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Self-modeling with behavioral and setting enhancements for the treatment of performance-impaired athletes

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SELF-MODELING WITH BEHAVIORAL AND SETTING ENHANCEMENTS FOR THE TREATMENT OF PERFORMANCE-IMPAIRED ATHLETES

by

Ralph Bieber

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Abstract

SELF-MODELING WITH BEHAVIORAL AND SETTING ENHANCEMENTS FOR THE TREATMENT OF PERFORMANCE-IMPAIRED ATHLETES

by

Ralph Bieber

Adviser: Dr. N. Anastasiow

Fifty-four performance impaired competitive Karate athletes (35 males and 19 females aged 7 to 17 years) were randomly assigned to a control group or one of three videotaped self-modeling treatments. Self-modeling treatments systematically differed regarding the amount of contextual information presented. It was hypothesized that treatments with higher amounts of contextual information would result in greater reductions of performance impairment as measured by actual Karate performance. In addition, a self-report Karate Performance Self-efficacy Questionnaire was created and employed to test if changes in self-efficacy were causally related to shifts in competitive Karate performance. A significant difference attributable to treatment group was found at posttest for the measures of Competitive Karate Performance, Competitive Self-Efficacy and amount of Skill Recovery. Furthermore, as predicted, specific contrasts indicated that each successively higher level of treatment was associated with greater improvements in Competitive Karate Performance. Evidence also supported the hypothesis that self-efficacy operates as a causal variable in influencing Competitive Karate Performance. Data was also collected to test if a relationship existed between Performance Impairment and risk for general problems with social anxiety. Results indicated that a strong

relationship does exist. A discussion of the educational implications of the findings is included.

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INTRODUCTION

In the world of athletics, there are countless incidences of individuals who clearly demonstrated the capabilities to succeed in high pressure situations but did not (Leo, 1983). Of paramount concern to most competitive athletes is to perform at their best during competition.

Often, the difference between placing and simply participating in a competitive event amounts to whether the context of being observed by an audience and evaluated by judges enhances or debilitates the individual's performance.

The difficulty of otherwise competent individuals not being able to perform under the scrutiny of an audience or evaluators has long been noticed but has only recently been the subject of research (Marks & Gelder, 1966).

The aim of this dissertation study will be to test the efficacy of self-modeling treatments with behavioral and setting enhancements to help performance-impaired athletes learn to perform at optimum levels under competitive conditions. Performance impairment will be operationally defined as a behavioral skill decrement of 10% or greater, occurring in a competitive setting, as contrasted to a practice setting.

Self-modeling, a psychological treatment developed in the 1970's by several independent researchers, displays graphic images of the self performing only desirable behaviors (Creer & Miklich, 1970; Dowrick, 1976 Hosford, Moss & Morrell, 1976). The primary (but not the only)

medium used to capture and create these images has been videotape. Through the use of editing and special effects technology, researchers can construct tapes depicting subjects performing at their best. These tapes can also be edited to "show" potential future behaviors in settings subjects have not yet mastered. Dowrick (1991) has coined the term "feed forward" (in contrast to feedback) to describe this essential element of self-modeling.

Until recently, it would have been highly impractical for the average person to have access to the equipment needed to produce or play back such images. Therefore, treatments employing this technology could not have been done. With the advent of home video technology and wide-scale affordable access to video production equipment, self-modeling tapes have become a practical possibility. Videotapes have several advantages:

1) they allow a graphic documentation of success, which has been shown to enhance self-efficacy (Bandura 1977a, 1984, 1986; Dowrick, 1991);
2) they allow the use of the self as a model, thereby increasing identification by decreasing model discrepancy and increasing attention (Fuller & Manning 1973; Rosenkrans, 1967);
3) through editing and special effects, videotape playback can add a dose of competence, power and attractiveness to the self -- elements shown to have positive impact on learning (Mischel & Grusec, 1966);

4) they decrease the amount of time spent with treatment personnel, thereby making them more cost-effective and accessible (Kahn, Kehle, Jenson & Clark 1990);
5) they allow for quality control over behavior while exposure occurs through the use of editing;
6) they allow an endlessly retrievable document, which can enhance the durability of treatment gains by giving the subject access to infinite review of the treatment (Dowrick 1991; Dowrick & Biggs 1983);
7) the graphic images of video bypass individual variations in the ability for using guided imagery.

