclusion of all seven treatment components or all three procedural phases in stress-inoculation training, (2) reference to Meichenbaum's work and inclusion of stress-inoculation training treatment components as described by Meichenbaum, or (3) a treatment specifically named "stress inoculation" by the researcher which also contained some treatment components fitting Meichenbaum's description.

Many dismantling studies used procedural phases instead of treatment components to describe experimental treatments. (See Figure I in Chapter II for comparison of procedural phases and structural components of stress-inoculation training.) All but one (Glass, Gottman, & Shmurak, 1976) of the stress-inoculation training dismantling studies that were reviewed contained both educational and rehearsal phases. Education, rehearsal, and application phases are included in six studies: Emmelkamp,

Kuipers, and Eggeraat, 1978; Emmelkamp and Mersch, 1982; Hackett and Horan, 1980; Hackett, Horan, Buchanan, and Zumoff, 1979; Horan, Hackett, Buchanan, Stone, and Demchik-Stone, 1977; and Thyer, Papsdorf, Himle, McCann, Caldwell, and Wickert, 1981. Many studies did not include an in vivo application phase as defined by Meichenbaum (1977a)--i.e., exposure to gradually increasing stressful experiences in order to strengthen newly-learned coping skills. Studies which lacked an in vivo application phase were included (1) when "stress inoculation" was used to describe a treatment (Altmaier, Leary, Ross, & Thornbrough, 1982; Girodo & Roehl, 1978; Hussian & Lawrence, 1978; Schlichter & Horan, 1981; Worthington & Shumate, 1981) or (2) when a treatment, based on Meichenbaum's work, included stress-inoculation training treatment components (Cooley & Spiegler, 1980; Glass, Gottman, & Shmurak, 1976; Glogower, Fremouw, & McCroskey, 1978; Holroyd & Andrasik, 1978; Kaplan, McCordick, & Twitchell, 1979; Meichenbaum, Gilmore, & Fedoravicius, 1976; Mendonca & Siess, 1976; Novaco, 1976b; Valerio & Stone, 1982).

The major foci of the dismantling research reviewed in this section were cognitive and behavioral coping strategies and in vivo components. The researchers investigated contributions of components in the rehearsal and application phases. This section discusses components in the educational phase infrequently

because the research did not examine them directly. The lack of research into the education phase is intriguing, and the implications of this will be examined.

The majority of studies investigated components in the rehearsal phase: (1) cognitive strategies alone: (Glogower et al., 1978; Hussian & Lawrence, 1978; Kaplan et al., 1979; Worthington & Shumate, 1981); and (2) a combination of behavioral and cognitive coping strategies (Altmaier et al., 1982; Cooley & Spiegler, 1980; Girodo & Roehl, 1978; Glass et al., 1976; Hackett & Horan, 1980; Holroyd & Andrasik, 1978; Meichenbaum et al., 1976; Mendonca & Seiss, 1976; Novaco, 1976b; Schlichter & Horan, 1981; Valerio & Stone, 1982). Five studies examined the in vivo application phase: Emmelkamp et al. (1978), Emmelkamp and Mersch (1982), Hackett et al. (1979), Horan et al. (1977); and Thyer et al. (1981). This review of stress-inoculation dismantling studies first examines components in the rehearsal phase: cognitive strategies alone followed by cognitive and behavioral coping strategies. Examination of the research pertaining to the application component completes this review of stress-inoculation training dismantling studies.

Cognitive strategies alone. The studies in this section focused on coping self-statements, alone and with other strategies. Hussian and Lawrence (1978) examined the contributions of different types of coping self-statements.

Glogower et al. (1978) studied differential treatment effects of understanding the role of negative self-statements and of implementation of coping self-statements. Worthington and Shumate (1981) researched differential treatment contributions of pleasant imagery, a conceptual understanding of pain, and coping self-statements. The two latter studies compared contributions of coping self-statements to those of an educational factor.

Hussian and Lawrence (1978) investigated the contributions of specific and general coping self-statements in reducing test anxiety. Subjects were 48 undergraduates assigned randomly to a treatment: (1) generalized coping self-statements, (2) test-specific coping self-statements, (3) discussion control, and (4) waiting list control. Training comprised three, 50-minute sessions spread over 3 weeks. Stress-inoculation training, adapted from Meichenbaum and Cameron (1973), was used in both general and specific coping treatments. Training components included: (1) explaining the role of negative self-statements in test anxiety; (2) relaxation training; (3) overt followed by covert rehearsal of positive coping self-statements; and (4) application of positive coping self-statements to test-taking situations by use of imagery. The two self-statement conditions differed in their respective self-statements: general, problem-solving self-statements compared to specific, test-related self-statements. Problem-solving self-statements

produced a problem-solving component; therefore, in the general, problem-solving condition, a problem-solving skills component was included. Subjects in the discussion condition talked about test anxiety, study habits, and test preparation. Waiting list controls participated in pre- and postassessments.

Dependent measures included self-report instruments and scores on psychology exams. No reliable differences existed between groups prior to treatment. Stress-inoculation training was effective in reducing anxiety, but the different coping self-statement conditions were not equally effective. Only test-specific self-statements reliably reduced test anxiety. No further differences were observed between the two self-statement conditions or between general self-statements and control conditions. Experimental results were interpreted as support for stress-inoculation training as an effective treatment for test anxiety and for test-specific, positive, coping self-statements as an "active ingredient" in the package.

Glogower et al. (1978) investigated the contributions of five treatments for communication anxiety: (1) extinction, (2) insight into negative self-statements, (3) rehearsal of coping self-statements, (4) stress-inoculation training, and (5) waiting list control. From undergraduate students with high scores on the Personal Report of Communication Apprehension (McCroskey, 1970), 60 were assigned to treatments using a random block

procedure. Treatments took place in five 1-hour group meetings. In the extinction condition, subjects discussed anxious feelings and rated anxiety before, during, and following speaking exercises. In the insight treatment, subjects described, monitored, and reported negative self-statements before, during, and following speaking exercises. In the coping treatment, subjects learned and rehearsed positive coping self-statements; they practiced these self-statements between sessions and rehearsed them before, during, and following speaking exercises. The combined treatment included both insight into the role of negative self-statements and use of coping self-statements to reduce anxiety. Waiting list subjects had pre- and posttreatment assessments.

Behavioral and self-report dependent measures were used. Three measures of communication were: number of verbalizations during group discussion (TotFreq); number of responses containing at least three words including a subject and predicate (FreqL); and response length, the point at which one subject began speaking until another person responded. Trained observers rated subject tension, relevance, and verbosity. No statistically reliable group differences were found before treatment. Reliable treatment effects were observed for all communication measures. t -test comparisons revealed reliable differences between coping and waiting list conditions and between combined and extinction,

insight, and waiting list conditions. Subjects in the coping condition showed greater improvement than those in the insight condition, and subjects in the combined condition showed reliably greater change than those in insight or extinction conditions. On self-report instruments, treated subjects reported reliably more improvement, than did subjects on the waiting list. At follow-up, reliable differences remained between waiting list subjects and treated subjects. Individually, 50% of subjects in the coping condition and 67% in the combined condition showed improvement; analysis indicated that these improvements were statistically reliable.

The combined treatment was more effective than any single treatment, and the coping treatment was more effective than any other single treatment. Coping self-statements contributed to treatment efficacy. Superiority of the combined treatment provided evidence of the contribution of the insight component. Subjects' comments, in interviews following treatment, suggested that self-statements may change spontaneously without specific training.

Worthington and Shumate (1981) researched contributions of cognitive and educational treatments in an analogue study of pain control. From a pool of women volunteers, 96 subjects were selected based on their tolerance on the cold pressor task. The experiment manipulated components singly and in combination for a

total of eight treatments, including a control condition. The cognitive treatments were pleasant imagery and coping self-statements. The educational treatment, derived from Melzack (1973) and Melzack and Wall (1965), explained that pain may be viewed as a multistage process. Stages of experiencing pain, based on Meichenbaum and Turk (1976), were: confronting a painful stimulus, handling a painful stimulus, and coping with critical moments and emotions. Self-reinforcement could follow any stage. Women in the imagery and coping self-statements treatments created pleasant images or coping self-statements, respectively, to use during the posttest. Training took place in one session which varied in length depending upon the number of treatment combinations.

Dependent measures were duration in minutes of tolerance of the cold pressor task and self-report measures of pain. Results demonstrated that pleasant imagery controlled pain better than no imagery; women trained to use imagery tolerated the ice water reliably longer than those who had not received this training. An imagery x educational condition interaction was observed; women in the combined treatment reported reliably less pain at withdrawal than did other subjects. Women who had not received imagery treatment but had received the educational treatment demonstrated greater improvement on tolerance and pain at withdrawal than did women who received neither of these

treatments. However, when women received the imagery treatment, the addition of the educational component produced no reliable improvement. Posttest questionnaires revealed that women trained in the imagery condition used this strategy 81% of the time, while women in the coping self-statement condition used their strategy only 26% of the time. The researchers suggested that underlying, negative cognitions must be treated before coping self-statements can be effective. Although this study did not provide evidence for the efficacy of coping self-statements, it did indicate that the educational component is an important ingredient in coping with pain in the absence of pleasant imagery. This study supported stress-inoculation training as an effective treatment for handling pain and stress. The researchers called for further studies to examine actively the ingredients and the clinical utility of this treatment package.

In summary, two studies of cognitive strategies, alone (Hussian & Lawrence, 1978; Glogower et al., 1978) provided evidence that coping self-statements contributed to treatment efficacy in stress-inoculation training. These studies also provided evidence of contributions made by an educational component to treatment efficacy. Worthington and Shumate (1981) failed to demonstrate contributions of coping self-statements.

Cognitive and behavioral coping strategies. Studies of cognitive and behavioral coping strategies were the most numerous

among the stress-inoculation training dismantling research. In these studies, coping self-statement treatments were combined with other cognitive and behavioral strategies. The first set of studies, Glass et al. (1976) and Valerio and Stone (1982), investigated coping self-statements and response acquisition treatments. Altmaier et al. (1982), Cooley and Spiegler (1980), Girodo and Roehl (1978), and Novaco (1976b) examined cognitive, coping strategies and relaxation components. Multiple cognitive strategies and relaxation components were investigated by Hackett and Horan (1980), Holroyd and Andrasik (1978), and Schlitcher and Horan (1981). Kaplan et al. (1979), Meichenbaum et al. (1976), and Mendonca and Seiss (1976) studied cognitive coping strategies and desensitization strategies.

Glass et al. (1976) and Valerio and Stone (1982) researched the effectiveness of coping self-statements, response acquisition, and stress-inoculation training treatments for dating skills and assertiveness training, respectively. Glass et al. selected 61 male undergraduate volunteers and assigned them randomly to one of six conditions. The conditions were based on response acquisition and coping self-statement treatments. The response acquisition treatment included coaching in appropriate responses, a modeled response, and further coaching for each of 11 training situations. The coping self-statements treatment consisted of modeled self-statements demonstrating appropriate

coping with each situation followed by reinforcement. Stress-inoculation training combined these two treatments. In order to control for the longer treatment time of the combined condition, both single conditions were enhanced with the addition of two more training examples. The sixth condition was a waiting list control. Training took place in four or five 1-hour sessions, depending upon the condition.

Dependent measures were a Dating Behavior Assessment Test (Glass, Gottman, & Shmurak, 1976), a phone call, and a questionnaire. The behavioral assessment contained 24 social situations; subject responses to each were rated. On the telephone measure, two subjects phoned a woman who rated each caller. After 6 months, subjects were reassessed with the same measures, and a questionnaire elicited information about the men's social behavior with women.

The six groups were similar on all dependent measures prior to treatment. On the behavioral measure, treated men improved relative to controls. On trained situations, response acquisition and stress-inoculation trained men demonstrated reliably similar improvement which was greater than that achieved by coping subjects men in the coping self-statement condition. On untrained situations, only coping men in the coping condition showed reliable improvement. On the telephone call, the men in the coping treatment made reliably more calls than any other

group and were rated reliably higher. At follow-up, the regular and enhanced response acquisition, stress-inoculation training, and coping skills groups were similar and more improved than the waiting list group. Men in stress-inoculation training continued to improve slightly over time. The study demonstrated the ability of a coping self-statements treatment to change *in vivo* behavior and to transfer this change to untrained situations. The response acquisition treatment did not demonstrate overall efficacy. The researchers suggested that the effectiveness of the cognitive treatments was attributable to the generalizability of these approaches. Experimental results were interpreted as support for stress-inoculation training.

Valerio and Stone (1982) examined a person x treatment interaction using single and combined treatments designed to increase assertive behavior. Assertive responses were trained behaviorally while positive, coping self-statements to negative cognitions were trained cognitively. A combined treatment incorporated assertive responses, awareness of self-statements, and challenging negative self-statements with positive, coping self-statements. A waiting list control group received pre- and postassessments. Following pretesting, 88 undergraduate women were divided into "high" and "low" groups based on their knowledge about assertive responses. Within these blocks, subjects were assigned randomly to treatments.

Self-report and behavioral measures were used to assess change. No reliable differences were present prior to treatment, and the validity of the knowledge groupings was confirmed. No reliable support for a subject x treatment interaction was found. All treatments demonstrated reliable improvement over controls on most measures. On a role-playing task, cognitively trained women were reliably less assertive than behaviorally trained women. However, women in the cognitive treatment produced more positive self-statements, and women in the cognitive and combined groups produced more positive than negative self-statements. At follow-up, reliable treatment and time effects indicated that the behavioral treatment was more effective than the cognitive treatment. The combined treatment was more effective than the cognitive treatment on only one measure. Improvement was maintained from posttest to follow-up assessment. This study demonstrated contributions of behavioral and cognitive-behavioral treatments.

Other studies have compared coping self-statements and relaxation components. Girodo and Roehl (1978) investigated coping self-statements and deep breathing treatments for fear of flying. Cooley and Spiegler (1980) researched coping self-statements and relaxation in reducing test anxiety. Altmaier et al. (1982) studied the benefits of matching treatments to subjects' modes of experiencing anxiety. Novaco

(1976b) researched the contributions of coping self-statements and imagery and relaxation treatments in anger control.

Girodo and Roehl (1978) assessed stress-inoculation training in reducing fear of flying. Subjects were 56 women undergraduates screened and assigned to a treatment: (1) preparatory information, (2) self-talk, (3) stress-inoculation training, and (4) control. Treatments were conducted in a single group session, lasting between 2 1/2 and 3 1/2-hours. Women in the information condition were told that they could use information to cope with fear. The self-talk treatment incorporated behavioral coping (taking a deep breath) with positive, coping self-statements. Women developed coping self-statements and rehearsed them using imagery techniques. The women were encouraged to practice positive self-statements in preparation for the flight. Stress-inoculation training incorporated both information and coping treatments. Women in the control condition viewed films on aviation.

Dependent measures were three self-report instruments. The women had agreed during screening to participate in an experiment that involved flying; the women were not aware, however, that the landing on return to Ottawa would be manipulated to appear as if it has been aborted. Following treatment, preflight self-reports revealed that women in the self-talk and combined conditions reported more anxiety than those in information and control

conditions. Anxiety assessments made during flight demonstrated reliable differences in anxiety levels between the uneventful flight and the "missed landing," but the groups did not differ reliably from each other. Women in the self-talk condition reported increased anxiety following the "missed landing." Self-talk, stress-inoculation training, and information conditions were equally effective in reducing fear of flying. In this study, coping self-statements increased anxiety prior to and during exposure to a stressor and were not more effective in reducing fear than the other active treatments.

Cooley and Spiegler (1980) investigated contributions of three treatments for test anxiety. Subjects were 78 college men and women selected by scores on a test anxiety scale (Sarason, 1973), matched on sex and anxiety scores, and assigned to conditions. Conditions were relaxation, coping self-statements, stress-inoculation training, and attention control. The relaxation treatment trained subjects in a variety of relaxation skills. Subjects in the cognitive treatment developed positive, coping self-statements which were incompatible with irrelevant task behaviors and learned self-reinforcement. Stress-inoculation training combined relaxation and cognitive treatments. The attention control group discussed unique reactions to and past determinants of test anxiety. Training took place in five 55-minute sessions over 2 weeks.

Dependent measures were self-report, performance, and physiological measures. Self-report data revealed that cognitive and stress-inoculation training groups improved reliably over other conditions. No reliable group differences were observed on performance or physiological measures. At a 5-week follow-up, subjects in cognitive and stress-inoculation training conditions maintained their improvement. Results were interpreted cautiously; data supported the inclusion of cognition components in treatments for test anxiety. The relaxation component in stress-inoculation training did not enhance treatment outcome. The authors suggested that coping self-statements might be the most effective treatment for influencing self-report measures of test anxiety.

Altmaier et al. (1982) matched treatments to client symptoms of anxiety. Subjects were selected by scores on the Personal Report of Confidence as a Speaker (Paul, 1966). Subjects were 65 undergraduates classified by the way they experienced anxiety: cognitively or physically (Schwartz et al., 1978) and then assigned randomly to conditions. Conditions were coping self-statements, relaxation, stress-inoculation training, and a no-treatment control. The cognitive treatment was designed to affect cognitive anxiety. Subjects (1) identified and monitored negative self-statements and (2) learned to substitute coping self-statements. In contrast, the relaxation treatment

emphasized somatic symptoms and trained subjects in relaxation, deep breathing, and use of cue words and imagery.

Stress-inoculation training combined cognitive and relaxation conditions. The control group participated in pre- and postassessments. Training took place in three 90-minute sessions over 3 weeks.

Dependent measures were self-reports, speeches, and a thought-listing procedure. Groups were not reliably different on cognitive measures prior to treatment but differed on how they experienced anxiety symptoms. On posttest measures, relaxation was a superior treatment for physically experienced anxiety. Stress-inoculation training was the most effective treatment for cognitively experienced anxiety, while the relaxation treatment was the least effective. Coping self-statements and stress-inoculation training conditions increased facilitative self-talk. On the speech measure, subjects in the coping self-statements, relaxation, and stress-inoculation training conditions demonstrated less anxiety than did control subjects, but there were no statistically reliable differences between treatments. These results suggested that specific treatments for reducing anxiety might be less important than teaching coping strategies.

Novaco (1976b) studied contributions of cognitive and relaxation components in treatments for anger management.

Subjects, self-selected or identified as having anger problems, were 34 men and women. Treatments were: (1) self-instructions, (2) relaxation, (3) stress-inoculation training, and (4) attention control. Subjects in the self-instructions condition monitored negative cognitions, learned coping self-statements, and adopted a problem-solving approach to situations that were potentially anger-arousing. Subjects in the relaxation condition learned to use relaxation to control stress and tension. Stress-inoculation training combined these two conditions into a cognitive-behavioral treatment. Attention control subjects received no effective therapy. Dependent measures were an anger inventory and indices of provocation in laboratory exercises. Results revealed that the most consistently reliable differences were between stress-inoculation training and control subjects. Subjects in self-instructions and coping self-statements conditions also improved more than controls. Subjects in stress-inoculation training often were not reliably different from subjects in the self-instructions condition. This research supported stress-inoculation training, self-instructions, and coping self-statement conditions as effective treatment components for anger control.

Another group of studies also investigated stress-inoculation training with relaxation; they differed from the previous studies in the number and composition of cognitive

strategies. Schlichter and Horan's (1981) study of anger used strategies similar to those used by Novaco (1976b). Both Hackett and Horan (1980) and Holroyd and Andrasik (1978) studied the contributions of multiple cognitive strategies with relaxation in treatments designed to reduce pain.

Schlichter and Horan (1981) studied stress-inoculation training as a treatment for anger in institutionalized delinquents aged 13-18. Subjects were 27 boys, selected for anger problems, who were assigned randomly to: stress-inoculation training, "treatment elements," or no-treatment conditions. Training took place twice weekly for 5 weeks in 1-hour sessions. Stress-inoculation training included: (1) teaching about anger and responses to it; (2) self-monitoring; (3) cognitive and behavioral strategies, including self-instructions; and (4) application of coping skills by role-playing scenes from an anger hierarchy. The "treatment elements" condition provided only one coping skill--relaxation. In this condition, there neither was modeling of coping skills nor were responses other than relaxation used in role-plays. Control subjects received pre- and postassessments.

Dependent measures included self-report instruments, ratings of role-play, and institutional behavior. On self-report measures, active treatments were superior to the control condition but did not differ from each other. Observations from

role-plays indicated that boys in the stress-inoculation training condition had reduced their verbal aggression. No reliable differences between the "treatment elements" condition and other conditions were observed. No reliable treatment effects were observed on the boys' behavior in the institution.

Hackett and Horan (1980) systematically manipulated coping strategies in their investigation of pain. For this analogue study, 81 undergraduate women were screened on the cold pressor task (Hines & Brown, 1932) and assigned randomly to one of nine conditions. Three sets of coping strategies were offered singly: (1) relaxation; (2) cognitive strategies: distraction, somitization, and imagery; and (3) self-instructions using cognitive, coping self-statements for dealing with a stressor (Meichenbaum, 1977a). These conditions were combined for additional treatments: (4) relaxation + cognitive strategies; (5) relaxation + coping self-statements; (6) cognitive strategies + coping self-statements; and (7) relaxation + cognitive strategies + coping self-statements (stress-inoculation training). Treatment (8) had no coping strategies but included educational and in vivo components. Treatment (9) was a no-treatment control. An educational component, included in treatments (1)-(8), consisted of an explanation of the gate-control theory of pain (Melzack, 1973; Melzack & Wall, 1965). The application component, also included in treatments

(1)-(8), provided a 3-minute practice on the cold pressor task in which subjects were encouraged to use coping strategies. Training took place in one session, lasting between 20 and 80 minutes, depending on the number of coping skills.

Dependent measures were pain threshold, pain tolerance, and self-report of discomfort. No reliable group differences existed before treatment. Only relaxation reliably increased pain tolerance. Cognitive strategies, singly and with coping self-statements, reliably increased pain threshold; cognitive strategies alone were more effective than in combination with coping self-statements. No reliable results for coping self-statements, singly or in combination, were observed. Treatment 8 (education and application components) was more effective in increasing pain tolerance than no treatment; this finding was interpreted as support for therapeutic contributions of education and application components. This experiment demonstrated the effectiveness of a relaxation component in increasing pain tolerance and of cognitive strategies in increasing pain threshold. The coping self-statements plus self-instructions treatment, very effective for a few women, was ineffectual for most women. This combination of components also decreased the effectiveness of relaxation training.

Holroyd and Andrasik (1978) investigated contributions of coping strategies in treatments for tension headaches. Subjects

were 39 community residents selected and assigned to treatments using a within sample matching technique. In the cognitive treatment, subjects were trained to monitor cognitions and control stress using cognitive reappraisal, attention deployment, and fantasy. In stress-inoculation training, relaxation was added; subjects were encouraged to practice cognitive and relaxation strategies and to use them to reduce stress. In a discussion condition, subjects explored headache symptoms and learned to monitor cognitions related to stress; no coping strategies were trained. Subjects in a control condition monitored their headaches and received pre- and postassessments. Training took place in weekly group sessions lasting 1 3/4-hours over 5 weeks.

Dependent measures included self-report instruments, headache data, and forehead muscle activity. No reliable group differences were found prior to treatment. Headache data revealed that active treatments were reliably different from the control treatment but not from each other. No reliable changes were observed in forehead muscle activity. Initially, the efficacy of cognitive coping strategies was questioned; however, posttreatment interviews with subjects revealed that all but one discussion subject had developed cognitive coping skills in the absence of training. The researchers suggested that specific cognitive strategies may not be related directly to treatment

outcomes and that treatment efficacy may not have been explored adequately by the experimental design. Education and self-monitoring components, common to all treatments, might have contributed to treatment outcomes. They hypothesized that training specific coping skills might contribute less to headache reduction than training subjects in self-monitoring and early detection so that they could implement incompatible cognitive or behavioral responses.

The final subset of studies investigating cognitive and behavioral components of stress-inoculation training examined multiple cognitive strategies and desensitization. All of these studies contained a cognitive imagery skill. Mendonca and Seiss (1976) used imagery and self-instructions in a problem-solving treatment. Kaplan et al. (1979) manipulated imagery and coping self-statements, while Meichenbaum et al. (1976) implemented imagery rehearsal, coping self-statements, and self-instructions.

Mendonca and Seiss (1976) researched counseling procedures for indecisiveness, using problem-solving and anxiety-management treatments. Subjects were university students concerned about career decisions who received high scores on the Inventory of Anxiety in Decision Making (Mendonca, 1974). These 32 men and 10 women were assigned randomly to one of five conditions: desensitization, problem solving, stress-inoculation training, placebo control, and no-treatment control. Desensitization

offered a rationale that anxious thoughts interferred with decision making and that stress and anxiety could be reduced through relaxation. Subjects were taught three types of relaxation. Desensitization generally followed Paul and Shannon (1966); subjects were instructed to experience their anxiety and then to cope with it by self-instructions to attend to specific tasks rather than by focusing on anxiety symptoms.

Problem-solving training, based on D'Zurilla and Goldfried (1971), provided a series of steps. At each step, subjects were coached in appropriate responses which then were practiced. Stress-inoculation training combined the main components of the above treatments. In the discussion condition subjects were presented with films and documentaries on career options and discussed the process of making a career decision. Subjects in the no-treatment condition participated in pre- and postassessments. Training took place in seven 1-hour group sessions over 18 days.

Data were collected on vocational measures, anxiety scales, and a problem-solving test (Mendonca, 1974). On the vocational measures, stress-inoculation training and desensitization groups demonstrated reliable improvement; stress-inoculation training subjects were reliably more improved than subjects in problem-solving or control conditions. There were no group differences on anxiety measures nor on a self-report of

difficulty in making decisions. On the problem-solving measure, stress-inoculation training reliably outperformed all other conditions. Subjects in the problem-solving condition improved more than either control group, and the desensitization group improved more than the no-treatment control group. These results provided evidence for the efficacy of stress-inoculation training in promoting exploratory and problem-solving behaviors. Desensitization and problem-solving conditions also contributed to specific treatment outcomes.

In their study of cognitive, behavioral, and stress-inoculation training treatments for test anxiety, Kaplan et al. (1979) recruited 17 women and 7 men and, within scheduling constraints, randomly assigned them to conditions. The cognitive condition explained the role of cognitions in anxiety and taught self-monitoring and three cognitive coping strategies: coping self-statements, self-instructions, and imagery rehearsal. The desensitization condition followed Meichenbaum's (1972) modifications: deep breathing and the use of coping imagery. Stress-inoculation training combined the separate treatments following Meichenbaum's Therapist Manual (1972b). In addition, subjects in all treatments received study skills training. Waiting list control subjects participated in assessment procedures. Training took place over 5 weeks in two 1-hour, biweekly, small group sessions.

Dependent measures were the Liebert-Morris Test Anxiety Scales (1967), a digit-symbol task, and self-reports of anxiety. Groups were not reliably different prior to treatment. Only the cognitive treatment demonstrated reliable improvement. Stress-inoculation training was less effective than the single cognitive condition. Results were interpreted as support for the contribution of the cognitive treatment components to the reduction of test anxiety.

Meichenbaum et al. (1976) evaluated therapies for speech anxiety. Volunteers, university students and community residents, were assessed for speech anxiety and, within constraints of sex composition and matching levels of speech anxiety, were assigned randomly to treatments. There were 35 men and 18 women in the study. An additional 15 low speech-anxious students, assessed on a Fear Survey similar to Geer (1965), provided normative data.

Nine conditions were developed from four treatments and a waiting list control. The treatments were: desensitization, cognitive ("insight"), stress-inoculation training, and discussion control. Two therapists lead a group in each of the four treatments. Desensitization included training in progressive relaxation, hierarchy construction, and imagery training and followed standard desensitization procedures (Paul & Shannon, 1966). The cognitive treatment explained the role of

cognitions in producing anxiety and taught self-monitoring skills; subjects learned coping self-statements and self-instructions that were incompatible with former cognitions and behaviors. In stress-inoculation training, subjects practiced cognitive skills during desensitization. The discussion control group talked about neutral topics. The waiting control group received pre-, post-, and follow-up assessments.

Data was obtained from behavioral and self-report dependent measures. Groups were equivalent on these measures prior to treatment. On behavioral and self-report measures for the posttest speech, the waiting control group was reliably less improved than all other groups. Subjects in the discussion and stress-inoculation training conditions were reliably less improved than the subjects in cognitive and desensitization conditions, who were similar to each other. On the cognitive and general self-report measures, desensitization, stress-inoculation training, and cognitive treatments were reliably more effective than control conditions. At 3-month follow-up, performance of the discussion group had deteriorated, and these subjects' scores were reliably lower than at pretest. Desensitization and cognitive subjects were reliably similar to the low speech-anxious students on all types of dependent measures. Post hoc comparison of treatment x subject anxiety revealed that

subjects with general anxiety improved more when they received a cognitive or stress-inoculation training treatment and that subjects with speech-specific anxiety made more improvement with the desensitization treatment. Single treatments were equally effective on all variables; stress-inoculation training, however, was less consistent in reducing speech anxiety. The researchers suggested that this treatment might be more effective if there had been more time to explore incompatible self-instructions.

The dismantling studies reviewed so far have investigated contributions of educational, cognitive, and behavioral components to treatment outcomes of stress-inoculation training. Coping self-statements and response acquisition contributed to treatment efficacy in Glass et al. (1976) and Valerio and Stone (1982). Studies investigating contributions of coping self-statements and relaxation components provided support for the superior performance of combined, stress-inoculation training treatments (Cooley & Spiegler, 1980; Novaco, 1976b) and also for constituent treatments (Girodo & Roehl, 1978). Studies of multiple cognitive strategies and relaxation components revealed that effective treatments frequently produced similar results (Holroyd & Andrasik, 1978; Schlichter & Horan, 1981). Studies of multiple cognitive strategies and desensitization components revealed contradictory trends: single treatments were generally superior (Kaplan et al., 1979; Meichenbaum et al., 1976), but in

Mendonca and Seiss (1976), stress-inoculation training was superior to effective single component treatments. Education components, teaching the role of cognitions and self-monitoring, and application components also contributed to treatment outcomes. Relaxation and cognitive strategy components were identified as "active ingredients." The role of coping self-statements remained unclear.

In vivo application studies. Five studies manipulated an application task. Horan et al. (1977) and Hackett et al. (1979) investigated the effects of repeated exposure to a stressor on both training and application tasks. Emmelkamp et al. (1978) used a crossover design to research the relative efficacy of a prolonged exposure treatment and a cognitive strategies treatment; when these two conditions were examined as a single condition, produced by the crossover design, a stress-inoculation training-like treatment emerged. In 1982, Emmelkamp and Mersch directly researched the efficacy of stress-inoculation training. Thyer et al. (1981) investigated contributions of in vivo applications to a cognitive-behavior package.

Horan et al. (1977) investigated four treatments for pain: (1) nonspecific, (2) coping strategies, (3) exposure, and (4) combined treatments. Subjects were 70 undergraduates, screened on the cold pressor task (Hines & Brown, 1932) and assigned to one of the four treatments or a no-treatment control. A

nonspecific treatment educated subjects about psychological dimensions of pain (Melzack, 1973). Cognitive and behavioral skills were added to the educational component in this coping skills treatment; these skills were the same as those in Hackett and Horan (1980). An exposure treatment consisted of six repetitions of the cold pressor task. A combined condition provided a stress-inoculation training treatment that included educational, rehearsal, and application components. In this condition, subjects were asked to self-instruct, relax, and use coping strategies during the final exposure to the cold pressor task. Training for all treatments took place in one session lasting from 75 to 120 minutes.

The cold pressor task (Hines & Brown, 1932) and the pressure algometer (Mersky & Spear, 1964) were analyzed for specific and generalization effects on measures of endurance, pain threshold, and self-reported discomfort. No reliable differences among groups were observed on pretreatment scores. Residual gain scores were calculated for each condition on each dependent measure. There were no reliable differences between the no-treatment and educational (nonspecific) conditions. The educational component, a necessary substructure for other components, had no effect on performance. There were reliable main effects on all measures for the coping treatment but none for the exposure condition. Stress-inoculation training produced

reliable changes on threshold and tolerance but not on self-report measures. There were no reliable effects on the generalization task. Repeated exposure decreased coping on the cold pressor task, but multiple exposures increased coping on the generalization task almost to statistical reliability on tolerance and threshold measures.

Hackett et al. (1979) manipulated the application component in order to improve generalizability of stress-inoculation training. From volunteer undergraduate students, 28 women were pretested on the cold pressor task, stratified on performance, and assigned randomly to conditions. Conditions manipulated the number of exposures to the cold pressor task. In all conditions, the women learned how cognitions affect pain. They were taught the same coping skills as in Horan et al. (1977). Unlike the Horan et al. study, the therapist in the Hackett et al. study modeled self-instructions to use coping skills in uncomfortable situations that had been identified by the women. Women in the no-exposure condition had a 3-minute practice using coping skills without exposure to a stressor. In the one-exposure condition, the women practiced using coping skills during a single exposure to the cold pressor task. In the six-exposure condition, the women were exposed to the cold pressor task after they rehearsed each coping skill. Training took place in a single individual session lasting between 90 and 120 minutes, depending upon

condition.

Data were analyzed from dependent measures on the cold pressor and pressor algometer tasks. There were no reliable group differences prior to training. Results favored the one-exposure condition over the no-exposure condition: a trend was observed on performances on the cold pressor task and reliable differences were observed on the pressure algometer task. No differences were found between the no-exposure and six-exposure conditions. The authors concluded that a brief exposure improved generalizability of stress-inoculation training but that no-exposure and multiple-exposure conditions appeared to lessen the efficacy of this treatment. The instructional training in use of coping skills was credited with treatment generalization.

Thyer et al. (1981) varied the in vivo component in their study of test anxiety. Subjects were 10 college students assigned randomly to two treatments: one with a distraction in vivo component, the other without. Both treatments consisted of behavioral and cognitive strategies and test-taking practice. Cognitive strategies included awareness of the role of cognitions, self-monitoring, and positive coping self-statements and imagery. Coping skills were applied to a test-related desensitization hierarchy. The in vivo component provided distraction-free test-taking practice or test-taking practice

amid tapes of distracting noises. Students in the distraction-coping condition were trained to apply coping strategies actively; as part of the application component, therapists modeled self-instructions that focused attention on test relevant tasks. Training took place in 10 1/2 hour sessions over 6 weeks.

Three self-report inventories, a motor task, and anagrams were dependent measures. There were no reliable differences between groups prior to treatment. Results demonstrated reliable decreases on all self-report measures of anxiety and on time to solve anagrams. Manual dexterity also was improved. No reliable group differences were observed. The authors speculated that the core treatment, without the distraction-coping component, was sufficient to reduce test anxiety. The experiment was not designed in such a way that contributions made by the distraction-in-vivo component could be identified.

Emmelkamp et al. (1978) used a crossover design to assess cognitive training with 20 hospitalized agoraphobics assigned randomly to treatments. Treatments were cognitive training and prolonged exposure. A combined treatment, produced by the crossover, approximated stress-inoculation training. The cognitive treatment included discussion of the role of cognitions, self-monitoring, and rehearsal of coping self-statements. Different coping self-statements were developed

for the four stages of dealing with a stressor. In prolonged exposure, subjects spent gradually increased time on their own in stressful situations. Training for each separate treatment took five 2-hour sessions; with crossover, total training time was 20 hours over 2 weeks.

Dependent measures were self-report, subject and observer ratings of anxiety, and the amount of time spent outside the hospital. Subjects were assessed before, at crossover, after training, and 1 month later. No reliable differences on any of the dependent measures were observed between groups prior to treatment. Subjects in the combined treatment (following crossover) showed reliable improvement on almost all variables; however, subjects in the exposure condition demonstrated the greatest improvement. The cognitive treatment demonstrated change on only a few measures, while the exposure treatment, as first or second treatment, demonstrated reliable improvement on 13 of 15 and 11 of 15 variables, respectively. Comparisons of the outcome data for first treatments showed that the exposure treatment produced greater improvement than did the cognitive treatment. The authors reported that subjects had difficulty incorporating cognitive training into *in vivo* training. They suggested that one explanation for the poor results of the cognitive treatment may have been the physiological arousal experienced by clinical phobics. Such arousal may be quite

different from that experienced by subjects in analogue studies.

Emmelkamp and Mersch (1982) extended the 1978 study to include a stress-inoculation training treatment and to emphasize the role of cognitions in anxiety. Subjects were selected from agoraphobics, 22 women and 5 men, who met selection criteria. They were assigned randomly to treatments: *in vivo* exposure, cognitive strategies, and stress-inoculation training. The *in vivo* treatment was similar to that implemented in 1978; the treatment rationale explained the influence of cognitions on avoidance behavior. The cognitive treatment extended the 1978 treatment: (1) teaching the role of cognitions, (2) teaching self-monitoring, (3) developing coping self-statements, (4) teaching self-instructions in preparation for a stressor, and (5) cognitive rehearsal of coping skills using imagery. The unproductiveness of negative cognitions was emphasized in this treatment. Stress-inoculation training combined components from *in vivo* exposure and cognitive treatments, but unproductive cognitions were not treated directly. Subjects in this condition practiced using coping skills during *in vivo* exposure. Training took place in eight 2-hour group sessions.

Dependent measures were similar to those used in the 1978 study. At posttest, subjects in the *in vivo* condition made reliable improvement on an overwhelming majority of measures. Subjects in the stress-inoculation training condition

demonstrated reliable improvement on many measures; however, phobic and most avoidance scale ratings by assessors did not reflect the improvement that these subjects had reported on self-ratings. Subjects in the cognitive condition showed improvement on some phobic and avoidance scales and on two out of four self-reports. At posttest, exposure and stress-inoculation training treatments were reliably superior to the cognitive treatment but did not differ from each other. At a 1-month follow-up, all treatments were reliably similar to each other. The cognitive subjects had improved on most phobic and one avoidance scales. Subjects in the in vivo condition generally had maintained their improvement but had deteriorated on two phobic scales. There was little change noted for stress-inoculation training subjects. The cognitive treatment did not enhance the in vivo condition, and stress-inoculation training was no more effective than the in vivo treatment. However, the cognitive treatment demonstrated generalization effects. This result encouraged the researchers to call for further study of this effect. The authors noted that a longer training period improved the efficacy of the cognitive treatment. If, as the authors suggested, insight into unproductive thoughts might be a more appropriate treatment component for agoraphobics than self-instructions, then the lack of this insight component in the stress-inoculation training condition may have adversely

influenced its efficacy.

In summary, the studies by Emmelkamp et al. (1978), Emmelkamp and Mersch (1982), and Hackett et al. (1979) suggested that exposure may be an effective treatment component. Hackett et al.'s conclusions supported Meichenbaum's conceptualization of the application component as exposure to a stressful situation in which coping skills can be applied and strengthened. The contributions of stress-inoculation training, coping procedures, and cognitive components to treatment outcomes remained unclear.

Conclusion. The stress-inoculation training studies reviewed in this dismantling section did not provide results that led to easily summarized conclusions as did the self-instructional training studies. Nevertheless, observations can be made of (1) ways in which the treatment components were implemented, (2) components of effective treatments, and (3) of components in effective and ineffective treatments. From information about implementation, frequencies, and proportions of stress-inoculation training components in effective treatments, it may be possible to formulate hypotheses about the contributions of individual components to stress-inoculation training.

A majority of the dismantling studies focused on training coping skills and strategies, while five studies (Emmelkamp et al., 1978; Emmelkamp & Mersch, 1982; Hackett et al., 1979; Horan

et al., 1977; Thyer et al., 1981) examined *in vivo* application of coping skills. The dismantling studies seldom employed the full complement of treatment components. Table 1 displays the implementation of treatment components for each dismantling study.

Table 1 illustrates how researchers implemented the seven components described by Meichenbaum (1977a). Understanding how components were implemented provides a basis for determining effectiveness both of individual components and of the entire stress-inoculation training package, as conceptualized by Meichenbaum. Some components were implemented according to Meichenbaum's descriptions, while others were varied or implemented in part.

Experimental treatments generally were more effective than control conditions. In a few studies, some treatments were superior to other effective treatments. Only three of these eight superior treatments were stress-inoculation training treatments. In three cases, other treatments were superior to stress-inoculation training. In two other instances, stress-inoculation training treatments and other treatments were statistically similar, and both were superior to other treatments employed in the experiments.