In the creation of a self-modeling tape, editing methods can be employed to improve behavioral errors and even alter and enhance the settings in which the behaviors occur. Behavior flaws from an "anxious" competitive performance can be removed, and outcomes from successful practice performances can be edited in their place (this is called "displaced outcome") (Dowrick 1991).

Backgrounds from competitive settings, complete with audiences, judges and evaluations, can be realistically coupled to successful practice performances, thereby displaying to the viewer successful performances in currently unmastered situations This is called "setting enhancements".

The recent display of "competitive nerves" that impaired so many Olympic figure skaters in the 1992 Winter Olympics is a timely example of how highly skilled athletes

can lose access to their skills in competitive settings. Would the repeated viewing by the athletes of their potential future performances, realistically displayed against the background of an Olympic audience, complete with media and judges, have helped their performances? Would some of the athletes have performed at their optimum if they had had the benefit of these kinds of self-modeling tapes?

A History of Social Anxiety

As noted earlier, Marks and Gelder (1966) first studied situations where ordinary behavior, such as writing one's name in a hotel register, eating at a public lunch counter or urinating in a public lavatory, became impossible or highly aversive. Yet these same behaviors were performed flawlessly and with no apprehension by the same individuals in private. In 1980, this phenomenon was codified as social phobia, and entered the Diagnostic and Statistical Manual of Psychiatric Disorders, III (DSM III, 1980), under the new heading of Social Phobia. When the condition is manifested in a highly circumscribed domain, such as fear of giving musical performances or public speaking, it is referred to as a "Focal Social Phobia" (Barlow, 1988).

One does not have to avoid the activity completely in order to be a focal social phobic: It is sufficient to experience high levels of distress during engagement for a diagnosis of Focal Social Phobia to be given (Barlow, 1988; DSM III-R, 1987).

While this trait exists in the clinical population of social phobics, it is not restricted to this population. This can be attested to by the various self-report and assessment measures that document the existence of a continuum of features of Social Phobia that run from mild sub-clinical manifestations through severe, highly debilitating ones (Craske & Craig, 1984; DiNardo, et al., 1985; Glass, Merluzzi, Biever & Larsen, 1982; Marks & Matthews, 1979; Watson & Friend, 1969).

Included in this population are a group of athletes who may not be Social Phobics in the clinical sense according to the most recent DSM III-R (1987) criteria, but who are just too anxious to perform at peak levels because they experience subclinical levels of Social Phobia (The DSM III-R retained the heading Social Phobia). For the purpose of this study, instances of behavioral performance decrements that are attributable to the features of Social Phobia will be of significance. Thus, the population of subjects that will be admitted into this study may not necessarily be equal with respect to severity to a clinically defined group of Social Phobics according to DSM III-R criteria. However, they will share manifestations of the trait.

Social Phobics

In addition to underachieving in the specific area in question, Social Phobics are likely to experience lower self-esteem, loss of valuable social approval and concurrent deficits in areas ranging from academics to employment

(Arkowitz, Lichtenstein, McGovern & Hines, 1975; Kratchwill, 1981). This can be attested to by the improvement in these areas which have been documented when performance anxious individuals have been successfully treated (Barlow, 1988). In addition to a continuum from mild to severe, Social Phobia runs across a broad spectrum of social activities.

In actuality, the prevalence of Social Phobia extends to all populations that have difficulty performing at optimal levels in social settings or that perform with great distress and lower levels of performance. Because there is almost no data on the subclinical population suffering from manifestations of this trait, the bulk of reporting in this review will draw from the population of subjects defined as Social Phobics according to DSM III-R (1987).