Several studies provided evidence of multiple effective treatments. In Hackett and Horan (1980), a relaxation treatment

Table 1

Implementation of Components in Stress-Inoculation Training

AUTHOR TREATMENTS	ROLE OF CONDITIONS	SELF-MONITOR	PROBLEM SOLVING	MODELING OF COGNITIVE STRATEGIES	MODELING OF S-INSTRUCT.	BEHAVIOR STRATEGIES	IN-VIVO APPLICATION WITH SELF-INSTRUCTIONAL TRAINING
Almeyer + 1. cognitive 1. relaxation 4. control	yes yes yes	yes yes		(coping s-s) (coping s-s + imagery)		relax. + breathe relax. + breathe	
Cooler/Singer 1. cognitive 1. relaxation 4. attention control	yes yes yes	yes yes			S-instruct. S-instruct.	relaxation relaxation	
Emmelkamp + 1. cognitive 1. combined (1&2) 2. relaxation	yes yes yes	yes yes		(coping s-s) (coping s-s)	(S-instruct) (S-instruct)		[exposure] [exposure]
Emmelkamp + 1. cognitive 1. combined (1&2) 2. relaxation 3. combined (1&2) 4. control	yes yes yes yes	yes yes	Information Information	(coping s-s) (coping s-s)	(S-instruct) (S-instruct)	breathing breathing	(exposure) [exposure + coping s-s]
Glass + 1. relaxation acquire 1. coping (1&2) 1. combined (1&2) 2. enhanced (1&2) 4. waiting control	yes yes	yes yes		coping s-s coping s-s coping s-s		modeled response modeled response modeled response	
Glass + 1. relaxation 1. cognitive 1. combined (1&2) 4. waiting control	yes yes	yes yes		(coping s-s)	(S-instruct) (S-instruct)		
Mackett/Worlan 1. relaxation 1. cognitive 4. combined (1&2) 2. combined (1&2) 7. combined (1&2) 4. control	yes yes yes yes yes yes			(imagery strategies) (coping s-s) (imagery strategies) (coping s-s) (coping s-s + imagery)	(S-instruct) (S-instruct) (S-instruct) (S-instruct)	relaxation relaxation relaxation relaxation	[exposure] [exposure] [exposure] [exposure] [exposure] [exposure]
Mackett + 1. no exposure 1. six exposures 1. relaxation 1. relaxation 1. relaxation 1. discussion	yes yes yes yes	yes yes		{ coping strategies { coping strategies { coping strategies	(S-instruct) (S-instruct) (S-instruct)	relaxation relaxation relaxation	[coping mode] + exposure [coping mode] + exposure [coping mode] + exposure

Author	Year	Sample	Intervention	Control	Outcome	Notes
Moran	1971	1. non-specific exposure 2. coping skills 3. control	1. coping strategies 2. coping strategies	1. (s-instruct) 2. (s-instruct)	relaxation relaxation	(exposure) (coping + exposure)
Russian/Levine	1971	1. generalization 2. combined (1,2) 3. waiting control	(coping s-s) (coping s-s)	(s-instruct) (s-instruct)	relaxation relaxation	
Kaplan	1971	1. cognitive 2. generalization 3. waiting control	(coping s-s & imagery) (coping imagery) (coping s-s + imagery)	(s-instruct) (s-instruct)	relax. & breathe relax. & breathe	
Levine	1971	1. generalization 2. combined (1,2) 3. waiting control	(imagery) (imagery + coping s-s)	(s-instruct) (s-instruct)	relaxation relaxation	
Levine	1971	1. generalization 2. combined (1,2) 3. waiting control	(coping imagery) (coping imagery)	(s-instruct) (s-instruct)	relaxation relaxation	
Schlichter/Moran	1971	1. cognitive 2. combined (1,2) 3. attention control	(coping s-s) (coping s-s)	s-instruct. s-instruct.	relaxation relaxation	
Thyer	1971	1. cognitive 2. core + attract. 3. behavior	imagery + (other)	s-instruct.	relaxation relaxation	
Worthington/Thyer	1971	1. cognitive 2. combined (1,2) 3. waiting control 4. waiting control 5. educational 6. combined (1,2) 7. combined (1,2,3) 8. control	(coping imagery + s-s) (coping imagery + s-s) (coping s-s) (imagery) (coping s-s) (imagery + coping s-s) (imagery + coping s-s) (imagery + coping s-s)	(s-instruct) (s-instruct) s-instruct. s-instruct.	relax. + biofeedback relax. + biofeedback assertive responses assertive responses	(cog. model) + practice

** = superior effective treatment
 + = stress-inoculation training
 - = distraction
 - = negative
 s-s = self-statement(s)
 () = only that part of the component specified within brackets was implemented

increased pain tolerance, while cognitive strategies increased pain threshold. Other studies (Altmaier et al., 1982; Mendonca & Seiss, 1976; Schlichter & Horan, 1981; Valerio & Stone, 1982) demonstrated outcomes in which one treatment was more effective on a certain measure while another treatment was more effective on another measure. When there are multiple effective treatments, treatment objectives may determine which of several effective treatment components will be used.

Rehearsal and educational components were implemented quite consistently, while the in vivo component was implemented infrequently. In the rehearsal components, certain cognitive, behavioral, and combined cognitive-behavioral strategies were repeated regularly in effective treatments. The most common strategies were imagery, coping self-statements, self-instructions, and relaxation. Combinations of cognitive and behavioral strategies were evident. The dismantling research indicated that effective treatments might contain several constituent components, in either cognitive or cognitive-behavioral combinations. Only rarely was a single coping strategy the only component included in an effective treatment. Thus, the research suggested that combinations of coping strategies are potential contributors to treatment efficacy.

Educational components were implemented in all studies

except for Glass et al. (1976). Treatment rationales for at least one condition were provided in all but three of the remaining studies (Cooley & Spiegler, 1980; Novaco, 1976b; Schlitcher & Horan, 1981); subjects in these three studies were trained to monitor their cognitions. The dismantling research supported Meichenbaum's emphasis on educational components in stress-inoculation training. In contrast, only a few *in vivo* application components were implemented. Most researchers did not distinguish between rehearsal and application of newly-learned skills to stressful situations as suggested by Meichenbaum, and *in vivo* components seldom employed a series of gradually increasing stressors.

Table I illustrates how treatment components were implemented and suggests which components are more likely to contribute to effective treatments. Experimental treatments were more effective than control conditions but were often statistically similar to each other. Superior effective treatments showed no pattern of component contributions to treatment outcomes. Researchers generally manipulated cognitive, behavioral, and educational components. These components appear to be the more likely contributors to treatment efficacy.

Some researchers identified those components in their studies that contributed to treatment efficacy. Table 2 records treatment outcomes and those "active ingredients" as identified

Table 2

Effective Components and "Active Ingredients"
in Stress-Inoculation Training Dismantling Studies

AUTHOR TREATMENTS	EFFECTIVE TREATMENTS	ACTIVE INGREDIENTS	AUTHOR TREATMENTS	EFFECTIVE TREATMENTS	ACTIVE INGREDIENTS
Altmaier + 1. cognitive* 2. relaxation* 3. STINT* 4. control	1=2>3>4 3> cognitive anxiety 1,2,3 physical anxiety		Horan + 1. non-specific 2. exposure 3. coping skills* 4. STINT (2&3)* 5. control	3>1,2 4>1,2	coping strategies
Coolley/Spiegler 1. cognitive* 2. relaxation 3. combined (1&2)* 4. attention control	1,3>2,4 self-report	cognitive coping	Russian/Lawrence 1. general STINT* 2. specific STINT* 3. discuss. control 4. waiting control	2=1>3,4	specific s-s
Emmelkamp + 1. cognitive 2. exposure** 3. combined (1&2)*	2>1,3	exposure	Kaplan + 1. cognitive** 2. desensitization* 3. combined (1&2)* 4. waiting control	1>3=2>4	cognitive component
Emmelkamp/Mersch 1. exposure* 2. cognitive* 3. combined (1&2)*	1,3>2 posttest 1=2=3 follow-up		Meichenbaum + 1. desensitization** 2. cognitive** 3. combined (1&2)* 4. discuss. control 5. waiting control	1=2>3=4>5 posttest 1=2>3>4,5 follow-up	
Girodo/Roehl 1. info* 2. self-talk* 3. combined (1&2)* 4. control	1=2=3=4 flying 1,3>2,4 unexpected 1=2=3>4 follow-up		Mendonca/Seiss 1. desensitization** 2. problem solving* 3. combined (1&2)** 4. placebo control 5. control	3>1,2,4,5 all measures 2>4,5 problem solving 1>2,4 exploratory behavior	
Glass + 1. response acquire 2. coping s-s* 3. combined (1&2)* 4. enhanced #1 5. enhanced #2* 6. waiting control	1,3,4>2,5>6 trained 2,5>1,3,4,6 phone 1=2=3=4>6 follow-up		Novaco 1. cognitive** 2. relaxation* 3. combined (1&2)** 4. attention control	1=3>4	
Glogover + 1. extinction 2. neg. s-s 3. cope s-s* 4. combined (2&3)* 5. waiting control	3=4>1,2,5 3>5 4>1,2,5	coping s-s	Schlichter/Horan 1. STINT* 2. elements* 3. control	1=2>3 self-report 1>3 role-play	
Hackett/Boran 1. relaxation** 2. cognitive strat.* 3. cope s-s 4. combined (1&2)* 5. combined (1&3)* 6. combined (2&3) 7. combined (1,2&3)* 8. no coping 9. control	1,4,5,7> others on tolerance 2>6=3=8=9 on threshold 8>9	relaxation	Thyer + 1. cognitive core* 2. core + distract.*	, 1=2	
Hackett + 1. no exposure 2. one exposure* 3. six exposures	2>1=3 tolerance		Valerio/Stone 1. behavior* 2. cognitive* 3. combined (1&2)* 4. waiting control	1,2,3>4 most measures 1>2 role-play 3,2>1,4 positive s-s	
Holroyd/Andrasik 1. cognitive* 2. combined* 3. discussion* 4. control	1=2=3>4 headaches	self-monitor coping strategies	Worthington/Shumate 1. imagery** 2. educational* 3. coping s-s 4. combined (1&2)* 5. combined (1&3)* 6. combined (2&3)* 7. combined (1,2&3)* 8. control	1,4,5,7>2,3,6,8 on tolerance 2=6>3	imagery

by researchers.

Less than half of the studies identified "active ingredients" in stress-inoculation training, and they frequently noted that further research was needed to tease out the contributions of components to stress-inoculation training. The cognitive coping strategies component was identified as an "active ingredient" six times, and self-instructions, behavioral coping strategies, self-monitoring, and *in vivo* application components were identified once each as contributors to the efficacy of stress-inoculation training.

In addition to identification of "active ingredients," three relevant observations were made. Horan et al. (1977) identified the educational rationale as a necessary but insufficient component in stress-inoculation training. Hackett et al. (1979) hypothesized that modeling of coping skills in the application component enhanced treatment generalization. On the other hand, Thyer et al. (1981) found that an *in vivo* application of coping skills in a stressful situation did not enhance test-taking performance more than did practice of the same coping skills in a stress-reduced environment.

Analysis of component frequencies may illuminate component contributions to treatment outcomes. Figure 3 shows the frequencies of implementation of each stress-inoculation training component across the reviewed studies.

Single Component	Frequency
1: Teaching the Role of Cognitions	37
2: Self-monitoring	25
3: Problem Solving	4
4: Modeling of Cognitive Strategies	44
5: Modeling of Self-instructions	27
6: Behavior Strategies	30
7: In_Vivo Application	12
Combined Components	Frequency
1 & 4: Teaching the Role of Cognitions and Modeling of Cognitive Strategies	33
1, 4, & 6: Teaching the Role of Cognitions, Modeling of Cognitive Strategies, and Behavior Strategies	21
1, 4, & 5: Teaching the Role of Cognitions, Modeling of Cognitive Strategies, and Self-instructions	21
1, 4, & 2: Teaching the Role of Cognitions, Modeling of Cognitive Strategies, and Self-monitoring	18

Figure 3. Frequencies of components in effective treatments.

Figure 3 demonstrates that cognitive strategies were implemented frequently in combinations. In Component 4, cognitive strategies included imagery and coping self-statements. The combined components of teaching the role of cognitions and modeling of cognitive strategies appeared as a core configuration to which other components were added. This core configuration frequently was augmented by self-instructions and/or behavior strategies components. Sole components occurred only rarely in an effective treatment. Examination of the superior effective treatments revealed that the cognitive strategies component was

implemented in seven out of eight superior treatments and the self-instructions component occurred in combination with the core configuration components six times. These data strongly suggest that the two components, teaching the role of cognitions and cognitive strategies, form a core configuration which contributes to treatment outcomes in effective treatments.

Relative contributions of components in stress-inoculation training may be inferred from proportions of their implementation in or absence from effective treatments. Table 3 summarizes information about the presence or absence of components in effective and ineffective treatments. Questionable implementations have been excluded from the table.

Teaching the role of cognitions and the modeling of cognitive strategies components both appear to contribute to the efficacy of stress-inoculation training. Their ratios for presence vs. absence were 37:13 and 44:12, respectively, and their implementation ratios in effective vs. ineffective treatments was 37:9 and 44:6, respectively. These components were present in effective treatments 74% and 79% of the time, respectively, and were almost three and four times as likely to be present in, than absent from, these treatments. These data suggest that these components contribute strongly to treatment efficacy.

Table 3
 Proportions and Ratios of Components
 in Effective and Ineffective Treatments

Proportions of Presence and Absence of Components in Effective and Ineffective Treatments

Components:	all components								superior components							
	1	2	3	4	5	6	7		1	2	3	4	5	6	7	
present	37 (78%)	25 (45%)	4 (8%)	44 (79%)	27 (49%)	30 (54%)	12 (21%)		5 (8%)	5 (43%)	1 (13%)	7 (88%)	6 (75%)	4 (100%)	1 (13%)	
effective	50*	55	52*	44	56	56	56		6*	8	8	8	8	4*	8	
absent	11 (26%)	31 (55%)	48 (92%)	12 (21%)	29 (52%)	26 (46%)	44 (79%)		1 (17%)	3 (78%)	7 (88%)	1 (13%)	2 (25%)	4 (100%)	7 (88%)	
effective	50*	56	52*	56	56	56	56		6*	8	8	8	8	4*	8	
present	9 (28%)	3 (9%)	8 (24%)	6 (18%)	5 (15%)	5 (15%)	5 (15%)									
ineffective	32*	32*	33	33	33	33	33									
absent	23 (72%)	29 (91%)	31 (100%)	27 (82%)	28 (85%)	28 (85%)	28 (85%)									
ineffective	32*	32*	33	33	33	33	33									

Ratio of Component Efficacy and Presence

	all components								superior components							
	1	2	3	4	5	6	7		1	2	3	4	5	6	7	
effective vs ineffective	37:50 (4.11%)	25:55 (8.33%)	4:52 (5%)	44:56 (7.33%)	27:56 (5.40%)	30:56 (6.00%)	12:56 (2.40%)		5:6 (5.8%)	5:8 (1.87%)	1:8 (1.2%)	7:8 (7.8%)	6:8 (3.6%)	4:4 (1.6%)	1:8 (1.2%)	
present vs absent	37:11 (2.85%)	25:31 (8.1%)	4:48 (8%)	44:12 (3.67%)	27:29 (9.3%)	30:26 (1.15%)	12:44 (2.7%)		5:1 (5.8%)	5:3 (1.67%)	1:7 (1.4%)	7:1 (7.8%)	6:2 (3.6%)	4:4 (1.6%)	1:7 (1.4%)	

* = frequency reduced by uncertain implementation

Component 1: teaching the role of cognitions
 Component 2: self-monitoring
 Component 3: problem solving
 Component 4: modeling of cognitive strategies

Component 5: modeling of self-instructions
 Component 6: behavior strategies
 Component 7: in vivo application

1 of 2

2 of 2

Contributions of the self-instructions, self-monitoring, and behavior strategies components are less clear. These three components had ratios of presence vs. absence of 27:29, 25:31, and 30:26, respectively, and implementation ratios in effective vs. ineffective treatments of 27:5, 25:3, and 30:5, respectively. These data suggest that these components may contribute to effective treatments but that their contributions are not sole determining factors in treatment efficacy.

It was not possible to draw conclusions about the contributions of problem-solving and *in vivo* application components because of their low frequency of inclusion in treatments in the studies reviewed. Contributions made by these components must be investigated further.

In summary, contributions of components in stress-inoculation training to treatment outcomes have been difficult to determine. Only tentative hypotheses have been advanced. The studies provided evidence that the combined components of modeling of cognitive strategies and teaching the role of cognitions contributed to the efficacy of stress-inoculation training. However, this hypothesis needs to address the relatively high frequency of the latter component in ineffective treatments. Contributions of self-instructions, behavior strategies, and self-monitoring components are less clear. Although these components were much more frequently

implemented in effective than in ineffective treatments, their absence did not affect adversely the effectiveness of treatments in which they were not present. These hypotheses are supported by identified "active ingredients" (see Table 2). Nevertheless, lack of systematic implementation of stress-inoculation training components and the tentative nature of hypotheses about the contributions of specific components necessitate continued investigation into the content and contributions of all components of stress-inoculation training.

Conclusion: General Effectiveness and Dismantling Studies

Chapter III has reviewed general effectiveness and dismantling studies. General effectiveness studies compare a specific treatment to a no-treatment control in order to determine whether the experimental treatment can produce a statistically reliable effect. Dismantling studies examine treatment components to determine the contributions of each component to treatment outcomes. This type of study attempts to identify the "active ingredients" in effective treatments. Data from general effectiveness studies supported the effectiveness of both self-instructional training and stress-inoculation training procedures. Both procedures were more effective than no-treatment controls. The self-instructional training studies demonstrated effectiveness across a variety of subject and problem variables. Although

there was only one stress-inoculation training study, the general effectiveness research was encouraging.

Dismantling studies of self-instructional training investigated contributions of the cognitive modeling and rehearsal components. The research suggested that cognitive modeling is a necessary but insufficient component in this training procedure. Cognitive modeling must be accompanied by the rehearsal component, containing overt to covert rehearsal of self-instructions. The studies reviewed supported self-instructional training as conceptualized by Meichenbaum and Goodman (1971). Although each experiment investigated different aspects of a component, the consensus of research was that these dismantling studies provided evidence for the contributions of both components and additional support for the general effectiveness of self-instructional training.

Data from stress-inoculation training dismantling studies were more complex, because of the number of treatment components and the ways in which components were implemented. Hypotheses about the contributions of the seven components were formulated. Insufficient data was available to analyze contributions of the problem-solving and in vivo application components. The remaining five components appeared to contribute to successful treatment outcomes. Two components, teaching the role of cognitions and modeling of cognitive strategies, formed a

core configuration of components that appeared to contribute the most strongly and consistently to effective outcomes of stress-inoculation training. Self-instructions, behavior strategies, and self-monitoring components also appeared to be present in many effective treatments, but it was unclear if their contributions enhanced treatment effectiveness.

The hypotheses formulated about the contributions of components of stress-inoculation training should serve as departure points for further research. Because components were implemented on the basis of researchers' specific interests, the reviewed research did not clarify use of components of stress-inoculation training as defined by Meichenbaum (1977a). In planning further research, attention needs to be focused not only on all the components but also on the cognitive modeling procedures used in training cognitive strategies and self-instructions, and on the complete in vivo application component, including the self-instructional training procedure.

Notwithstanding the tentative and inconclusive data from the research from stress-inoculation training studies, the results from the general effectiveness and dismantling studies are generally supportive of both self-instructional training and stress-inoculation training. The next chapter reviews studies that investigate the relative efficacy of these two training

procedures against other potentially effective treatments.

**CHAPTER IV: FUNCTIONAL ANALYSIS OF SELF-INSTRUCTIONAL TRAINING
AND STRESS-INOCULATION TRAINING: PART II**

Comparative Outcome Studies

This chapter continues the functional analysis of self-instructional training and stress-inoculation training by focusing on comparative outcome studies. These studies examine the efficacy of treatments incorporating self-instructional training and stress-inoculation training by comparing the treatment outcomes of these experimental conditions to those of other treatments commonly used in a particular situation.

Self-Instructional Training Studies

This section examines comparative outcome studies in which the efficacy of self-instructional training is compared to that of other treatments. These studies may be grouped broadly into studies examining changes in self-control and those examining changes in cognitive performance of tasks. These cognitive tasks are similar to those learned in school. Self-control studies are discussed in terms of treatment conditions: self-instructional training compared to contingency awareness (Snyder & White, 1979); self-instructional training augmented with response cost contingencies compared to other treatments (Arnold & Forehand, 1978; Kendall, 1982; Kendall & Zupan, 1981); and self-instructional training with and without response cost contingencies compared to medical treatments (Bugental, Collins,

Collins & Chaney, 1978; Bugental, Whalen & Henker, 1977; Yellin, Kendall & Greenberg, 1981). Studies investigating the differential efficacy of self-instructional training on cognitive or school-related tasks also are discussed in terms of treatment conditions: self-instructional training augmented by other treatment components compared to the same components without self-instructional training (Genshaft, 1982; Genshaft & Hirt, 1980; Robin, Armel, & O'Leary, 1975) and self-instructional training alone compared to other treatments (Asarnow & Meichenbaum, 1979; Guralnick, 1976).

Self-control studies. Snyder and White (1979) tested the efficacy of self-instructional training in treating aggressive, institutionalized adolescents. Selection of 15 subjects, aged 14-17, was based on minimal improvement in an operant behavior modification program. Treatment conditions were (1) self-instructional training, (2) contingency awareness, and (3) assessment control. Self-instructional training, modeled on Meichenbaum and Goodman (1971), was augmented with coping self-statements and rehearsal of self-instructions using role-play and covert imagery techniques. A contingency awareness group discussed and explored behavioral contingencies at the institution. An assessment control group received only pre- and posttests. The institution already was following an operant behavior modification program; experimental training ran

concurrently with this program. Dependent measures were impulsive behaviors, school absences, and adherence to social/self-care responsibilities.

Data were analyzed by ANOVA's and post hoc comparisons. Changes in impulsive behaviors, in school absences, and social/self-care tasks were revealed by statistically reliable trials and trials x treatment interaction effects. Trained children had reliably fewer impulsive behaviors at posttest and follow-up. They missed fewer classes than children in other conditions. They demonstrated fewer failures to fulfill their self-care and social responsibilities at posttest and follow-up. In short, self-instructional training was found to be effective in modifying behaviors of adolescents. Behavior changes were maintained and strengthened at follow-up. These results, although encouraging, were interpreted cautiously because (1) the authors served as therapists and (2) no formal reliability data for dependent measures was reported.

Several studies have used treatments that combine self-instructional training with other treatment components in order to produce more effective treatments. Kendall and Zupan (1981, p. 344) cite research (Kendall, 1977; Kendall & Finch, 1979; Kendall & Wilcox, 1980) that supports an integration of cognitive training and behavioral contingency management. Response cost contingencies were added to self-instructional

training in the following studies: Arnold and Forehand, 1978; Kendall, 1982; Kendall and Zupan, 1981; and Yellin et al., 1981. Arnold and Forehand (1978) compared self-instructional training, self-instructional training combined with response cost contingency, response cost contingency, and a control condition in their study of preschoolers' self-control. Kendall and Zupan (1981) and Kendall (1982) compared self-instructional training combined with response cost in individual and group treatments to each other and to a nonspecific control treatment. Yellin et al. (1981) compared self-instructional training with response cost contingency with a medical intervention. (This study will be discussed with studies comparing self-instructional training to medical treatments.)

Arnold and Forehand (1978) investigated preschoolers' self-control using self-instructional training, response cost contingency, combined self-instructional training with response cost contingency, and control conditions. Self-instructional training was similar to that employed by Meichenbaum and Goodman (1971). In the response cost condition, tasks were modeled and children were asked to perform them. Feedback on performance was given. Response cost contingency was applied at posttest and follow-up: children were given pennies and told that they would lose one for each error made. Children in the combined condition, self-instructional training with response cost

contingency, were trained following the self-instructional training paradigm; response cost contingency was implemented at posttest and follow-up. The control condition involved modeling, trials, and performance feedback in the same manner as in the response cost condition; however, a response cost contingency was not implemented. Subjects were selected by scores on the Kansas Reflection-Impulsivity Scale for Preschoolers [KRISP] (Wright, 1973). Treatment assignments were designed to equate age, sex, and race in a randomized procedure. Training took place in five 20-30 minute sessions over 2 weeks.

The KRISP and a classroom matching task were dependent measures. Analysis of KRISP data revealed a statistically reliable reduction in errors from pre- to posttest and from pre- to follow-up for all of the children. On the classroom measure, cognitively trained groups had reliably lower mean scores at posttest and follow-up. These results demonstrated an ability of the children in the self-instructional training condition to transfer learning to a setting different from the one in which training took place. The researchers suggested that reduction of errors across all treatments may have resulted from instructions, practice, and feedback. These procedures were common to all treatment conditions.

Kendall and Zupan (1981) compared two treatments having self-instructional training with response cost contingency

conditions to a nonspecific treatment in their investigation of self-control behaviors. Kendall (1982) reported 1-year follow-up data for this study. Referrals for the 30 elementary children, mean age 9 years 9 months, were based on self-control problems in academic and social classroom situations. Children were assigned to individual or group cognitive-behavior treatments or to a control group. Both cognitive-behavior therapies included self-instructional training and response cost contingencies. The nonspecific group did not receive self-instructional training. Tasks, instructions, and performance feedback were similar for children in all conditions. Training took place in 12, 45-55 minute sessions over 6 weeks. Individually trained children completed more tasks than did children in group conditions.

Dependent measures included performance measures, cognitive measures, rating scales, and self-control behavior norms developed from 100 children randomly selected from participating schools. No statistically reliable differences existed prior to treatment. "Blind" teacher ratings revealed statistically reliable effects for groups, periods, and group x periods interactions. Children in group and individual cognitive-behavior conditions improved reliably more than those in the nonspecific group; however, there were no statistically reliable differences between cognitive-behavior training conditions. Performance measures revealed statistically reliable

differences for periods; children in all treatment conditions improved independently of treatments. Therapist ratings (not "blind") suggested that children in the cognitive-behavior group improved more than individually trained children and that cognitively trained children improved more than control groups. Comparing pre- to posttest subject data with the normative data, it was found that children in the cognitive-behavior conditions had become more like their peers that had not been referred.

Two follow-up assessments were performed, the first, 2 months following treatment, and the second, a year later. At 2 months, teacher ratings demonstrated that statistically reliable improvement had been maintained independent of treatment conditions. Some dependent measures now could be differentiated between groups. On Matching Familiar Figures (Kagan, 1966), latency scores were no longer statistically reliable, but error scores revealed maintenance of improvement. Decreased latency and error scores suggested that the children had established fast and accurate performance on this measure. On a role-taking task (Chandler, 1973), children in the cognitive condition demonstrated reliably greater improvement at follow-up than did children in the control group. Therapist ratings for attention, interest, and following directions correlated positively with these performance measures.

Kendall (1982) followed-up 23 (77%) children from the

previous study. This smaller group was not reliably different from the original experimental group on any of the dependent measures employed in the original study. Dependent measures included performance tasks, rating scales, and structured interviews. Posttreatment gains were maintained at the 1-year follow-up assessment. Teacher ratings indicated that children in the cognitive-behavior groups were not reliably different from their peers. A Self-control Rating Scale (Kendall & Wilcox, 1979) revealed reliable differences between children trained individually in the cognitive-behavior condition and those in the nonspecific treatment condition. The Conners' Teacher Rating Scale (1969) revealed similar differences between children in the cognitive group and those in the nonspecific treatment group. Latency and error scores from Matching Familiar Figures at posttest and 1-year follow-up revealed no group differences. The improvement noted for all groups on these scores was attributed to maturational development. Performance measures revealed that reliable differences between pretest and posttest scores were no longer reliable at 1-year follow-up. Interview data indicated that children trained individually recalled details of treatment better than did children trained in the group. These results demonstrated maintenance of treatment effects using a cognitive-behavior approach. The individual application of this treatment was supported by interview information.

The effectiveness of self-instructional training as a treatment for hyperactivity has been compared to medical--methylphenidate--treatments. Yellin et al. (1981) combined self-instructional training with response cost contingency. Bugental et al. (1977, 1978) compared the relative efficacies of self-instructional training and contingent social reinforcement, both treatments being given to medicated and nonmedicated children.

Yellin et al. (1981) compared two groups of boys, five per group, referred to psychiatric or psychological services for hyperactivity. Mean age was 10 years 2 months. The boys were matched for level of hyperactivity and age. Medical procedures were followed for administration and maintenance of methylphenidate treatment; treatment was continued through follow-up. Cognitive treatment included self-instructional training, response cost contingencies for errors, and social reinforcement for self-instructing. Cognitive training took place in 12, 45-55 minute sessions over 6 weeks. Dependent measures were Conners' Parent-Teacher Questionnaire (1973) and a Self-control Rating Scale (Kendall & Wilcox, 1979). Analysis of data revealed statistically reliable effects for periods; both groups improved, but treatment outcomes were not different between groups. These results need to be interpreted cautiously, but they suggest that cognitive-behavior training may be an

alternative to medical treatment for hyperactive children.

Bugental et al. (1977, 1978) investigated the extent to which hyperactive children's causal attributions are related to differential treatment effectiveness. Medicated children were selected first; then hyperactive children were selected using Conners' Teacher Rating Scale (1969). Children were assigned randomly to two treatments: a self-instructional training condition and a contingent social reinforcement condition; each treatment condition contained both medicated and nonmedicated children. Training took place twice weekly in 1-hour sessions over 8 weeks.

Dependent measures were errors in style and strategy from the Porteus Maze (1942), the Abbreviated Teacher Rating Scale (Conners, 1973), and a structured interview designed to elicit the children's attributions of successful achievements. Children were defined as having high locus of control if they attributed good grades to personal efforts and low locus of control if they attributed good grades to luck, teacher whim, or other environmental factors. Analysis of covariance was used to analyze the data. On the Porteus Maze, children in the cognitive treatment demonstrated greater improvement if (a) they had high locus of control and/or (b) were nonmedicated. Scores of children in the social reinforcement condition revealed a trend toward improvement for those children who had low locus of

control and/or were medicated. Statistically reliable main effects for medication and a medication x treatment interaction indicated that a superior treatment for the nonmedicated children was self-instructional training, while a superior treatment for medicated children was social reinforcement. There was no reliable difference in short term gains between treatments. No differences were observed in teacher ratings. Because interactions between the children's attributions and assumptions about a particular treatment were more evident in the self-instructional training treatment than in social reinforcement treatment, these interactions need to be considered in cognitive interventions.

Bugental et al. (1978) followed-up 20 children from the previous study 6 months after treatment. Using the same dependent measures and statistical analyses, reliable main effects were found for treatments. Children in the self-instructional training condition evaluated their performance to be due to their own efforts more frequently than did children in the social reinforcement condition. A trend toward attributing performance to environmental factors was noted for medicated children. Statistically reliable treatment effects were observed on teacher ratings. Children in the social reinforcement condition were rated as less hyperactive than children in the self-instructional training condition.

Results from the Bugental et al. (1977, 1978) studies did not indicate which of the treatments employed was the more effective. The authors suggested that a sequential combination of these treatments, social reinforcement followed by self-instructional training, might prove beneficial. Social reinforcement demonstrated long-term advantage on teacher ratings, and it may be that this treatment may produce more visible behavior change. Interestingly, data indicated that the children trained in self-instructional training perceived themselves as more self-controlled. The medication status x treatment interaction effect, significant at posttest, now indicated only a trend in this direction.

Cognitive performance studies. The following self-instructional training studies investigated modification of cognitive behaviors that promote or interfere with academic performance. In some of these studies self-instructional training has been compared directly to other treatments (Asarnow & Meichenbaum, 1979; Guralnick, 1976). In other studies, self-instructional training has been augmented with tutoring (Genshaft, 1982; Genshaft & Hirt, 1980) and with feedback and social reinforcement (Robin, Armel, & O'Leary, 1975).

Guralnick (1976) investigated the relative efficacy of various instructional methods in teaching problem-solving behaviors to educable mentally-retarded children. Thirty-two

educable mentally-retarded children, mean chronological age of 11.1 years and mean IQ of 63.2 (Peabody Picture Vocabulary Test, Dunn, 1965), were selected on ability to match-to-sample. They were assigned randomly to one of four conditions: self-instructional training, modeling, feedback, and control. Self-instructional training followed procedures developed by Meichenbaum and Goodman (1971). A problem-solving strategy, incorporated into the self-instructional training paradigm, focused on analyzing a sample, differentiating critical dimensions, and eliminating incorrect alternatives. Children in the modeling group observed the same behaviors and verbalizations but received no self-instructional training. Following each demonstration, they were encouraged to use the strategy modeled. The feedback group received neither modeling nor self-instructional training; they were asked to solve each match-to-sample problem and were given feedback on their accuracy. Amount of encouragement and social reinforcement were kept equivalent across groups. The control group received neither training nor exposure to training tasks; these children participated in pre- and posttests only. Training took place in three 20-minute sessions.

Dependent measures were match-to-sample tasks using line drawings, similar to those in the Matching Familiar Figures test (Kagan, 1965). The groups were equivalent prior to treatment.

Data analysis showed that children in self-instructional training reliably improved their performance on match-to-sample problems and on generalization forms. No reliable difference was observed on the Matching Familiar Figures test. These results were interpreted as support for self-instructional training as an effective treatment in modifying problem-solving strategies in educable mentally-retarded children.

Asarnow and Meichenbaum (1979) investigated the differential efficacy of three treatments in increasing rehearsal and improving recall in kindergarten children. Thirty-six kindergarteners were chosen by performance on a recall task. Half of the children selected (18) were nonproducers of a rehearsal strategy and the other half were inconsistent producers. Subject triads were formed, matched on sex and pretest rehearsal and recall scores. Children within triads were assigned randomly to conditions. Conditions were self-instructional training, induced rehearsal procedure, and practice control. In self-instructional training, the Meichenbaum and Goodman (1971) paradigm was employed, incorporating into it a rehearsal strategy, attention-focusing self-instructions, coping self-statements, and reinforcing self-statements. The induced rehearsal condition required a child to repeat the name of each picture as it was pointed to and to continue repeating the names of the pictures until the next

stimulus array was presented. The child also was required to point to the to-be-remembered array as a final step in the rehearsal procedure. Repetitions were produced audibly. Each child in the rehearsal group was yoked to a child in the self-instructional training group for the purpose of equating the number of training trials per difficulty level. In the practice-control condition, a child was encouraged to find a "good way to remember" the pictures. Again, yoking to a child in the self-instructional training group allowed the number of training trials to be equal between groups. Training took place in individual sessions of 30-minutes each.

Dependent measures were the number of trials needed for a child to attain correct serial recall and the number of trials during which a child rehearsed. There were no differences between groups prior to treatment. Results were analyzed for conditions and for nonproducers and inconsistent producers. On serial recall, inconsistent producers outperformed nonproducers at posttest and follow-up. At posttest, nonproducers performed reliably better than controls. Nonproducers in self-instructional training maintained superior performance at follow-up; they continued reliably to outperform nonproducers in the induced and control conditions. Inconsistent producers made reliable improvement from pretest through to follow-up. Although no reliable differences due to training were observed, trends

avored self-instructional training over induced rehearsal and induced rehearsal over practice control conditions. Data on numbers of trials during which a child rehearsed paralleled that of serial recall. Nonproducers in both self-instructional training and induced conditions rehearsed on more trials at posttest than at pretest. Nonproducers who received self-instructional training rehearsed reliably more than nonproducers in the other conditions. Inconsistent producers' performance did not differ reliably from pretest to posttest. This experiment provided evidence that self-instructional training for children who do not rehearse on a memory task can produce reliable improvement in this cognitive task and that such performance can be maintained over some time. These results supported self-instructional training as an effective treatment that can enhance treatment outcomes at follow-up. The researchers noted that the efficacy of self-instructional training may be influenced by children's cognitive performance level and task-specific requirements.

Genshaft (1982) and Genshaft and Hirt (1980) investigated treatments for girls whose performance in math was caused, in part, by math anxiety. They chose 36, upper-middle class, white grade 7 students whose math performance was at least 1-year below grade level and whose reading performance was above grade level. Children were assigned randomly to conditions: math tutoring,

self-instructional training plus math tutoring, and a no-treatment control. Students continued to attend regular math classes. Tutoring was based on students' deficits; occasional lectures, practice geared toward instructional objectives, and review formed the content of tutoring. Self-instructional training was modified but followed the procedures used by Meichenbaum and Goodman (1971). Additional self-instructions were trained to decrease deprecating cognitions and behaviors and to decrease anxiety arousal. Training lasted for 8 weeks, with two 40-minute sessions per week.

Dependent measures included self-report questionnaires, the Stanford Diagnostic Math Test (Beatty, Madden, Gardner, & Karlsen, 1976), and a locus of control measure (Nowicki & Strickland, 1973). Treatment groups were equivalent prior to training. Postassessment revealed changes in attitude toward math and in math achievement. On measures of attitude, children in both self-instructional training plus tutoring and tutoring groups demonstrated increased preference for math. The self-instructional training group developed reliably more favorable attitudes toward math. On performance measures, all the girls demonstrated statistically reliable improvement on their use of math operations to problems. The girls in the self-instructional training condition also improved reliably on computational performance. These results were interpreted

cautiously as support for self-instructional training as a treatment for poor math performance when deficits are due to anxiety.

Robin et al. (1975) investigated the comparative effectiveness of self-instructional training and direct training in teaching handwriting skills to kindergarten children. Thirty children, 13 girls and 17 boys, were selected by scores on a handwriting test and were assigned randomly to a condition: self-instructional training, direct training, and control. Self-instructional training was modeled on Meichenbaum and Goodman's (1971) paradigm with the following modifications. The trainer modeled correct letter copying and self-instructed aloud while the child watched. Next, the trainer modeled correct performance while the subject self-instructed along with the trainer. In the next step, the child self-instructed aloud and copied the letter while the trainer self-instructed along with the child. In the fourth step, the child self-instructed aloud and, in the fifth, self-instructed silently. Direct training consisted of the trainer comparing the child's letter to a model on an overlay, describing how the letter compared with performance criteria, and placing a "+" beside each letter achieving criteria. Performance feedback and social reinforcement were given to children in both treatments. Children in the control group received only pre- and

postassessments. Training took place in 40-minute sessions, approximately three per week over a 7-week period.

Dependent measures were letter performance criteria for target letters (trained) and generalization letters (not trained), geometric forms (another generalization measure), and examination of children's recorded self-instructions. Data analysis for target letters revealed that children from self-instructional training and direct training both showed statistically reliable improvement over controls. Comparison of self-instructional training performance to direct training performance revealed a reliable difference, considered by the researchers as borderline. No reliable results were found for generalization measures. Analysis of children's self-verbalizations indicated that children in the self-instructional training group self-instructed at a high rate, both during training and at posttest on target letters. However, these children did not spontaneously self-instruct on generalization tasks. Data indicated that self-instructional training and direct training were more effective than no treatment in teaching correct letter formation to kindergarten children. However, it was difficult to shape self-instructional responses. For example, children often shortened a self-instruction into a single word, which, on occasion, was not coordinated with the motor response it was supposed to guide.

Sometimes, a child self-instructed correctly while performing an incorrect written response. The authors suggested that self-instructional training procedures were cumbersome and interfered with practice in writing the letters. They also indicated that classroom considerations would minimize the applicability and probably the efficacy of self-instructional training as a training procedure for teaching correct printing.

Conclusion. These studies provided evidence that self-instructional training, alone or augmented, can be an effective treatment for increasing self-control and emergent skills, for teaching new behaviors, and for influencing attitudes. The efficacy of self-instructional training was supported across a wide range of ages (preschool to adolescence) and a variety of problem situations--self-control, interpersonal, and cognitive. However, its superiority over other treatments has not been established, and appropriate conditions for its application need to be clarified. Robin et al. (1975) noted the difficulties that researchers have had in training children and adults in consistent use of self-instructions. Arnold and Forehand (1978) and Kendall (1982) suggested that changes in children's impulsive behavior may be due to maturation. Although the research to date is promising, further comparative outcome studies are needed to evaluate the role of self-instructional training and to judge its efficacy compared to other treatments.

Stress-Inoculation Training Studies

Studies in this section compare treatment outcomes of stress-inoculation training to the outcomes of cognitive-behavioral and other treatments. Although none of these studies included a named stress-inoculation training treatment, all of the reviewed studies contained treatment components of stress-inoculation training. Studies containing cognitive-behavioral treatments similar to or based on stress-inoculation training components are considered, for the purposes of this review, to be examples of stress-inoculation training research. Stress-inoculation training was employed initially to treat phobias (Meichenbaum & Cameron, 1972a; 1974), anger (Novaco, 1974), and pain (Turk, 1975, 1978). The broad applicability of this training procedure is illustrated by the diversity of studies covered here. The studies reviewed in this section investigated the efficacy of stress-inoculation training treatments for phobias (Meichenbaum and Cameron, 1972a, 1974); test anxiety (Goldfried, Linehan, & Smith, 1978; Holroyd, 1976; Leal, Baxter, Martin, & Marx, 1981; Meichenbaum, 1972a); speech anxiety (Fremouw & Zitter, 1978; Weissberg, 1977); nonassertive behavior (Carmody, 1978; Thorpe, 1975); tension headaches (Holroyd, Andrasik & Westbrook, 1977); obesity (Dunkel & Glaros, 1978); and creativity (Meichenbaum, 1975a). Stress-inoculation training generally has attempted to change behavior by reducing

or eliminating maladaptive thoughts and behaviors. Meichenbaum's study on creativity (1975a), on the other hand, used stress-inoculation training to increase creative behaviors. This experiment suggested that stress-inoculation training can be effective in either increasing or decreasing target thoughts and behaviors. Stress-inoculation training treatments can be used to increase existing behaviors, to train new ones, or to decrease maladaptive ones. Clinical populations, subjects who exhibited problematic or maladaptive behaviors, were used in many experiments. The use of clinical populations in comparative outcome studies can provide pertinent and more accurate information about possible treatment outcomes when a treatment is used with a specific population; being able to match a treatment to a subject's cognitive or behavioral characteristics is an important consideration in selecting a therapeutic intervention.