Prevalence

It has been estimated that the prevalence of this disorder is between 1.2 and 2.2 percent, with a slightly greater proportion presenting itself in women (DSM III-R, 1987). In comparison to other anxiety disorders, several surveys have shown Social Phobia to represent 12 to 15 percent of the cases that come to anxiety disorder clinics for treatment; the mean age of onset has been noted to be between 15 and 20 years of age (Barlow, 1988).

There are reasons to believe that these statistics are conservative estimates. First, the data from other highly circumscribed anxiety disorders -- for example Simple Phobia such as fear of flying or small animals -- indicate that

very few individuals ever bother to come for treatment even though they report suffering from the disorder (Agras, Sylvester & Oliveau, 1969). These individuals are apparently able to avoid the triggering cues of their aversive experience and, therefore, are often able to circumvent the distress and behavioral impairments that result (Barlow, 1988). Thus, most of these individuals only come for psychological treatment if other psychological problems in addition to the circumscribed anxiety disorder manifest themselves.

Second, individuals may more readily attribute their adverse reactions to stable internal dispositions, such as shyness or poor ability (Heimberg, Dodge & Becker, 1987). Third, especially in cases of highly complex behaviors, faulty performance may wrongly be ascribed to skills deficits or insufficient training. Fourth, even moderate levels of apprehension may significantly impair the performance of complex behaviors because of slight cognitive distractions; these lower levels of subjective distress may not be sufficient to motivate seeking treatment (Kendrick, Lawson, & Davidson, 1982).

A Review of Past Studies Aimed at the Treatment of Social Phobia

The mis-attributions and confusions that many Social Phobics hold regarding their own disorder is echoed by professionals (Falloon, Lindley, McDonald & Marks, 1977; Stravynski, Marks & Yule, 1982). Many of these researchers

have not clearly delineated alternative causes for performance impaired subjects. For example, Social Phobias, Avoidant Personality Disorders and Social Skills Deficit nosologies have often been grouped together in research or therapy (Brady, 1984; Emmelkamp, 1982), and, therefore, these heterogenous groupings have frequently made analysis of research outcomes difficult to interpret.

More recently, attempts have been made to separate these groups (Heimberg et. al. 1987; Turner, Beidel, Dancu & Key, 1986). An early study that made efforts to control for the differential effects of treatments for Social Phobics and Social Skill Deficit subjects was conducted by Trower, Yardley, Bryant and Shore (1978). They divided subjects into two groups, predominantly Socially Phobic or predominantly Social Skills Deficient. Treatments were either social skills training or systematic desensitization. Outcomes indicated that while Skills Deficit subjects benefitted substantially more from skills training, Social Phobics improved equally with either treatment. In similar studies conducted by Shaw (1979), and Ost, Jerremalm & Johansson (1981), these results were replicated.

The treatment outcome for skills deficit subjects was predictable; however, the fact that Social Phobics were equally helped by either treatment conflicts with initial research predictions. Upon further analysis, however, it was found that there wasn't a conflict. Even though it appeared that the Social Phobics improved equally with

either treatment, there was an indirect ingredient common to both--exposure to the problematic situation, which was direct in the skills training and symbolic in desensitization.

The systematic use of exposure as a primary treatment component for Social Phobia has been tested by Vermilyea, Barlow & O'Brien, (1984). These researchers used a single case design, applying both cognitive and exposure strategies at varying times. Improvements at first appeared to have occurred sporadically across both treatments; however, when the researchers scrutinized the results carefully, a pattern eventually emerged. The researchers found a high correlation between subjects' engagement in practice exposure and improvements.

Actual practice did not always take place when scheduled; the researchers had to calculate practice time from self monitoring records. Thus, subjects' records indicated they practiced exposure during cognitive treatment phases: It was only during those times of the cognitive treatment phase that improvement accrued.

An important implication of this finding is that effects attributed to non-exposure strategies, such as, cognitive strategies, in this case--may not always be accurate. Careful assessment and control measures need to be taken if exposure is to be ruled out because of the potential for self-initiated exposure practice effects during those times.