Meichenbaum and Cameron (1972a) investigated the relative efficacy of stress-inoculation training for multiphobic clients. Male volunteers were screened for clinical phobias to both rats and snakes; men whose activities were curtailed because of these fears were assigned to one of four conditions: stress-inoculation training, self-instructional training, systematic desensitization, and a waiting list control. Treatments were administered individually, in six 1-hour sessions over 4 weeks. Stress-inoculation training included seven

treatment components, all of the components specified by Meichenbaum (1977a), except self-instructions: (1) learning about the role of thoughts on behavior; (2) self-monitoring for cognitive and physiological stress; (3) conceptualizing phobic reactions as divisible into four stages and planning for each stage using a problem-solving approach; (4) developing coping self-statements to use at each stage of the phobic reaction; (5) relaxing by alternatively tightening and relaxing muscles and by deep breathing; (6) rehearsing newly-learned self-statements through self-instructional training; and (7) applying coping strategies to a nonphobic stressor, in this case, unpredictable electric shock. Self-instructional training included the same first five components; men in this condition did not apply their coping skills to a stressful experience nor did they practice them using self-instructional training. Systematic desensitization paired deep muscle relaxation with imagination of anxiety-producing scenes. Men in the control condition received only pre- and postassessments. Half of the men in each condition were inoculated or desensitized only to rats and the other half to snakes.

The dependent measure was an approach to each of the phobic animals. Stress-inoculation training was the most effective condition for reducing fear and for promoting treatment generalization. Self-instructional training was also an

effective treatment. Men in the desensitization condition demonstrated reduced fear to the animal to which they had been desensitized; however, they demonstrated minimal generalization to the animal to which they had not been desensitized. The authors interpreted these results as strong support for the efficacy of both stress-inoculation training and self-instructional training.

Goldfried et al. (1978), Holroyd (1976), Leal et al. (1981), and Meichenbaum (1972a) investigated the relative efficacy of stress-inoculation training compared to other treatments for test anxiety. Meichenbaum's (1972a) study of the efficacy of a cognitive modification treatment for decreasing test anxiety in university undergraduates was an early example of stress-inoculation training. This treatment contained several stress-inoculation training components: (1) explaining the role of cognitions in maladaptive behavior; (2) self-monitoring; (3) coping strategies, including coping self-statements, task relevant self-instructions, and coping and mastery imagery; and (4) deep breathing for relaxation. Stress-inoculation training was compared to a desensitization treatment and a waiting control condition. Group desensitization consisted of progressive relaxation training, imagery training, and group desensitization procedures outlined by Paul and Shannon (1966). The control group was assessed but not given training. Students were

assigned to conditions in a randomized procedure constrained by matching on sex and initial test anxiety scores. Training took place in eight 1-hour sessions; both group and individual training were given. A group of 10 peer students, selected by low test anxiety scores on a fear survey schedule similar to Geer's (1965), received the same preassessment measures. Data from this group provided baseline measures for low test anxious students.

Students were assessed on self-report measures, performance measures, and grade point average. The Alpert and Haber (1960) test anxiety questionnaire provided scales for debilitating anxiety and facilitating anxiety. Self-report measures were used to assess the degree to which anxiety was perceived to be a problem and to assess the emotional and cognitive states of students during analogue testing situations. Analogue testing procedures included performance measures believed to be affected by test anxiety: a digit symbol test (Brown, 1969) and Raven's Test of Progressive Matrices (1956). Grade point average was a further performance measure. These measures were used for pre- and posttreatment assessments. The Alpert and Haber questionnaire was completed by all students in the experiment as a follow-up measure.

Data analysis showed that groups were not reliably different prior to treatment and that treatment outcomes did not

differentiate between group and individual treatments. The data revealed statistically reliable differences in improvement between groups. Outcomes for stress-inoculation training, although demonstrating greater improvement, were statistically similar to those for the desensitization treatment. Both treatment groups improved relative to the control group on grade point average and the digit test. In addition, students receiving stress-inoculation training outperformed other students on the measure of grade point average. On self-report measures, both treatments demonstrated statistically reliable reduction in debilitating anxiety, and improvement was maintained at follow-up 1 month later. Students in stress-inoculation training showed statistically reliable increases in facilitating anxiety. Meichenbaum hypothesized that the stress-inoculation training group learned to view the onset of anxiety as a positive cue to practice coping skills. Students in the stress-inoculation training condition were statistically similar to low text anxious peers at posttreatment.

Holroyd (1976) also researched the comparative outcome of several treatments for test anxiety. His work was similar to Meichenbaum's in terms of subjects, dependent measures, and some treatments. Holroyd chose 60 university volunteers based on their scores on the debilitating scale of the Achievement Anxiety Test (Alpert & Haber, 1960). Students were assigned randomly to

conditions with constraints for matching groups on sex and levels of anxiety and for students' scheduling. Treatments included cognitive, desensitization, stress-inoculation training, pseudotherapy, and waiting list control. The cognitive treatment had several stress-inoculation training components: (1) explaining the role of cognitions, (2) self-monitoring, and (3) using positive and attention-focusing self-statements. The desensitization treatment, following Paul and Shannon's (1966) procedures, paired deep muscle relaxation with imagination of anxiety hierarchy scenes. Stress-inoculation training combined cognitive and desensitization conditions. Group interactions in the combined condition were curtailed in order to complete this treatment in the same length of time allotted to each of the other treatments. Treatment components were: (1) teaching the role of cognitions, (2) self-monitoring, (3) positive self-statements and attention-focusing self-instructions, and (4) relaxation. The pseudotherapy, to control for nonspecific treatment effects, trained students in meditation exercises based on a placebo procedure (McReynolds, Barnes, Brooks, and Rehagen; 1973). Waiting list students received assessments only. Training was given in seven 1-hour group sessions, with a 1-week hiatus between sessions 6 and 7.

Dependent measures were similar to those used by Meichenbaum (1972a): self-report, analogue testing performance, and grade

point average. There were no reliable group or therapist differences prior to treatment. On self-report measures, students in the four treatment conditions showed reliable decreases in debilitating anxiety over those students in the waiting list control group. The researcher suggested that this lack of treatment differentiation may have resulted from nonspecific treatment factors common to all treatments, including the pseudotherapy treatment. On analogue testing, students in the cognitive condition demonstrated statistically reliable improvement over all other students. The cognitive treatment was more effective than stress-inoculation training, which, in turn, was more effective than either desensitization or pseudotreatment; the latter treatments were equivalent and more effective than the control condition. On the digit symbol test, only cognitive and stress-inoculation training groups showed reliable improvement; the other conditions did not differ from each other. On anxiety measures, the cognitive treatment was reliably more effective than stress-inoculation training, desensitization, or pseudotreatment, all of which were equivalent to each other and more effective than the control condition. This improvement was maintained at a 1-month follow-up, except for the desensitization treatment. The latter treatment had become reliably more effective than either stress-inoculation training or the pseudotreatment. On grade point average,

students in the cognitive condition demonstrated reliably greater increases than all other students; students in the desensitization, stress-inoculation training, and pseudotreatment groups were equivalent to each other and had reliably higher grade point averages than controls.

These results were interpreted as support for the efficacy of a cognitive, attention-focusing treatment for test anxiety. Students in the cognitive condition outperformed other students on almost all measures. The researcher hypothesized that the superiority of cognitive treatment, in part, resulted from the specific cognitive procedures employed; however, these could not be distinguished by the design employed in the experiment. The general lack of differentiation between stress-inoculation training, desensitization, and the pseudotreatment raised questions about the efficacy of these treatments. The author suggested that procedural variables rather than content variables may have influenced treatment outcomes.

Leal et al. (1981) investigated the relative efficacy of stress-inoculation training and desensitization treatments for test anxiety with grade 10 high school students. This study was based in part on Meichenbaum's (1972a) and Holroyd's (1976) work. From a pool of volunteers, 30 grade 10 students were screened for test anxiety; screening eliminated students who suffered general rather than test anxiety and those whose test anxiety was related

to poor study habits. Students were randomly assigned to one of three conditions: stress-inoculation training, systematic desensitization, and waiting list control. Stress-inoculation training was more similar to Holroyd's cognitive treatment than to Meichenbaum's stress-inoculation treatment (1972a); the components included: (1) teaching the role of cognitions, (2) self-monitoring, and (3) positive self-statements. The desensitization condition was modeled after Holroyd's (1976) treatment, pairing muscle relaxation with imagined scenes containing increasing degrees of anxiety. Students in the waiting list condition received only pre- and postassessments. Training took place in six 1-hour group sessions, held weekly.

Dependent measures were three performance instruments. Data were analyzed by ANOVA's. There were no reliable differences on the Anxiety Differential (Husek & Alexander, 1963). Post hoc analysis on Raven's Standard Progressive Matrices (Raven, 1965), the analogue testing measure, revealed that the desensitization group had improved reliably more than other groups. The stress-inoculation training group demonstrated reliably decreased scores on the State-Trait Anxiety Inventory--State form (Spielberger, Gorsuch, & Lushene, 1970). The results were interpreted carefully, with particular attention to the apparent superiority of desensitization training on the analogue test measure. Inspection of the data revealed that the

greater within group variability of the scores from the stress-inoculation training group required a greater improvement on performance scores in order to reach a statistically reliable result. The stress-inoculation group improved its Raven Matrices scores by 76% of its pretest standard deviation while the desensitization group increased their scores by 30% of the pretest standard deviation. The amount of improvement shown by students in the stress-inoculation training condition had been large, but it was not sufficiently large enough to overcome the greater requirements for statistical reliability. The authors cautioned that accepting at face value the results of the statistical analysis based on the Raven's scores might lead to a Type II error. They further pointed toward the clear superiority of stress-inoculation training based on the anxiety measure; 90% of the students in the stress-inoculation group improved in comparison to 40% in the desensitization group. This finding supports the use of stress-inoculation training treatment as a superior treatment on self-report measures of test anxiety for high school students as well as university students. The lack of a clear conclusion as to the relative efficacy of the two treatments on the performance measure also concurred with previous research; no strong conclusion has been reached yet as to the relative efficacy of these two treatments for test anxiety.

Goldfried et al. (1978) also compared stress-inoculation training to another treatment, in this case, prolonged exposure to anxiety-producing scenes from a test-taking hierarchy. In this study, 15 men and 21 women answered advertisements for subjects and were assigned to conditions using within sample matching procedures. Stress-inoculation training contained the following components: (1) explaining the role of cognitions, (2) self-monitoring, and (3) coping self-statements. Coping self-statements were practiced using a standardized hierarchy of test-related scenes; subjects were instructed to imagine themselves in the scene, focus on their negative thoughts, and to write positive, coping self-statements. Subjects were encouraged to practice these coping strategies *in vivo*. The prolonged exposure treatment was similar in content to stress-inoculation training; the same hierarchy scenes were used. Subjects in this condition were told to attend to their anxious feelings during each scene presentation. The rationale for this treatment emphasized habituation and extinction as means of reducing test anxiety. The third condition was a waiting list control group which participated only in assessments. Training took place in six 1-hour group sessions, meeting weekly.

Dependent measures were six questionnaires to measure different aspects of test anxiety and three ratings of anxiety taken before and following an analogue test situation. No

statistically reliable differences between groups existed before treatment. Data were analyzed by ANOVA's. On the anxiety measures, subjects in the stress-inoculation training condition were reliably less anxious than subjects in the other conditions, and subjects in stress-inoculation training and exposure conditions were less anxious than the controls. On measures of general anxiety, subjects in stress-inoculation training were less anxious than subjects in either the exposure or control conditions, which were not reliably different from each other. Overall, students in the stress-inoculation training condition demonstrated reliable improvement on all but one measure of test and generalized anxiety. Students in the exposure group improved reliably only on three measures and the control group on none. At a 6-week follow-up, subjects in stress-inoculation training reported reliably less anxiety than subjects in the other conditions on three measures. The results were interpreted as support for stress-inoculation training as an effective treatment for reducing test anxiety; subjects in this cognitive treatment were the only subjects who reported decreased anxiety prior to the analogue exam and a general reduction in anxiety.

Weissberg (1977) attempted to replicate Meichenbaum's (1972a) results with a speech anxious population of undergraduate students. He used a stress-inoculation training treatment similar to Meichenbaum's and two desensitization treatments, one

modified from Meichenbaum in incorporating coping imagery during the presentation of hierarchy scenes and the second following procedures outlined by Paul (1966). All treatment conditions were subdivided into direct and vicarious treatment formats, making six treatments. A control condition was formed from students whose scheduling conflicts prevented them from being assigned to a condition. The other 91 volunteers were assigned randomly to a treatment. Training took place in three weekly group sessions lasting 2 hours each. The direct treatment sessions were videotaped, and the vicarious groups were instructed to watch the tapes of the direct treatments as they would watch a TV program. No therapist was present in the vicarious conditions.

Dependent measures were self-report measures and a Timed Behavioral Checklist for Performance Anxiety (Paul, 1966). The Checklist contained 20 observable behaviors associated with anxiety. Students were videotaped making speeches, and their speech behaviors were assessed and rated from the tapes. Two of the self-report measures assessed speech anxiety and the others measured general anxiety. Postassessment followed treatment by 1 week, and follow-up was 11 weeks later.

Results showed consistent decreases in anxiety scores across time; students in the control condition demonstrated reliably less improvement than treated students. Although there were no

statistically reliable results from self-report measures, some measures of general anxiety approached statistical reliability. This trend, which favored the direct stress-inoculation training condition, was not maintained at follow-up. On behavioral measures, direct stress-inoculation training and direct desensitization treatments demonstrated statistically reliable decreases in observable anxiety during a speech presentation. In comparison to controls, treated students demonstrated reliable reductions in speech and general anxiety. These results provided some support for stress-inoculation training as a treatment for reducing speech and general anxiety and for the efficacy of direct ~~over~~ vicarious treatments. Posttest trends suggested that stress-inoculation training may be more effective than desensitization training with or without coping imagery. Weissberg concluded that his data provided some support for Meichenbaum's (1972a) cognitive modification treatment.

Fremouw and Zitter (1978) compared the relative efficacy of a stress-inoculation training treatment to a skills-training treatment for speech anxiety. From a pool of undergraduate students, 46 speech anxious subjects were selected based on scores on the Personal Report of Communication Apprehension (McCroskey, 1970). These 19 men and 27 women were divided into groups of high and low social anxiety based on scores from the Social Anxiety and Distress Scale (Watson & Friend, 1969) and

assigned randomly to a condition. Conditions were: skills training, stress-inoculation training, discussion placebo, and waiting list control. Thus there were eight groups, four conditions x two anxiety levels. The skills-training condition used modeling, behavioral rehearsal, and videotaped feedback to teach seven skills specific to public speaking.

Stress-inoculation training included self-monitoring, coping self-statements practiced using covert imagery, and deep muscle relaxation. The discussion group used videotaped group discussions of interpersonal topics as the content of treatment. Students in the waiting list condition received the same pre- and posttests as the other students but were told they would have to wait for treatment. Training took place in five 1-hour group sessions, held weekly.

Dependent measures included self-report instruments, used for subject selection and treatment generalization; and four behavioral measures and one subjective measure. The attrition rate of students resulted in reliable group differences prior to treatment; data were analyzed by using pretest scores as covariates and posttest scores as dependent measures. On a measure of 14 inappropriate speaking behaviors (Mulac & Sherman, 1974), the skills-training and stress-inoculation training groups (with a trend in favor of the discussion group) made reliable improvement over students in the control group. On ratings of

overall anxiety while making a speech, students in the skills-training and stress-inoculation training conditions revealed reliably more improvement than the controls; students in the stress-inoculation training condition also improved reliably more than did students in the discussion condition. On the self-report measure of confidence as a speaker (Paul, 1966), students in the skills-training group outperformed all other groups; stress-inoculation training outperformed the discussion group. At a 2-month follow-up, assessed by self-report instruments, students in the skills-training and stress-inoculation training groups continued to show improvement. On the measure of confidence as a speaker, students in the stress-inoculation training group outperformed those in the control group but were no longer reliably different from those in the discussion group. On generalization measures, students in the skills-training and stress-inoculation training conditions improved more than did the students in other conditions, but there was no reliable difference between groups. The experiment also investigated a subject x treatment interaction. The results revealed that students with low social anxiety reliably outperformed students with high social anxiety on two measures of speaking anxiety and confidence. Trends suggested that students with high social anxiety improved more in the stress-inoculation training condition, while skills training was an effective

treatment for either high or low social anxiety.

This experiment demonstrated that both skills training and stress-inoculation training were effective treatments for speech anxiety and that skills training was the more effective. The combination of cognitive strategies and relaxation was effective in reducing anxiety relative to control students and appeared to be a time efficient treatment. A subjects x treatment interaction, suggested by a trend, would need to be researched further. The authors speculated that stress-inoculation training might be an important treatment for maximizing treatment generalization when skills training was too specific a treatment; unfortunately, the experiment did not reveal generalization effects. This hypothesis will need to be researched.

Thorpe (1975) and Carmody (1978) investigated the efficacy of stress-inoculation training treatments with nonassertive college undergraduates and personnel. Thorpe's subjects were 32 volunteer students who had received predetermined scores on a Conflict Resolution Inventory (McFall & Lillesand, 1971). Scores were divided into high, medium, and low ranges. Students were assigned to treatments using a random procedure constrained by score range, sex, and scheduling restrictions. Carmody recruited "clinical" subjects among university students and personnel (p. 245); 63 volunteers were assigned randomly to treatments. Carmody compared a stress-inoculation training treatment with

rational-emotive therapy and behavior assertion training.

Thorpe used 12 situations to which an assertive response was appropriate as the basis for therapy. The treatments, stress-inoculation training, desensitization, and modeling-rehearsal, may suggest a dismantling study; however, Thorpe purposed a comparative outcome study. Stress-inoculation training treatment included: (1) explaining the role of cognitions, (2) awareness of negative cognitions, (3) production of positive self-statements, (4) modified self-instructional training, and (5) practice. In the modified self-instructional training, a therapist modeled an assertive response to a situation which a student rehearsed overtly and then covertly. The desensitization treatment followed procedures used by Paul and Shannon (1966); Thorpe instructed students to imagine themselves responding assertively in each scene. The therapist modeled appropriate assertive responses for each situation. In the modeling-rehearsal treatment, students role-played scenes. A therapist made an unreasonable request and a student responded with a typical (nonassertive) answer. After giving corrective feedback, the therapist role-played appropriate, assertive responses. Following coaching, the student practiced the response. Students in the control group discussed origins of their nonassertive behaviors. Treatment was given once weekly, in six 1-hour sessions.

Dependent measures included self-report, behavioral, and physiological measures. Self-report measures assessed assertiveness and generalized anxiety. Behavioral measures were student responses to 13 assertion appropriate situations derived from McFall and Lillesand (1971); responses were rated on a 5-point scale. Pulse rate and finger sweat tests were administered during and following behavioral measures. Subject response to an importuning telephone caller was the follow-up assessment.

No statistically reliable differences between groups prior to treatment were observed. Posttreatment scores on the Conflict Resolution Inventory showed general improvement. Assertive scores demonstrated reliable differences in improvement between groups. Stress-inoculation training and modeling-rehearsal treatments were superior to the control condition, and stress-inoculation training was superior to desensitization. Similar results were observed for nonassertive and difference (between assertive and nonassertive) scores. The control group had reliably higher scores on the nonassertive measure. Stress-inoculation training and modeling-rehearsal treatments were superior to the control, and desensitization was superior to the control. Similar patterns of differential group performance were observed when scores for trained and untrained assertion situations were analyzed. On a generalization measure,

situations for which training had not been given, the performance of students in stress-inoculation training and modeling-rehearsal conditions was superior to that of control students. A similar pattern emerged for those situations used in training: students in stress-inoculation training and modeling-rehearsal conditions were superior to students in desensitization and control conditions. Scores on autonomic measures were not reliably different. Responses to an importuning telephone caller 3 weeks following treatment revealed no group differences. These results suggested that stress-inoculation training and modeling-rehearsal treatments were equally effective in treating nonassertive behavior. These treatments were superior to the desensitization treatment which was, in turn, superior to the control condition. The stress-inoculation training treatment was judged most effective because it was superior to desensitization while the modeling-rehearsal treatment was superior only to the control condition.

Carmody's (1978) research on nonassertive behavior compared the relative efficacy of rational-emotive therapy, behavior assertion training, stress-inoculation training, and a control condition. Rational-emotive therapy was combined with behavioral rehearsal. Subjects learned to identify, examine, and dispute negative self-statements that contributed to nonassertive behavior. They learned and practiced positive self-statements

and overt, assertive behavior. In behavior assertion training, overt, assertive behaviors were modeled; subjects were coached in performing these behaviors and then practiced them. Cognitive contributions to nonassertive behavior were not discussed. In stress-inoculation training, subjects learned: (1) about the influence of cognitions on behavior, (2) a problem-solving orientation, (3) coping self-statements, (4) self-instructions, and (5) overt, assertive behaviors. They practiced these skills while role-playing assertive scenes. A delayed treatment group served as a control. Subjects were assigned randomly to conditions. Training took place in small groups during four 90-minute sessions.

Dependent measures included self-report measures of assertiveness and social anxiety, and behavioral measures based on videotaped role plays. There were no statistically reliable differences between groups prior to treatment. Data were analyzed as change scores. All treatments were superior to the control condition on the self-report measure of assertiveness; however, treatments did not differ reliably from each other. There were no reliable differences on behavioral measures, although the rational-emotive subjects did perform reliably better than other groups on an *in vivo* measure, consisting of role-playing untrained scenes. At follow-up, statistically reliable main effects for time but not for treatments were

observed. There was no reliable difference between groups on the telephone call measure. These results were interpreted as failure to support the superiority of stress-inoculation training over a behavioral treatment for assertiveness training.

Holroyd, Andrasik, and Westbrook (1977) researched treatments for tension headaches. They compared stress-inoculation training, biofeedback relaxation training, and control conditions. Community residents, 27 women and 4 men, who reported having three or more headaches weekly, were assigned to treatments using within sample matching procedures.

Stress-inoculation training included: (1) teaching the role of cognitions; (2) self-monitoring; and (3) cognitive coping strategies, including coping self-statements, reappraisal, attention deployment, and fantasy. Biofeedback relaxation training focused on subjects' control of muscle contractions that contribute to tension headaches. Control subjects maintained data records and participated in assessments. Training took place in eight biweekly, individual sessions, lasting 45 minutes each.

Dependent measures were headache symptoms, which provided measures for occurrence, intensity, and duration; frontalis electromyograms; trait anxiety; and locus of control measures. No statistically reliable differences between groups were present prior to treatment. Headache data revealed that subjects in the

stress-inoculation training conditions had reliable reductions in headache activity; this improvement was maintained at a 15-week follow-up. Although the biofeedback condition showed moderate improvement, this improvement was not reliably different from that of the control group, which showed little improvement. Similar patterns of improvement were noted for the separate headache measures. The data demonstrated that the superiority of stress-inoculation training over the biofeedback treatment was due to greater consistency in outcomes achieved by the former group. All subjects in the stress-inoculation training condition reported headache improvement at posttreatment and continued to improve following the end of treatment. Subjects in the biofeedback condition reported improvement at postassessment and at follow-up, but fewer of these subjects reported lesser degrees of improvement. Subjects in both treatments reported reliably greater decreases in psychosomatic symptoms and medication than did controls. Only on the electromyogram measure did biofeedback subjects outperform subjects in stress-inoculation training; biofeedback subjects demonstrated reliably lower levels of frontalis activity. Stress-inoculation training was identified as an effective treatment for tension headache. These results were interpreted with some caution because the experimental design did not control for therapist effects.

Dunkel and Glaros (1978) compared the efficacy of a

self-instructional procedure, stimulus control training, combined self-instructional procedure with stimulus control (stress-inoculation training), and a relaxation control as treatments for obesity. Forty female volunteers, who were 15% overweight but weighed less than 260 pounds, were selected and assigned at random to conditions. The stress-inoculation training treatment was modeled on Meichenbaum's (1975b) work. Components of this treatment were: (1) explaining the role of emotions; (2) using a problem-orienting approach; (3) self-instructional training; (4) coping self-statements; (5) training in relaxation and breathing; and (6) in vivo application of coping strategies to a stressor. Stress-inoculation training treatment combined both self-instructional and stimulus control training procedures. Training took place once weekly for 6 weeks; the group sessions lasted 75 minutes. (Correspondence with the second author has not provided further information on the nature of the stimulus control or relaxation treatments.)

Weight reduction quotients served as the dependent measure. Data showed that women in the stress-inoculation training condition lost reliably more weight than women in the stimulus control condition. The self-instructional group lost reliably more weight than did the relaxation control group. At a 7-week follow-up, women in stress-inoculation training and self-instructional treatments showed continued weight loss

following postassessment while women in the stimulus control and relaxation control treatments did not. Women in both stress-inoculation training and self-instructional treatments were effective in reducing weight and maintaining the loss. The data suggested that stress-inoculation training was the superior treatment.

Meichenbaum (1975a) compared a creativity training procedure resembling stress-inoculation training to attention control and waiting list control treatments. Subjects were 21 volunteer undergraduates who were assigned to conditions using a random procedure constrained by sex distribution and pretest creativity performance. The stress-inoculation training treatment included: (1) explaining role of cognitions, (2) self-monitoring, (3) problem solving, (4) positive self-statements and imagery-inducing self-statements, and (5) self-instructional training. The attention control treatment was a noncognitive treatment developed by Gendlin (1969); in this treatment, students focused on experiencing and reformulating their feelings. A waiting list control received only pre- and postassessments. Training took place in six group sessions; these 1-hour sessions were spread over 4 weeks.

Dependent measures were four standardized creativity tests and two self-report measures. The creativity tests assessed divergent thinking, preference for complexity, and ability to

combine fantasy and reality. Groups were equivalent prior to treatment. On performance measures, data revealed highly consistent and statistically reliable group differences. Students in the stress-inoculation training condition performed consistently higher on all creativity tests. Students in the focusing group showed statistically reliable improvement on two tests. Students in the stress-inoculation training condition showed improvement over students in the focusing condition on the Welsh Revised Art Scale (1959), while the students in the focusing condition performed reliably better on this scale than did students in the control condition. Three of the self-report subscales revealed reliable group differences. The stress-inoculation training group was superior on two of these scales; the focusing group was superior on an "exhibition" scale. Meichenbaum suggested that students in the focusing condition felt more creative. Data revealed, however, that only students in stress-inoculation training condition changed both their perceptions and performance.

Conclusion. In the comparative outcome studies reviewed in this section, stress-inoculation training has been demonstrated to be an effective treatment for a variety of problems. Stress-inoculation training was more effective than other treatments for test anxiety (Goldfried et al., 1978; Meichenbaum, 1972a); speech anxiety (Weissberg, 1977); nonassertive behavior

(Thorpe, 1975); tension headache (Holroyd et al., 1977), weight control (Dunkel & Glaros, 1978); and creativity enhancement (Meichenbaum, 1975a). Only in three cases, (Carmody, 1978; Frenouw & Zitter, 1978; Holroyd, 1976), was stress-inoculation training found to be less effective than another treatment. When outcomes of stress-inoculation training and other treatments were not reliably different (Leal et al., 1981; Thorpe, 1975; Weissberg, 1977), data were interpreted in favor of stress-inoculation training. In a variety of problem applications, research evidence points toward stress-inoculation training as an effective and often superior treatment. These results are encouraging for further research and development using this treatment package.

Conclusion: Comparative Outcome Studies

Treatment outcomes of self-instructional training and stress-inoculation training have been compared to those of other treatments thought to be effective in given situations. Studies reviewed in this section supported the efficacy of stress-inoculation training procedures and generally provided evidence of their superiority to other treatments. The comparative outcomes of self-instructional training studies did not support the superior efficacy of this treatment. Self-instructional training was shown to be a superior treatment in only a few studies. More frequently, treatment outcomes of

self-instructional training were not differentiated from those of other treatments. When self-instructional training was found to be more effective than other treatments on one or a small number of measures, only qualified support for this treatment could be given. Although there exists a growing consensus regarding the efficacy of stress-inoculation training and continuing research interest in self-instructional training, the data are not conclusive. Further studies are needed to replicate existing studies and to clarify the parameters within which self-instructional training and stress-inoculation training can be most effectively implemented.

CHAPTER VI: CONCLUSION

In drawing conclusions to this paper, structural, functional, and theoretical considerations have been culled from preceding chapters. This chapter summarizes current understandings of self-instructional training and stress-inoculation training and addresses the question posed at the end of the first chapter: are self-instructional training and stress-inoculation training substantively different training procedures? In answering this question, structural considerations are discussed first, followed by functional considerations. Then both sets of considerations are examined in view of Meichenbaum's theory of cognitive-behavior change. After relating the findings of this paper to the question that initiated it, this chapter will conclude by examining the implications of these findings.

Summary of Structural Considerations

Both self-instructional training and stress-inoculation training were developed to help clients change overt and cognitive behaviors, in particular, thinking processes. Self-instructional training was used initially to help impulsive children increase performance on tasks that require thoughtful, careful, and systematic cognitive processing. Self-instructional training was designed to overcome cognitive and/or behavioral difficulties resulting from comprehension,

mediational, or production deficits which interfere with performance.

Self-instructional training focuses on problem-solving behaviors, including: problem definition, attention focusing, response guidance, self-reinforcement, self-evaluation, coping skills for errors or failure, and error-correcting procedures. A series of practice trials, during which a client/student repeats a modeled set of self-instructions, moves from explicit guidance by a therapist to internal, covert self-guidance by the client. Self-instructional training is a training procedure that assists a client/student in performing a task more effectively.

Self-instructional training has two components: a cognitive modeling component which contains a flexible set of self-instructions built upon a problem-solving procedure and a rehearsal component which contains a series of practice trials that lead a client to internalize and follow self-instructions. These components focus on learning processes. The self-instructions to be learned vary across situations and clients, but the framework and learning procedures remain constant. Sets of self-instructions may be highly similar when tasks require similar cognitive processing. The way in which a client plans and executes a plan is the object of change--viz., the thinking processes that precede, accompany, and follow task performance. In summary, self-instructional training is a

two-component training procedure in which the goal is to improve task performance by using a flexible set of problem-solving self-instructions to correct a cognitive deficit.

In contrast, stress-inoculation training grew out of attempts to generalize treatment effects. Meichenbaum and Cameron (1974) serendipitously discovered the power of coping self-statements to generalize behaviors across different situations. Through his research and study of the literature on coping skills, Meichenbaum developed a treatment procedure that he named stress-inoculation training. Training goals of this procedure were to help clients cope with painful, stressful, or other noxious situations. The purpose of this training was to change a broad set of overt and covert behaviors across a wide spectrum of situations.

Stress-inoculation training, as conceptualized by Meichenbaum, is a seven-component training procedure. The first two components are educational; they assist a client in understanding the effects of emotions on behavior and in becoming aware of the interdependent relationships among thoughts, feelings, and behaviors. The next four components train a wide variety of coping skills: problem-solving skills; cognitive coping skills and strategies, including self-statements, self-instructions, and imagery; and behavioral coping skills, particularly relaxation. The final component applies

newly-learned skills to problematic situations using self-instructional training.

Stress-inoculation training components focus both on learning procedures and on coping skills techniques. According to Meichenbaum's theory of behavior change, learning takes place at three levels: underlying cognitive structures; self-regulatory activity of self-statements and self-instructions; and overt and covert behaviors. Considerable time is spent educating a client before beginning coping skills training. Meichenbaum (1977a) believes that such education is necessary if change is to be maintained and to generalize. Following the educational components, the next set of components trains coping techniques. On completion of educational and coping skills training, maintenance and generalization procedures are incorporated into stress-inoculation training as part of the final component. The structure, content, and processes of stress-inoculation training suggest that learning to cope is a more important treatment objective than masterful performance on specific tasks.

In terms of the goals of training and in terms of component elements, processes, and content, these two training procedures are both similar and different. They seem to have different explicit purposes: competent task performance (self-instructional training) vs. coping ability across a variety

of situations (stress-inoculation training). Self-instructional training attempts to produce proficient task performance, while stress-inoculation training attempts to develop a generalized set of coping skills for many difficult situations.

Self-instructional training promotes a mastery model of performance, while stress-inoculation training espouses a coping model. However, effective coping may result in competent performance, and self-instructional training does train clients to cope with failure and errors. In addition, both training procedures use self-instruction as a vehicle for changing cognitive processes that regulate and facilitate overt or covert behaviors.

Similarities are evident when the middle components of stress-inoculation training are compared with the two components of self-instructional training. Three stress-inoculation training components--problem solving, modeling of self-statments, and modeling and rehearsal of self-instructions--are similar in content and assumed learning processes to the components of self-instructional training. However, the stress-inoculation training components do not specify explicit overt-to-covert rehearsal of self-instructions. In addition to differential deployment of overt-to-covert rehearsal of self-instructions, stress-inoculation training includes educational and application components while self-instructional training does not.

Stress-inoculation training teaches clients to implement a variety of coping skills and self-instructions. Overall, stress-inoculation training is structurally more complex than self-instructional training and, in the application component, uses self-instructional training as a learning procedure to increase proficient coping.

Stress-inoculation training, a multicomponent training procedure that teaches specific coping skills, includes training processes common to self-instructional training. Stress-inoculation training includes modeling and rehearsal procedures and adds application training processes. Self-instructional training provides only coping self-instructions for handling difficult situations, while stress-inoculation training offers many coping skills. Although many of the coping skills used in stress-inoculation training are foreshadowed in self-instructional training, stress-inoculation training formally introduces and teaches them. Coping skills and application components are included to increase treatment generalization to a variety of situations for which training has not been given. In summary, structural differences between self-instructional training and stress-inoculation training may be observed in treatment goals and in the number, content, and complexity of component elements. Similarities are found in terms of modification of cognitive processes and in common

training procedures. Self-instructional training appears to be reproduced and expanded in stress-inoculation training. This latter procedure introduces educational and application components, a large number of cognitive and behavioral coping skills, and a complex mixture of learning processes and skill content, all in service to response generalization. Self-instructional training appears to be an early training procedure using cognitive-behavior modification techniques, while stress-inoculation training is a later one (built on the self-instructional training framework).

Summary of Functional Considerations

Self-instructional training demonstrated its effectiveness in 10 out of 12 general effectiveness studies, but the comparative outcome research did not provide convincing evidence that self-instructional training is a superior treatment (to other experimental treatments) for the problem areas investigated. The results of the general effectiveness, dismantling, and comparative outcome studies demonstrated overall effectiveness of self-instructional training with impulsive, hyperactive, and distractible children; with normal school-aged children; with aggressive children and adolescents; and with schizophrenics. It was effective across a variety of problem areas, principally self-control, interpersonal relations, and cognitive tasks.

The dismantling studies investigated both modeling and rehearsal components. Meichenbaum and Goodman's research (1971) demonstrated that the modeling component is a necessary but insufficient component in this training procedure and that the rehearsal component must be included in self-instructional training for effective treatment outcomes. The dismantling research confirmed Meichenbaum and Goodman's conceptualization of self-instructional training and of the components and skills that comprise it. However, because the researchers examined different aspects of the components, none of the studies was replicated. In the conclusion to their comparative outcome study, Whitman and Johnston (1983) suggested that some of the operant procedures employed in self-instructional training (reinforcement, prompting, shaping, and fading) may be important contributors to the effectiveness of this training procedure.

Out of seven comparative outcome studies, self-instructional training demonstrated superior efficacy in four cases. Self-instructional training was equally as effective as another treatment in two studies and slightly less effective than a direct instruction treatment in another study (Robin et al., 1975). Treatment outcomes for self-instructional training were frequently maintained at follow-up, and some researchers noted generalization to other tasks and in other environments. The comparative outcome studies also explored the potential efficacy

of self-instructional training in new areas, e.g., as an alternative to medical treatment for hyperactivity, in training cognitive thinking styles, and in reducing anxiety.

The comparative outcome studies provided support for self-instructional training as an effective treatment but did not provide convincing evidence of its superiority over other treatments. In the self-instructional training studies reviewed in this paper, self-instructional training demonstrated flexibility across subjects and problems. Self-instructional training was used for self-control, interpersonal relations, and cognitive problems. It was shown to be effective in inhibiting inappropriate behaviors, in encouraging emergent and new behaviors, and in changing attitudes. The research demonstrated that self-instructional training was effective either alone or combined with other interventions or techniques, e.g., response cost contingency. Meichenbaum (1977a) noted that the incorporation of operant procedures produced a cognitive-behavior modification treatment (p. 47). Asarnow and Meichenbaum (1979) suggested that self-instructional training may be effective for situations which require or allow for the development of specific skills. Margolis and Shemberg (1976) concurred, writing that self-instructional training may be a training procedure best suited to changing behaviors when specific skills need to be trained.

The research highlighted some questions and opportunities. On measures of impulsivity or response latency (e.g., Matching Familiar Figures, Kagan [1965, 1966]), children's scores improved over time. Improvement on this and similar dependent measures had been attributed to the effectiveness of self-instructional training. However, Kendall (1982) suggested that such improvement might be related to maturation rather than to treatment efficacy. Several researchers (Margolis & Shemberg, 1976; Robin et al., 1975; Whitman & Johnston, 1983) had difficulty training clients to self-instruct and to use self-instructions on posttests. A closely-related methodological problem was assessment of self-instructions. Robin et al. recorded children's verbalizations during training and at posttest; however, this method might not be appropriate in other experimental and applied contexts. On the other hand, Yellin et al. (1981) provided evidence that self-instructional training might be an alternative treatment to medication for impulsive children. In studies similar to Yellin et al., Bugental et al. (1977, 1978) found that self-instructional training promoted more cause and effect self-attribution than did a medical treatment among impulsive, medicated children. Finally, self-instructional training was effective not only in improving math scores of grade 7 girls but also in altering their negative attitudes toward this subject (Genshaft, 1982; Genshaft & Hirt, 1980).

In summary, results of the studies in self-instructional training demonstrated that this is an effective training procedure, although it was not the most efficient in a few cases. It is a training procedure that is flexible and capable of being expanded and individualized. It has been used effectively with children, adolescents, and adult schizophrenics in a variety of self-control, interpersonal, and cognitive problem areas. Some researchers, however, had difficulty in developing, implementing, maintaining, and generalizing self-instructions. Methodological problems in assessing the use of self-instructions were noted.

Unlike self-instructional training, there was only one general effectiveness study in the stress-inoculation training research reviewed in this paper. However, dismantling and comparative outcome studies provided evidence of the general effectiveness of stress-inoculation training. The comparative outcome research provided strong evidence that stress-inoculation training is an effective and superior treatment for many problems, particularly those, such as pain, for which an effective treatment has been elusive. There was no clear indication, from dismantling or comparative outcome studies, of which components contributed to the effectiveness of this training procedure.

No specific conclusions were drawn from the dismantling studies. However, tentative hypotheses were developed.

Dismantling experiments using stress-inoculation training were formulated to answer research questions that focused on treatment outcomes; consequently, some components of stress-inoculation training were implemented infrequently. Meichenbaum (1975a) himself did not implement all of the components in stress-inoculation training. Because of incomplete implementation of components and insufficient data, further research will be necessary to substantiate or disconfirm these hypotheses. Given the available data, two components appeared to form a core configuration of contributing components; these components were teaching the role of cognitions in a problem area and cognitive strategies, especially coping strategies. There was some evidence that three other components contributed to the effectiveness of stress-inoculation training: self-monitoring, behavior strategies, and self-instructions.

Many questions relating to dismantling studies remain to be answered. In order to assess Meichenbaum's conceptualization of stress-inoculation training, future research needs to implement all of the components in stress-inoculation training according to Meichenbaum's description. The combination or combinations of components that contributed to the efficacy of stress-inoculation training need to be determined empirically by manipulating all seven components. Researchers need to investigate the interactions between and among components, because research

(Hackett & Horan, 1980; Worthington & Shumate, 1981) suggests that there may be interactions and positive and negative effects of some components on other components.

Stress-inoculation training treatments in the comparative outcome studies were generally more successful than other treatments, and the results generalized more frequently than did the results of other treatments. The successful results of the comparative outcome research using clinical populations further strengthens the promise of this training procedure. Out of the 12 studies reviewed, stress-inoculation training was the most effective treatment eight times; it was as effective as other treatments (often having stress-inoculation training components) in two other experiments and twice was less effective than another treatment. Examination of instances in which stress-inoculation training was not a superior treatment do not diminish its superior effectiveness. In Leal et al. (1981), stress-inoculation training demonstrated a 76% increase over pretest standard deviation scores and a greater improvement per student than did the desensitization treatment which appeared by statistical analysis to be more effective. In Holroyd (1976), stress-inoculation training was less effective than the cognitive treatment, which contained three stress-inoculation training components that have been identified as potential contributors to the efficacy of stress-inoculation training. Stress-inoculation

training was often as effective as desensitization. However, desensitization treatments contained several components of stress-inoculation training, particularly imagery and coping self-statements. In Fremouw and Sitter (1978), stress-inoculation training was as effective as the skills-training treatment. The authors suggested that stress-inoculation training might be more effective with subjects experiencing generalized anxiety because of the apparent ability of stress-inoculation training to maximize treatment generalization. In the only other study in which stress-inoculation training was not a superior treatment (Carmody, 1978), the skills-training and stress-inoculation training treatments were reliably similar. This examination underlines the need for identification of the components which contribute to the efficacy of stress-inoculation training and for careful interpretation of experimental results.