Public Writing Phobics

Biran, Augusto & Wilson (1981) conducted a similar study with three subjects who lost the ability to write under the scrutiny of social observers. They used cognitive strategies on two subjects for the first phase of treatment. The second phase of treatment for these two subjects was small group exposure practice. The third subject received small group exposure practice from the onset of treatment. No improvements were observed during the cognitive phase, whereas once exposure practice was initiated, treatment gains were rapid and significant. The subject who received exposure from the onset showed steady gains throughout.

Social Phobics

Very few normatively designed studies of the differential effects of exposure on Social Phobia have been conducted. Of this small number, two major studies that used homogeneously diagnosed subjects were conducted by Butler, Cullington, Munby, Amies & Gelder (1984) and by Heimberg, Dodge, Hope, Kennedy, Zollo & Becker (1988). These studies also investigated the potential additional benefits of cognitive strategies. The groups in both studies were: exposure; exposure plus cognitive enrichment; control condition.

All exposure groups improved significantly in contrast to the control groups. The interesting finding in these studies was that cognitive enrichment groups had greater improvement than practice exposure groups alone. In the

Butler et al (1984) study, these treatments were not noticeable immediately after the study, but appeared in a six month follow up, at which time the enrichment exposure groups were clearly superior.

In the Heimberg et al (1988) study, the enrichment group was not only superior at the six month follow up, but rated higher on many measures immediately after treatment. These results suggest that changes in cognitive pattern structures appear to be helpful in treating Social Phobia.

The results of the Butler et al (1984) study and the Heimberg et al (1988) study contradict earlier work concerning the positive contribution of cognitive treatment elements in the treatment of Social Phobia. In fact, the results of these two studies conflict with the bulk of studies, which have found that cognitive interventions rarely add anything of significance to exposure alone in the treatment of any type of anxiety disorder (Barlow, 1988).

Why have the Butler, et al. (1984) and Heimberg, et al. (1988) studies obtained these new findings? An intriguing possibility is the nature of the tasks which some Social Phobics must engage in in order to overcome their phobia. Unlike Simple Phobics, who usually need to only perform very elemental behaviors, such as a claustrophobic walking into a closet or a small animal phobic remaining in the presence of a mouse or a dog, many social phobics must perform very complex behaviors, such as delivering a lengthy speech, playing a highly complex piece of music, or executing a

difficult series of figure skating maneuvers (in contrast to other social phobics who only need to perform simple behavior such as writing their name or eating).

It is possible that slight amounts of distraction, which are brought about by counter productive thinking patterns exert a more significant impact on the execution of these more complex behaviors. The study by Kendrick et. al. (1982) compared the effectiveness of a cognitive treatment, a behavioral rehearsal treatment and a wait-list control group for musicians who were severely performance phobic. The cognitive treatment package included viewing videotapes that depicted each performer playing with great amounts of anxiety and making errors. After viewing the tapes, discussions were held where the importance of on-task thinking and the shifting from negative to positive thoughts were emphasized. The behavioral treatment consisted of practice exposures to playing in front of an audience.

At posttest, both active treatment groups were superior to the wait-list control group. At a follow-up evaluation, however, the cognitive group was judged as performing with significantly less visible anxiety and demonstrating significantly higher overall quality playing. This study supports the findings in the Heimberg et al. (1988) and Butler et al. (1984) studies and suggests that earlier findings were inaccurate in their conclusions that cognitive elements in treatment would not significantly add anything to exposure alone in the treatment of anxiety, especially

when pertaining to Social Phobics engaged in performing complex behaviors.

Panic Disorders

It is interesting to note that evidence for the additional effectiveness of cognitive treatment components above exposure alone have not emerged until these studies. More recent studies involving the treatment of other anxiety disorders, such as Panic Disorder, have found that even in treatments where cognitive interventions are not provided--as in drug treatments or exposure alone--subjects who do not develop new patterns of thinking in the face of anxiety triggers relapse at alarming rates after treatment is discontinued (Barlow, Brown, Craske, Rapee, & Antony; 1991, Clark, Salovskis, Hackman, & Gelder; 1991, Margraf, Dornier & Schneider; 1991). Thus evidence is appearing that suggests that cognitive alterations must occur, either through direct treatment strategies or as byproducts for long-term improvement to occur even in the treatment of anxiety disorders other than Social Phobia.