The stress-inoculation training research demonstrated that this is an effective and usually superior treatment across a large variety of problems, including those for which effective treatments had been elusive. Treatments implementing stress-inoculation training demonstrated maintenance and generalization effects in many experiments. The ability of a stress-inoculation training treatment to generalize to other problem areas appeared to be a significant strength of this

training procedure. Its flexibility and built-in individualization produced treatments that were appropriate to clients having different problems or concerns.

Stress-inoculation training was effective both in increasing desirable behaviors and cognitions and in decreasing unwanted behaviors and cognitions. Only a few studies among the experiments reviewed in stress-inoculation training did not support the superior efficacy of this training procedure. Future research needs to address questions raised by the dismantling research and by those studies in which stress-inoculation training was not a superior treatment. It will be important to know the strengths and limitations of this treatment in terms of populations, problems, implementation, and treatment outcomes.

The research needs to determine whether stress-inoculation training, the specific seven-component framework conceptualized by Meichenbaum, is also, as Meichenbaum (In press) has suggested, a framework for generic cognitive-behavior modification treatments.

Both self-instructional training and stress-inoculation training produced desired treatment effects. However, they differed in their superiority to other treatments; stress-inoculation training was more frequently a superior treatment than was self-instructional training. The dismantling research demonstrated that both self-instructional training

components were necessary for an effective treatment. The stress-inoculation training research did not demonstrate whether a single component or combination of components was necessary for effective treatment. Inspection of effective treatments similar to Meichenbaum's stress-inoculation training which were reviewed in the dismantling and comparative outcome research suggested that there may be several variants based on different combinations of components.

Not only is further dismantling research of stress-inoculation training needed to determine which components contribute to treatment efficacy, but additional research is needed to determine the relationship of an expanded self-instructional training treatment to stress-inoculation training treatments. Self-instructional training treatments often incorporated other techniques into the basic training procedure outlined by Meichenbaum. Behavioral techniques were represented by response cost and social reinforcement contingencies. Other modifications of self-instructional training included training to reduce negative self-statements and anxiety (Genshaft, 1980; Genshaft & Hirt, 1982) and incorporation of self-monitoring, modification of self-statements and self-instructions, and individualization of self-instructions (Meichenbaum & Cameron, 1973). As self-instructional training

was expanded, it began to resemble stress-inoculation training. In addition, many treatments similar to stress-inoculation training had other names but were identified as "self-instructional (training)" treatments. Meichenbaum (1977a) classified his 1975a creativity enhancement study as a self-instructional training study. It was discussed in this review as a stress-inoculation training study because it included four stress-inoculation training components. The fact that this study was classified differently by Meichenbaum and this author suggests that there is more similarity than difference between self-instructional training and stress-inoculation training, at least as operationalized for experimental and applied purposes.

Although there are structural differences between these two training procedures, Meichenbaum's (1977a) summary of self-instructional training minimized them. He suggested that educational factors were introduced into self-instructional training by experimenters who involved their clients in defining the problem and/or in developing and implementing treatments. The use of cognitively similar tasks to train self-instruction pointed toward an application component. These modifications blurred the differences that had been drawn between these two treatments. In his summary (1977a), Meichenbaum identified important processes in self-instructional training that recur in stress-inoculation training.

The focus of the self-instructional training has been on the child's *conscious self-regulatory ability*. Thus by teaching clients (1) to recognize and label their impulses and the cues that instigate them at different levels of intensity, and (2) to spontaneously employ cognitive and behavioral coping responses, they will develop self-control. (author's italics; pp. 103-4)

Meichenbaum's summary highlights the similarities between the two procedures. His description of an expanded treatment in self-instructional training included (1) teaching the role of cognitions, (2) problem-solving strategies, (3) cognitive strategies and coping self-statements, (4) self-instructions, and (5) behavioral strategies. It also hinted at a self-monitoring component. Only an *in vivo* application component was absent. These observations underscore the blending and overlapping characteristics observed in these two training procedures.

Having noted common functional and structural characteristics, differences between self-instructional training and stress-inoculation training are now discussed. Functional differences between the two procedures were not very significant. Both training procedures demonstrated general effectiveness. Stress-inoculation training was more often a superior treatment in comparative outcome studies than was self-instructional training. However, in those studies in which stress-inoculation training and self-instructional training were both implemented

(Dunkel & Glaros, 1978; Meichenbaum & Cameron, 1972b, 1974) both treatments were reliably similar.

A possible explanation for the fact that stress-inoculation training appeared more often as a superior treatment may be related to the types of problems that each training procedure treated most effectively. Ansarow and Meichenbaum (1979) and Margolis and Shemberg (1976) both suggested that self-instructional training may be best implemented in task-specific skills training. Inspection of the studies reviewed which implemented self-instructional training supports this idea. Superior stress-inoculation training treatments, on the other hand, appear to address problems that require training for more generalized, broadly-based problems, such as overcoming fear or anxiety; or coping with pain, anger, or undesired impulses. Reasons for the use of self-instructional training in the *in vivo* application component of stress-inoculation training are clarified by this functional contrast. In stress-inoculation training, self-instructional training helps clients apply newly-learned coping skills in a variety of stressful situations. Application training, itself task-specific, is, therefore, an appropriate domain for self-instructional training. This relationship between self-instructional training and stress-inoculation training is supported by the observation that self-instructional training tends to promote mastery learning

while stress-inoculation training promotes learning how to cope. Clients trained in stress-inoculation training learned to cope with stressful situations; self-instructional training built and strengthened these coping skills so that they become masterful and permanent responses. Finally, in studies in which stress-inoculation training was not a superior treatment, superior treatments employed skills training. If, in these cases, stress-inoculation training failed to train specific skills, a treatment implementing self-instructional training might have been a superior treatment.

Summary of Theoretical Considerations

Meichenbaum (1977a) developed his theory of cognitive-behavior modification based on his research and others' experimental work. He hypothesized three major phases in an effective cognitive-behavior change treatment: (1) modification of underlying cognitive processes, including beliefs, assumptions, feelings, and thoughts upon which inner dialogues and resultant behaviors are based; (2) modification of self-regulatory inner dialogue to produce guiding self-statements and self-instructions to direct behavior positively; and (3) modification of cognitive and overt behaviors. Meichenbaum believed that only through modification of both underlying cognitions and self-regulatory internal dialogue could changes in behavior become permanent. This conceptualization relates

directly to treatment generalization. By training clients to cope with problem situations rather than with a specific problem, treatment effects may generalize to different situations.

Because Meichenbaum's theory of cognitive-behavior change was developed from his own research, it is understandable that the structural components of stress-inoculation training and of an expanded self-instructional training fit his theory. Both training procedures have an educational emphasis; stress-inoculation training has two educational components. Although there is no structural component in self-instructional training dedicated to educational purposes, an educational process is included in the cognitive modeling component. By modeling thoughts while performing a task, a therapist can emphasize differences between positive and negative beliefs, feelings, and assumptions. Modeling of self-regulating inner dialogue presents an educational process of attending to thoughts and feelings and their influences on behaviors. The educational process, less structured in self-instructional training, is implicit within its training procedure.

Rehearsal components in stress-inoculation training and self-instructional training teach new skills, particularly coping and self-instructional skills. The purpose of rehearsal components is to modify self-regulating internal dialogue in order that permanent change may take place. Coping

self-statements are provided to handle failure, frustration, and unforeseen setbacks. New self-instructions and coping skills replace former negative or absent self-statements and self-instructions. In self-instructional training, changes in inner dialogue focus on acquisition of new skills for performing a task. In stress-inoculation training, changes in internal dialogue focus on replacing negative inner dialogue with positive, productive self-statements and self-instructions. This new self-regulatory internal dialogue replaces previous dialogue that interfered with or prevented desired behavior. Because assumptions, beliefs, and feelings (cognitive structures) that previously influenced the content of inner dialogue have been modified or eliminated, a new inner dialogue is more likely to be maintained.

The final phase in Meichenbaum's theory of cognitive-behavior change is mastery of new skills by systematic application across a variety of stressful situations. In self-instructional training, this mastery learning is accomplished through presentation of progressively more demanding tasks. These tasks have similar cognitive demands but their content varies across sensorimotor, cognitive, and social modalities. In stress-inoculation training, an in vivo application component provides for mastery learning of coping skills. Self-instructional training is included in the

application component, because it is an effective procedure for training new skills across a variety of settings.

In addition to structural compatibility with Meichenbaum's theory of cognitive-behavior change, the functional outcomes of self-instructional training and stress-inoculation training fit with theoretically-intended outcomes. Maintenance and generalization of treatment were hypothesized outcomes of cognitive-behavior change. Changes in underlying cognitive processes affect self-regulatory inner dialogue which in turn influences behaviors and cognitions. Meichenbaum maintained that behavioral and cognitive changes can become permanent and pervasive only when underlying cognitive structures are changed first, followed by modification of self-regulating inner dialogue. Stress-inoculation training was designed to facilitate maintenance and generalization effects. The functional analyses of stress-inoculation training, and, to a lesser degree, of self-instructional training provide evidence that these procedures do produce treatment effects that are maintained up to a year following treatment and that frequently generalize to other situations.

In summary, the structural and functional analyses of self-instructional training and stress-inoculation training provide evidence that these training procedures are compatible with Meichenbaum's theory of cognitive-behavior modification and

provide support for this conceptualization. In addition, the studies reviewed in this paper, formulated on this or similar conceptualizations, provided evidence that a large number of researchers generally agreed with Meichenbaum's theory.

Implications of These Conclusions

Implications for future research can be derived from the preceding discussions of self-instructional training and stress-inoculation training. An important consideration is the nomenclature used to distinguish these two training procedures. Meichenbaum (1977a) primarily distinguished self-instructional training and stress-inoculation training based on structural differences. However, when he discussed stress-inoculation training (1975c, 1977b, In press; Meichenbaum & Cameron, 1974), he referred to it as "self-instructional training." This lack of consistency has confused the two procedures. Some researchers referred to treatments very similar to stress-inoculation training as "self-instructional training," while "stress inoculation" also was used to refer to treatments like stress-inoculation training. The confusion about which term refers to which training procedure is unfortunate, if understandable. The confusion between these two training procedures was increased by Meichenbaum and Cameron's (In press) reference to a specific stress-inoculation training developed from their 1972b research and to a generic stress-inoculation

training, a general treatment paradigm. There seem to be multiple referents for the terms self-instructional training and stress-inoculation training.

Researchers need to standardize the terminology within the domain of cognitive-behavior modification. A name is needed for all treatments combining cognitive and behavioral training techniques. There likely will be a subset of cognitive-behavioral procedures focusing on self-instructional training techniques. This subset would include both self-instructional training and stress-inoculation training. Names to distinguish between self-instructional training and stress-inoculation training may be needed if these training procedures really are appropriate for differing populations and/or problems, as the literature has suggested. Finally, clarification of Meichenbaum's specific self-instructional training and stress-inoculation training procedures and their generic counterparts is needed along with distinguishing names.

In order to clarify the nomenclature of different treatments within cognitive-behavior modification, several lines of research may be necessary. Future research will need to examine cognitive and cognitive-behavioral treatments to determine whether the outcomes of cognitive-behavioral treatments differ from those of cognitive treatments. This research may specify the domain of cognitive-behavior modification procedures and may help develop a

global designation for this type of treatment. (Because there were instances of cognitive-only stress-inoculation training experiments [Glogower et al., 1978; Worthington & Shumate, 1981], clearer understanding and commonly-agreed upon definitions of cognitive, behavioral, and cognitive-behavioral treatments are of considerable importance.) Once the domain of cognitive-behavioral treatments has been delimited, subsets of these treatment paradigms might be established. Dismantling and theoretically-based studies of cognitive-behavioral treatments could help accomplish this task. Researchers need to cross-fertilize their efforts, replicating and expanding colleagues' research findings. Such collaborative research might diminish the confusion of differing empirical results from highly similar studies.

Once a subset of cognitive-behavioral treatments is established, it may be possible to differentiate between self-instructional training and stress-inoculation training, as described by Meichenbaum (1977a). Comparative outcome studies can compare, on one hand, the treatments derived from stress-inoculation training and self-instructional training and, on the other, treatments of specific and generic stress-inoculation training. Such research might establish the effectiveness of each of these cognitive-behavior treatments. Further research is needed to investigate the relative efficacy

of self-instructional training and stress-inoculation training in treating anxiety-based problems and in treating skill deficit problems. These experiments should compare these treatments singly, in combination, and in different sequences of treatment presentation. Finally, research is needed to determine what problems can be best remediated with self-instructional training and stress-inoculation training and which cannot. If these two training paradigms can be distinguished from each other and from generic treatments of the same names, names for specific and generic forms of each paradigm will be needed.

Elimination of confusion surrounding nomenclature will require a considerable body of dismantling research. This research will need to investigate stress-inoculation training as described by Meichenbaum (1977a) and, perhaps, generic stress-inoculation training. Dismantling studies investigating Meichenbaum's (1977a) stress-inoculation training ideally would include all seven components implemented as Meichenbaum described them. Such research may clarify not only which components are essential for treatment efficacy but also whether or not stress-inoculation training as described by Meichenbaum is a viable and separate paradigm from other treatments similar to stress-inoculation training.

Having defined and named distinctive treatment paradigms using cognitive-behavior modification treatments, research can

investigate specific concerns within stress-inoculation training. Differences between the rehearsal and application components in stress-inoculation training were not clear. Meichenbaum (1977a) stated that an *in vivo* application component included stressful, painful, or unpleasant experiences in which clients practiced newly-learned coping skills. This description suggests that application exercises should have different content and different settings than training exercises that were used in the rehearsal components. Meichenbaum included unpredictable electric shock, cold pressor test, imaginary stress, stress-inducing films, and failure and embarrassment situations as suitable application experiences (1977a, p. 156). Recently, Meichenbaum and Cameron (In press), included imagery rehearsal, coping imagery, and role-playing techniques as examples of application tasks. These latter techniques were used in many experiments, but it was not clear whether they were part of the acquisition learning (rehearsal) components or part of the mastery/generalization learning (application) component. Future research will need to investigate whether separate and distinct components are necessary for rehearsal and application training and whether there are experiences that are more suitable to one or the other of these activities.

This review asked whether self-instructional training and stress-inoculation training are the same or different training

procedures. The question was answered by comparing structural and functional analyses of these two training procedures. Then, results of these analyses were considered in relation to Meichenbaum's theory of cognitive-behavior modification. The paper demonstrated that self-instructional training and stress-inoculation training theoretically are part of the same procedure: cognitive-behavior modification. Structural differences in self-instructional training have, to date, been overshadowed by similarity in treatment intent and implementation of these procedures. Functional differences seemed to be related to differences in problems addressed. The research suggested that these differences generally do not differentiate the two treatments. However, self-instructional training may be more effective than stress-inoculation training as an initial treatment for problems that require specific skill training. This paper concludes that self-instructional training and stress-inoculation training are variants of the same training procedure--viz., cognitive-behavior modification. Self-instructional training was an early example of a cognitive-behavior modification treatment; stress-inoculation training illustrates a fuller development of this type of treatment. Further research needs to be done to clarify issues concerning the nomenclature of cognitive-behavior treatments, of variants of these treatments, and of the "active ingredients" in

these treatments. On the basis of the analyses reported herein, one would predict that future research will find that components contributing to the efficacy of stress-inoculation training will be highly similar to the effective components and methods already identified in self-instructional training.

This paper has investigated two variants of cognitive-behavior modification. It has been concluded that the two training procedures, self-instructional training and stress-inoculation training, are part of the same cognitive-behavior modification treatment.

References

- Alpert, R., & Haber, R. Anxiety in academic achievement situations. Journal of Abnormal and Social Psychology, 1960, 61, 207-215.
- Altmaier, E., Leary, M., Ross, S., & Thornbrough, M. Matching stress inoculation's treatment components to clients' anxiety mode. Journal of Counseling Psychology, 1982, 29(3), 331-334.
- Argulewicz, E., Elliott, S., & Spencer, D. Application of a cognitive-behavioral intervention for improving classroom attention. School Psychology Review, 1982, 11(1), 90-95.
- Armentrout, J. Parental child-rearing attitudes and preadolescents' problem behaviors. Journal of Consulting and Clinical Psychology, 1971, 37, 278-285.
- Arnold, S., & Forehand, R. A comparison of cognitive training and response cost procedures in modifying cognitive styles of impulsive children. Cognitive Therapy and Research, 1978, 2(2), 183-187.
- Asarnow, J., & Meichenbaum, D. Verbal rehearsal and serial recall: The mediational training of kindergarten children. Child Development, 1979, 50, 1173-1177.
- Bandura, A. Principles of Behavior Modification. New York: Holt, Rinehart & Winston, 1969.
- Beatty, L., Madden, R., Gardner, E., & Karlsen, B. Stanford Diagnostic Mathematics Test: Manual for Administering and Interpreting. New York: Harcourt Brace Javonovich, 1976.
- Bender, N. Self-verbalization versus tutor verbalization in modifying impulsivity. Journal of Educational Psychology, 1976, 68(3), 347-354.
- Bornstein, P., & Quevillon, R. The effects of a self-instructional package on overactive preschool boys. Journal of Applied Behavior Analysis, 1976, 9, 179-188.
- Brown, M. A set of eight parallel forms of the digit symbol test. Unpublished set of tests, University of Waterloo, 1969. Cited in R. Margolis & Shemberg, K. Cognitive self-instruction in process and reactive schizophrenics: A failure to replicate.

Behavior Therapy, 1976, 7, 668-671.

Bugental, D., Whalen, C., & Henker, B. Causal attributions of hyperactive children and motivational assumptions of two behavior-change approaches: Evidence for an interactionist position. Child Development, 1977, 48, 874-884.

Bugental, D., Collins, S., Collins, L., & Chaney, L. Attributional and behavioral changes following two behavior management interventions with hyperactive boys: A follow-up study. Child Development, 1978, 49, 247-250.

Camp, B., Blom, G., Hebert, F., & Van Doorninck, W. "Think Aloud": A program for developing self-control in young aggressive boys. Journal of Abnormal Child Psychology, 1977, 5(2), 157-169.

Carmody, T. Rational-emotive, self-instructional, and behavioral assertion training: Facilitating maintenance. Cognitive Therapy and Research, 1978, 2(3), 241-253.

Chandler, M. Egocentrism and anti-social behavior: The assessment and training of social perspective-taking skills. Development Psychology, 1973, 9, 326-332.

Chapman, J., & McGhie, A. A comparative study of disordered attention in schizophrenia. Journal of Mental Science, 1962, 108, 487-506.

Conners, C. A teacher rating scale for use in drug studies with children. American Journal of Psychiatry, 1969, 126, 884-888.

Conners, C. Rating scales for use in drug studies with children. Psychopharmacology Bulletin, 1973, (Special Issue), 24-84.

Cooley, E., & Spiegler, M. Cognitive versus emotional coping responses as alternatives to test anxiety. Cognitive Therapy and Research, 1980, 4(2), 159-166.

Douglas, V., Parry, P., Marton, P., & Garson, C. Assessment of a cognitive training program for hyperactive children. Journal of Abnormal Child Psychology, 1976, 4(4), 389-410.

Dunkel, L., & Glaros, A. Comparison of self-instructional and stimulus control treatments for obesity. Cognitive Therapy and Research, 1978, 2(1), 75-78.

Dunn, L. Expanded Manual for the Peabody Picture Vocabulary Test.

- Minneapolis: American Guidance Series, 1965.
- D'Zurilla, T., & Goldfried, M. Problem solving and behavior modification. *Journal of Abnormal Psychology*, 1971, 78, 107-126.
- Emmelkamp, P., Kuipers, A., & Eggeraat, J. Cognitive modification versus prolonged exposure in vivo: A comparison with agoraphobics as subjects. *Behavior Research and Therapy*, 1978, 16, 33-41.
- Emmelkamp, P., & Mersch, P. Cognition and exposure in vivo in the treatment of agoraphobia: Short-term and delayed effects. *Cognitive Therapy and Research*, 1982, 6(1), 77-88.
- Epstein, P., & Komurita, S. Self-esteem, success-failure and locus of control in Negro children. *Developmental Psychology*, 1971, 4, 2-8.
- Flavell, J., Beach, D., & Chinsky, J. Spontaneous verbal rehearsal in a memory task as a function of age. *Child Development*, 1966, 37, 283-299.
- Fremouw, W., & Zitter, R. A comparison of skills training and cognitive restructuring-relaxation for the treatment of speech anxiety. *Behavior Therapy*, 1978, 9, 248-259.
- Friedling, C., & O'Leary, S. Effects of self-instructional training on second- and third-grade hyperactive children: A failure to replicate. *Journal of Applied Behavior Analysis*, 1979, 12, 211-219.
- Fry, P. Resistance to temptation as a function of the duration of self-verbalization. *British Journal of Social Clinical Psychology*, 1978, 17, 111-116.
- Geer, J. The development of a scale to measure fear. *Behavior Research and Therapy*, 1965, 3, 45-53.
- Gendlin, E. Focusing. *Psychotherapy: Theory, Research and Practice*, 1969, 6, 4-15.
- Genshaft, J. The use of cognitive behavior therapy for reducing math anxiety. *School Psychology Review*, 1982, 11(1), 32-34.
- Genshaft, J., & Hirt, M. Race Effects in modifying cognitive impulsivity through self-instruction and modeling. *Journal of*

Experimental Child Psychology, 1979, 27, 185-194.