Though exposure-based treatments have been found to be highly efficacious, they are not without their problems. The primary problems are:

1) Some exposure treatments result in highly adverse, intensely uncomfortable experiences for subjects. Major survey studies have estimated 12 percent as the median dropout rate in exposure-based treatments for anxiety (Jansson & Ost, 1982). Dropout rates increase

dramatically as exposure strategies become more aversive (Emmelkamp & Wessels, 1975; Emmelkamp & Ultee, 1974).

2) Of the subjects who do not drop out, many fail to significantly improve. For example, in the literature on Agoraphobia treated with exposure, 30 to 40 percent failed to make significant improvements (Barlow, 1988). Of those that do improve, a relapse rate of up to 50 percent has been noted (Munby & Johnston, 1980).

3) Many exposure-based treatments employ therapists assistants to ensure that exposure occurs. This assistance has been found to foster dependency and to interfere with sustained self-initiated practice, a major source of initial and maintenance treatment gains (Mathews, Teasdale, Munby, Jonston & Shaw, 1977).

In order to better understand why exposure is not always beneficial, several issues must be explored.

Exposure Treatments: Three Primary Variations

How is exposure used in treatments? Are there different strategies for employing exposure and do these different strategies account for differential treatment effects? What are the theories that explain why exposure is effective? How do these theories guide the way exposure strategies are designed and employed?

Even Freud (1926) acknowledged the need for patients to be directly exposed to their fears in order to obtain a satisfactory cure. But Freud's prescription was not systematically employed or theoretically developed.

Systematic use of exposure in therapy can be traced to Wolpe's pioneering work in the 50's (Wolpe, 1954; 1958). Since that time through the present, exposure treatments have varied primarily in three ways:

1) direct vs. symbolic;
2) gradual vs. intense or massed;
3) subject control vs. no subject control (Barlow, 1988).

For direct exposure treatments, therapists or researchers arrange to have subjects put in actual contact with the feared objects or situations. Often treatment personnel will accompany subjects to ensure that exposure has occurred and is of sufficient intensity, duration or frequency. Symbolic exposure, for example can be accomplished through "guided imagery" (Wolpe, 1958), analog role plays (Heimberg, Becker, Goldfinger & Vermilyea, 1985), and techniques employed in variations on observational learning, such as modeling (Bandura 1971; Bandura & Rosenthal, 1968), or self-modeling (Dowrick 1991; Dowrick & Biggs, 1983).

For graduated exposure techniques researchers frequently use hierarchical organizations of anxiety and fear-producing stimuli. These stimuli are then presented systematically to the subject. Often movement to a more aversive stimuli in the hierarchy does not occur until sufficient subjective comfort is developed with less aversive stimuli in the hierarchy. (Wolpe, 1958).

Intensive exposure, in contrast, aims to bombard the subject with maximum doses of anxiety- or fear-producing stimuli (Marshal, 1985; Watts, 1979).

Flooding is a technique that typically applies intensive, relatively long duration exposures through the use of guided imagery. Intensive, frequent and long duration exposures to anxiety-producing stimuli are not limited to indirect treatment strategies, however. For example, the most typical approach to treating Agoraphobia in many clinics is direct exposure to the Agoraphobic's most terrifying situations for prolonged periods of time, often with therapists' assistance (Barlow, 1988).

Subjects exposed to fear- and anxiety-producing stimuli can either be given control over terminating, increasing or continuing exposure--or not. Wolpe's systematic desensitization treatment emphasizes a subject control approach within an symbolic exposure format.

In a direct exposure format, Agras et. al. (1969) developed a system for treating Agoraphobics where the subject controls reinforced practice trials. The subject completely controls the amount of direct exposure he or she wishes to encounter. Whatever amount of exposure the subject reported when he/she again had contact with the therapist was met with social reinforcement and approval.

Exposure, whether applied within the framework of the three variations presented above, or in differing and novel ways, has formed one of the most productive bases of

treatment for anxiety and fear reduction (Barlow, 1988; Kratochwill, 1981). However, several questions remain: First, are there methods of exposure that are more beneficial than others; and second, why?

To begin answering the first question, it would be helpful to present a more careful analysis of the functional relationship between the negative side effects of exposure treatments and types of exposure. For example, a significant problem with exposure-based treatments is the dropout rate (Jansson & Ost 1982).

Jansson and Ost (1982) have extensively surveyed the literature and found, as cited previously, that the median dropout rate associated with exposure treatments anxiety disorders is 12 percent. While ultimately 12 percent will not be an acceptable number, it is highly preferable to the significantly greater dropout rate which is associated with exposure treatments that are experienced as extremely aversive (Emmelkamp & Ultee, 1974; Emmelkamp & Wessels, 1975).

The types of exposure treatments usually experienced as very aversive (with higher drop out rates) have two characteristics:

1) They are intensive or massed, "high dose" exposures, rather than gradual, mildly dosed ones.

2) Subjects often are not given control over the frequency or duration of the exposure;

> rather, only the clinician has the authority to stop exposure. The criteria for terminating the exposure is usually based on the subject's adverse reaction, often related to arousal level "peaking out" or beginning to fatigue and lessen. (The theoretical implications of this will be discussed later.)

For subjects who do not drop out, another difficulty associated with exposure treatment for many clients is insufficient improvement. For example, in the treatment of Agoraphobia, as many as 30 to 40 percent of agoraphobic clients fail to improve (Jannson & Ost, 1982). As stated above, one of the most common exposure treatments applied to Agoraphobia is therapist-assisted, intensive, direct exposure.

Clients undergoing this treatment were often put on a bus in small groups and taken to a local shopping center, where they were instructed to remain for prolonged periods of time -- often four or more hours (Barlow, 1988). In contrast to this treatment approach, recent evidence confirms that the early approach expressed by Agras, Leitenberg & Barlow (1968) using self-limited exposure with instructions to only continue exposure until undue anxiety commences, produces at least equal and usually superior outcomes, both in percentages of success and quality of success compared with intensive in vivo flooding (Emmelkamp,

1974, 1982). Researchers have recently suggested why less intensive exposure with self-limiting elements may be superior (deSilva & Rachman, 1981; Rachman, Craske, Tallman & Solyom, 1986). These researchers maintain that the self directed elements in many milder exposure techniques may heighten perceptions of control, and self efficiacy which short circuits the process of anxiety and fear.

In contrast, these researchers believe that intensive in vivo exposure with therapist control fosters perceptions of dependency and low efficacy, and may actually increase faulty cognitive styles that set in motion and maintain dysfunctional levels of anxiety. Aside from positively enhancing these cognitive mediating events, subjects who are treated with milder forms of exposure tend to continue to self expose after treatment is terminated (Barlow, 1988).

As Barlow states, "...it has been consistently observed that continued progress after treatment is terminated does not occur with intensive therapist assisted in vivo exposure" (Barlow, 1988, page 414). Barlow goes on to note that this constitutes a significant problem because most treatments that aim to reduce anxiety and fear do not reach sufficient levels of success at the time of treatment termination.

Instead, they rely on the patient's sustained efforts at exposure after treatment is terminated for sufficient improvement to ultimately occur. Furthermore, Mathews et. al. (1977) conclude that intensive in vivo exposure

treatment produces therapist dependency, which precludes self-initiated practice.

A related conclusion is that even while treatment is in progress, most subjects do not practice in the significant target areas -- the home, the workplace, performance arena, etc. --because of their dependency (Mathews, et.al., 1977).

Furthermore, the need for a therapist to be present during exposure practice times because of the level of adversity puts an added financial burden on the subject. If less-therapist-intensive treatments are equal or superior to more-therapist-intensive treatments, it may be in the best interests of clients to use such treatments.