Genshaft, J., & Hirt, M. The effectiveness of self-instructional training to enhance math achievement in women. Cognitive Therapy and Research, 1980, 4(1), 91-97.

Girodo, M., & Roehl, J. Cognitive preparation and coping self-talk: Anxiety management during the stress of flying. Journal of Consulting and Clinical Psychology, 1978, 46(5), 978-989.

Glass, C., Gottman, J., & Shmurak, S. Response-acquisition and cognitive self-statement modification approaches to dating-skills training. Journal of Counseling Psychology, 1976, 23(6), 520-526.

Glogower, F., Fremouw, W., & McCroskey, J. A component analysis of cognitive restructuring. Cognitive Therapy and Research, 1978, 2(3), 209-223.

Goldfried, M., Linehan, M., & Smith, J. Reduction of test anxiety through cognitive restructuring. Journal of Consulting and Clinical Psychology, 1978, 46, 32-39.

Gottman, J., Gonso, J., & Rasmussen, B. Social interaction, social competence and friendship in children. Unpublished manuscript, Indiana University, 1974. Cited in D. Meichenbaum. Cognitive-Behavior Modification: An Integrative Approach. New York: Plenum Press, 1977(a).

Guralnick, M. Solving complex perceptual discrimination problems: Techniques for the development of problem-solving strategies. American Journal of Mental Deficiency, 1976, 81(1), 18-25.

Hackett, G., & Horan, J. Stress inoculation for pain: What's really going on? Journal of Counseling Psychology, 1980, 27(2), 107-116.

Hackett, G., Horan, J., Buchanan, J., & Zumoff, P. Improving exposure component and generalization potential of stress inoculation for pain. Perceptual and Motor Skills, 1979, 48, 1132-1134.

Halstead, W. Brain and Intelligence: A Quantitative Study of the Frontal Lobes. Chicago: University of Chicago Press, 1947.

Hines, E. & Brown, G. A standard stimulus for measuring vasomotor

- reactions: Its application to the study of hypertension. Proceedings of the Staff Meetings of the Mayo Clinic, 1932, 7, 332.
- Holroyd, K. Cognition and desensitization in the group treatment of test anxiety. Journal of Consulting and Clinical Psychology, 1976, 44(6), 991-1001.
- Holroyd, K., & Andrasik, F. Coping and the self-control of chronic tension headache. Journal of Consulting and Clinical Psychology, 1978, 46(5), 1036-1045.
- Holroyd, K., Andrasik, F., & Westbrook, T. Cognitive control of tension headache. Cognitive Therapy and Research, 1977, 1(2), 121-133.
- Holtzman, W., Thorpe, J., Swartz, J., & Herron, W. Inkblot Perception and Personality. Austin: University of Texas Press, 1961.
- Horan, J., Hackett, G., Buchanan, J., Stone, C., & Demchik-Stone, D. Coping with pain: A component analysis of stress inoculation. Cognitive Therapy and Research, 1977, 1(3), 211-221.
- Husek, T., & Alexander, S. The effectiveness of anxiety differential in examination stress situations. Educational Psychological Measurement, 1963, 23, 309-318.
- Hussian, R., & Lawrence, P. The reduction of test, state, and trait anxiety by test-specific and generalized stress inoculation training. Cognitive Therapy and Research, 1978, 2(1), 25-37.
- Kagan, J. Impulsive and reflective children. In J. Krumboltz (Ed.), Learning and the Educational Process. Chicago: Rand McNally, 1965.
- Kagan, J. Reflection-impulsivity: The generality and dynamics of conceptual tempo. Journal of Abnormal Psychology, 1966, 71, 17-24.
- Kagan, J., Rosman, B., Day, D., Albert, J., & Phillips, W. Information processing in the child: Significance of analytic and reflective attitudes. Psychological Monographs, 1964, 78(1, Whole Number 578).

- Kaplan, R., McCordick, S., & Twitchell, M. Is it the cognitive or the behavioral component which makes cognitive-behavior modification effective in test anxiety? Journal of Counseling Psychology, 1979, 26(5), 371-377.
- Kaufman, L. The development of a proverb scale for the measurement of thinking pathology in schizophrenia and a further investigation of the process-reactive dimension. Unpublished master's thesis, University of Illinois, 1960. Cited in D. Meichenbaum & Cameron, R. Training schizophrenics to talk to themselves: A means of developing attentional controls. Behavior Therapy, 1973, 4, 515-534.
- Kendall, P. On the efficacious use of verbal self-instructional procedures with children. Cognitive Therapy and Research, 1977, 1, 331-341.
- Kendall, P. Individual versus group cognitive-behavioral self-control training: 1-year follow-up. Behavior Therapy, 1982, 13, 241-247.
- Kendall, P., & Finch, A., Jr. A cognitive-behavioral treatment program for impulsivity: A group comparison study. Journal of Consulting and Clinical Psychology, 1978, 46(1), 110-118.
- Kendall, P., & Finch, A., Jr. Developing nonimpulsive behavior in children: Cognitive-behavioral strategies for self-control. In P. Kendall & S. Hollon (Eds.), Cognitive-Behavioral Interventions: Theory, Research, and Procedures. New York: Academic Press, 1979.
- Kendall, P., & Wilcox, L. Self-control in children: Development of a rating scale. Journal of Consulting and Clinical Psychology, 1979, 47, 1020-1024.
- Kendall, P., & Wilcox, L. A cognitive-behavioral treatment for impulsivity: Concrete versus conceptual training in non-self-controlled problem children. Journal of Consulting and Clinical Psychology, 1980, 48(1), 80-91.
- Kendall, P., & Zupan, B. Individual versus group application of cognitive-behavioral self-control procedures with children. Behavior Therapy, 1981, 12, 344-359.
- Leal, L., Baxter, E., Martin, J., & Marx, R. Cognitive modification and systematic desensitization with test anxious high school students. Journal of Counseling Psychology, 1981,

28(6), 525-528.

- Liebert, R. & Morris, L. Cognitive and emotional components of test anxiety: A distinction and some initial data. Psychological Reports, 1967, 20, 975-978.
- Lindquist, E. Design and Analysis of Experiments in Psychology and Education. Boston: Houghton Mifflin, 1953.
- Luria, A. The Role of Speech in the Regulation of Normal and Abnormal Behaviors. New York: Liveright, 1961.
- Malamuth, Z. Self-management training for children with reading problems: Effects on reading performance and sustained attention. Cognitive Therapy and Research, 1979, 3(3), 279-289.
- Margolis, R., & Shemberg, K. Cognitive self-instruction in process and reactive schizophrenics: A failure to replicate. Behavior Therapy, 1976, 7, 668-671.
- Matsushima, J. An instrument for classifying impulse control among boys. Journal of Consulting Psychology, 1964, 28, 87-90.
- McCarthy, D. Manual for the McCarthy Scales of Children's Abilities. New York: Psychological Corporation, 1972.
- McCroskey, J. Measures of communication-bound anxiety. Speech Monographs, 1970, 37, 269-277.
- McFall, R., & Lillesand, D. Behavior rehearsal with modeling and coaching in assertion training. Journal of Abnormal Psychology, 1971, 77, 313-323.
- McReynolds, W., Barnes, A., Brooks, S., & Rehagen, N. The role of attention-placebo influences in the efficacy of systematic desensitization. Journal of Consulting and Clinical Psychology, 1973, 41, 86-92.
- Meichenbaum, D. The effects of instructions and reinforcement on thinking and language behaviors of schizophrenics. Behavior Research and Therapy, 1969, 7, 101-114.
- Meichenbaum, D. Cognitive modification of test anxious college students. Journal of Consulting and Clinical Psychology, 1972, 39(3), 370-380. (a)

- Meichenbaum, D. Therapist manual for cognitive-behavior modification. Unpublished manuscript, University of Waterloo, 1972(b). Cited in K. Holroyd. Cognition and desensitization in the group treatment of test anxiety. Journal of Consulting and Clinical Psychology, 1976, 44(6), 991-1001.
- Meichenbaum, D. Self-instructional strategy training: A cognitive prosthesis for the aged. Human Development, 1974, 17, 273-280.
- Meichenbaum, D. Enhancing creativity by modifying what subjects say to themselves. American Educational Research Journal, 1975, 12(2), 129-145. (a)
- Meichenbaum, D. A self-instructional approach to stress management: A proposal for stress inoculation training. In I. Sarason & C. Spielberger (Eds.), Stress and Anxiety (Vol. 2). New York: Wiley, 1975. (b)
- Meichenbaum, D. Self-instructional methods. In F. Kanfer and A. Goldstein (Eds.), Helping People Change: A Handbook of Methods. New York: Pergamon Press, Inc., 1975. (c)
- Meichenbaum, D. Theoretical and treatment implications of developmental research on verbal control of behavior. Canadian Psychological Review, 1975, 16, 22-27. (d)
- Meichenbaum, D. Cognitive-Behavior Modification: An Integrative Approach. New York: Plenum Press, 1977. (a)
- Meichenbaum, D. Teaching children self-control. In B. Lahey and A. Kazdin (Eds.), Advances in Clinical Child Psychology II. New York: Plenum Press, 1977. (b)
- Meichenbaum, D., & Burland, S. Cognitive behavior modification with children. School Psychology Digest, 1979, 4, 426-433.
- Meichenbaum, D., & Cameron, R. An examination of cognitive and contingency variables in anxiety-relief procedures. Unpublished manuscript, University of Waterloo, 1972(a). Cited in D. Meichenbaum. Cognitive-Behavior Modification: An Integrative Approach. New York: Plenum Press, 1977. (a)
- Meichenbaum, D., & Cameron, R. Stress inoculation: A skills training approach to anxiety management. Unpublished manuscript, University of Waterloo, 1972(b). Cited in D.

- Meichenbaum. A self-instructional approach to stress management: A proposal for stress inoculation training. In I. Sarason & C. Spielberger (Eds.), Stress and Anxiety (Vol. 2). New York: Wiley, 1975(b); in D. Meichenbaum. Cognitive-Behavior Modification: An Integrative Approach. New York: Plenum Press, 1977(a); and in D. Meichenbaum & Cameron, R. The clinical potential of modifying what clients say to themselves. Psychotherapy: Theory, Research and Practice, 1974, 11(2), 103-117.
- Meichenbaum, D., & Cameron, R. Training schizophrenics to talk to themselves: A means of developing attentional controls. Behavior Therapy, 1973, 4, 515-534.
- Meichenbaum, D., & Cameron, R. The clinical potential of modifying what clients say to themselves. Psychotherapy: Theory, Research and Practice, 1974, 11(2), 103-117.
- Meichenbaum, D., & Cameron, R. Stress-inoculation training: Toward a general paradigm for training coping skills. In D. Meichenbaum and M. Jaremko (Eds.), Stress Prevention and Management. New York: Plenum Press, in press.
- Meichenbaum, D., Gilmore, J., & Fedoravicius, A. Group insight versus group desensitization in treating speech anxiety. Journal of Counseling Psychology, 1975, 23, 339-347.
- Meichenbaum, D., & Goodman, J. Training impulsive children to talk to themselves: A means of developing self-control. Journal of Abnormal Psychology, 1971, 77, 115-126.
- Meichenbaum, D., & Novaco, R. Stress inoculation: A preventative approach. In I. Sarason and C. Spielberger (Eds.), Stress and Anxiety (Vol 5). New York: Wiley, 1978.
- Meichenbaum, D., & Turk, D. The cognitive-behavioral management of anxiety, anger and pain. In P. Davidson (Ed.) The Behavioral Management of Anxiety, Depression, and Pain. New York: Bruner Mazel, 1976.
- Meichenbaum, D., & Turk, D., & Burstein, S. The nature of coping with stress. In I. Sarason & C. Spielberger (Eds.), Stress and Anxiety (Vol. 2). New York: Wiley, 1975.
- Melzack, R. The Puzzle of Pain. New York: Basic Books, 1973.
- Melzack, R., & Wall, P. Pain mechanisms: A new theory. Science,

1965, 150, 971-979.

- Mendonca, J. Effectiveness of problem-solving and anxiety-management training in modifying vocational indecision. Unpublished doctoral dissertation, University of Western Ontario, 1974. Cited in J. Mendonca & Siess, T. Counseling for indecisiveness: Problem-solving and anxiety-management training. Journal of Counseling Psychology, 1976, 23, 339-347.
- Mendonca, J., & Siess, T. Counseling for indecisiveness: Problem-solving and anxiety-management training. Journal of Counseling Psychology, 1976, 23, 339-347.
- Merskey, A. & Spear, F. The reliability of the pressure algometer. British Journal of Social and Clinical Psychology, 1964, 3, 130-136.
- Miller, L. School behavior check list: An inventory of deviant behavior for elementary school children. Journal of Consulting and Clinical Psychology, 1972, 38, 134-144.
- Mulac, A., & Sherman, A. Behavioral assessment of speech anxiety. Quarterly Journal of Speech, 1974, 60, 134-143.
- Nelson, W., & Birkimer, J. Role of self-instruction and self-reinforcement in the modification of impulsivity. Journal of Consulting and Clinical Psychology, 1978, 46(1), 183.
- Nomellini, S., & Katz, R. Effects of anger control training on abusive parents. Cognitive Therapy and Research, 1983, 7(1), 57-68.
- Novaco, R. A treatment program for the management of anger through cognitive and relaxation controls. Unpublished doctoral dissertation, Indiana University, 1974. Cited in K. Schlichter & Horan, J. Effects of stress inoculation on the anger and aggression management skills of institutionalized juvenile delinquents. Cognitive Therapy and Research, 1981, 5(4), 359-365.
- Novaco, R. Functions and regulation of the arousal of anger. American Journal of Psychiatry, 1976, 133, 1124-1128. (a)
- Novaco, R. Treatment of chronic anger through cognitive and relaxation controls. Journal of Consulting and Clinical Psychology, 1976, 44(4), 681. (b)

- Nowicki, S., & Strickland, B. A locus of control scale for children. Journal of Consulting and Clinical Psychology, 1973, 40, 148-154.
- Paul, G. Insight Versus Desensitization in Psychotherapy: An Experiment in Anxiety Reduction. Stanford, Calif.: Stanford University Press, 1966.
- Paul, G., & Shannon, D. Treatment of anxiety through systematic desensitization in therapy groups. Journal of Abnormal Psychology, 1966, 71, 124-135.
- Porteus, S. Qualitative Performance on the Maze Test. Vineland, N. J.: Smith, 1942.
- Porteus, S. The Maze Test: Recent Advances. Palo Alto, Calif.: Pacific Books, 1955.
- Quay, H. Measuring dimensions of deviant behavior: The behavior problem checklist. Journal of Abnormal Child Psychology, 1975, 5, 277-287.
- Raven, J. Guide to Using Progressive Matrices. London, England: H. E. Lewis Press, 1956.
- Raven, J. Standard Progressive Matrices Manual. New York: Psychological Corporation, 1965.
- Robin, A., Armel, S., & O'Leary, K. The effects of self-instruction on writing deficiencies. Behavior Therapy, 1975, 6, 178-187.
- Sarason, I. Test anxiety and cognitive modeling. Journal of Personality and Social Psychology, 1973, 28, 58-61.
- Schlichter, K., & Horan, J. Effects of stress inoculation on the anger and aggression management skills of institutionalized juvenile delinquents. Cognitive Therapy and Research, 1981, 5(4), 359-365.
- Schwartz, G., Davidson, R., & Goldman, I. Patterning of cognitive and somatic processes in the self-regulation of anxiety: Effects of meditation versus exercise. Journal of Psychosomatic Medicine, 1978, 40, 321-328.

- Shure, M., & Spivack, G. The PIPS test manual. Unpublished manuscript, Hahnemann Medical College and Hospital, Community Mental Health/Mental Retardation Center, Department of Mental Health Sciences, Philadelphia, Penn, 1974. Cited in B. Camp, et al. "Think Aloud": A program for developing self-control in young aggressive boys. Journal of Abnormal Child Psychology, 1977, 5(2), 157-169.
- Snyder, J., & White, M. The use of cognitive self-instruction in the treatment of behaviorally disturbed adolescents. Behavior Therapy, 1979, 10, 227-235.
- Spielberger, C., Gorsuch, R., & Lushene, R. The State-Trait Anxiety Inventory: (STAI) Manual. Palo Alto, Calif.: Consulting Psychologists Press, 1970.
- Sutton-Smith, B., & Rosenberg, B. A scale to identify impulsive behavior in children. Journal of Genetic Psychology, 1959, 95, 211-216.
- Terman, L., & Merrill, M. Measuring Intelligence: 1972 Norms Edition. Boston: Houghton Mifflin, 1973.
- Thorpe, G. Desensitization, behavior rehearsal, self-instructional training and placebo effects on assertive-refusal behavior. European Journal of Behavior Analysis Modification, 1975, 1, 30-44.
- Thyer, B., Papsdorf, J., Himle, D., McCann, B., Caldwell, S., & Wickert, M. In vivo distraction-coping in the treatment of test anxiety. Journal of Clinical Psychology, 1981, 37(4), 754-764.
- Turk, D. A skills-training approach for the control of experimentally-induced pain. Unpublished doctoral dissertation, University of Waterloo, 1975. Cited in D. Meichenbaum. Cognitive-Behavior Modification: An Integrative Approach. New York: Plenum Press, 1977(a); and in D. Turk. Application of coping-skills to the treatment of pain. In I. Sarason & C. Spielberger (Eds.), Stress and Anxiety (Vol. 5). New York: Wiley, 1978.
- Ullmann, L., & Giovannani, J. The development of a self-report measure of process-reactive continuum. Journal of Nervous and Mental Disease, 1964, 138, 38-43.

- Valerio, H., & Stone, G. Effects of behavioral, cognitive, and combined treatment for assertion as a function of differential deficits. Journal of Counseling Psychology, 1982, 29(2), 158-168.
- Vygotsky, L. Thought and Language. New York: Wiley, 1962.
- Watson, D., & Friend, R. Measurement of social evaluative anxiety. Journal of Consulting and Clinical Psychology, 1969, 33, 448-457.
- Wechsler, D. Manual: Wechsler Intelligence Scale for Children. New York: Psychological Corporation, 1949.
- Wechsler, D. Wechsler Intelligence Scale for Children--Revised: Manual. New York: Psychological Corporation, 1974.
- Weinreich, R. Inducing reflective thinking in impulsive, emotionally disturbed children. Unpublished master's thesis, Virginia Commonwealth University, 1975. Cited in P. Kendall & Finch, A., Jr. A cognitive-behavioral treatment program for impulsivity: A group comparison study. Journal of Consulting and Clinical Psychology, 1978, 46(1), 110-118.
- Welsh, G. Welsh Figure Preference Test: Preliminary Manual (research ed.). Palo Alto, Calif.: Consulting Psychologists Press, 1959.
- Weissberg, M. A comparison of direct and vicarious treatments of speech anxiety: Desensitization, desensitization with coping imagery, and cognitive modification. Behavior Therapy, 1977, 8, 606-620.
- Whitman, T., & Johnston, M. Teaching addition and subtraction with regrouping to educable mentally retarded children: A group self-instructional training program. Behavior Therapy. 1983, 14, 127-143.
- Williams, D., & Akamatsu, T. Cognitive self-guidance training with juvenile delinquents: Applicability and generalization. Cognitive Therapy and Research, 1978, 2(3), 285-288.
- Worthington, E., Jr., & Shumate, M. Imagery and verbal counseling methods in stress inoculation training for pain control. Journal of Counseling Psychology, 1981, 28(1), 1-6.
- Wright, J. The KRISP: A technical report. Unpublished

manuscript, 1973. Cited in S. Arnold & Forehand, R. A comparison of cognitive training and response cost procedures in modifying cognitive styles of impulsive children. Cognitive Therapy and Research, 1978, 2(2), 183-187.

Yellin, A., Kendall, P., & Greenberg, L. Cognitive-behavioral therapy and methylphenidate with hyperactive children: Preliminary comparisons. Research Communications in Psychology, Psychiatry and Behavior, 1981, 6(3), 213-227.