In fact, there have been several studies that investigated the relationship of therapists' contact time and treatment effectiveness (Ghosh, Marks & Carr, 1984; Kahn et. al. 1990; Mathews, Gelder & Johnston, 1981; Weekes, 1973, 1976;). In general, these studies indicate that at least the same benefit can be accrued by the subject with very little therapist contact as with more intensive therapist. The only exception to this seems to be for severely impaired patients, where for any exposure to occur, therapist assistance is absolutely necessary (Barlow, 1988).

Finally, some early research indicated that greater treatment gains were made with the use of direct exposure (Barlow, Leitenberg, Agras & Wincze, 1969) as opposed to

symbolic exposure. These early analyses tended to only look at gains immediately after termination, however. They failed to analyze treatment gains at follow-up periods. Studies that looked at follow-up comparisons found a "catch-up effect" associated with methods of indirect or symbolic exposure. Additionally, these studies found that many symbolic exposure treatments ultimately surpass treatment gains of direct exposure treatments (Munby & Johnston, 1980).

A rationale offered by some theorists for this is that symbolic exposure results in more self initiated practice in the actual target areas; in direct exposure, more practice tends to occur in the contrived situation around the office or clinic (Mathews, et al., 1977).

The increased levels of self-directed exposure resulting from symbolic exposure treatments may marry well with the belief that it is not exposure per se that causes improvement, but the alteration of faulty cognitive processes.

Taking into account the risks, costs, and limited potential for gains after treatment termination associated with intensive direct exposure treatments, at present it appears that some form of symbolic, at most mildly adversive, self-initiated exposure which fosters an increased sense of self-efficacy is to be preferred. To study if this type of treatment approach will improve

performance and undermine the faulty cognitive processes which may be associated with anxiety is a likely direction for future research.

Exposure and the Mechanisms of Anxiety Reduction

What is the mechanism of action that allows exposure to reduce anxiety or fear responses? While exposure is a common element employed to treat individuals suffering from excessive anxiety and fear, exposure itself is not a theory of therapeutic action (Rosenthal & Bandura, 1978). Rosenthal and Bandura emphasize that not all exposures are equal in their information giving properties, even if they are of equal duration.

Indeed, subject differences and contextual information differences may vary infinitely; watching a model who is similar to an observer provides different information than watching one who is dissimilar (Rosenkrans, 1967). Watching successful and adaptive functioning is different from watching failure and psychopathological functioning, even if exposure length is held constant.

According to Barlow (1988), five major theories have been developed that try to account for the general process of anxiety reduction during exposure. These are:

1) habituation;

2) extinction;

3) toughening up;

4) emotional processing;

5) self-efficacy.

All of these theories (except for self-efficacy) come out of a neurophysiological/biochemical perspective (Barlow, 1988; Izard, 1977). The most heavily weighted dependent variable in this type of theory is arousal and supportive physiology in general. By emphasizing the role of supportive neurophysiology and biochemistry, these theories have developed specific theoretical biases regarding the use of exposure. In two of the theories--toughening up and habituation--exposure is conceptualized as acting directly on arousal as manifested in measures such as neuroadrenal level, GSR and heart rate (Lader & Wing, 1966; Weiss, Glazer & Pohorecky, 1976).

The basic premise of these theories is that short term exposure to anxiety producing stimuli will result in overall increases of arousal, whereas prolonged high intensity exposure will eventually result in overall decreases. For example, in Gray's (1985) bioinformational theory, animals that were exposed to prolonged aversive stimuli showed an increased resistance toward becoming negatively aroused. According to these theories, exposure reduces fear through neurophysiological and biochemical fatigue resulting in receptor desensitization (Gray, 1985, Lader & Wing, 1966; Weiss, et al., 1976).

A close theoretical relative to habituation and toughening up is extinction theory (Pavlov, 1927; Rescorla, 1979). Extinction theory differs from habituation and toughening up because it primarily deals with learned

responses, whereas the former theories primarily deal with unlearned responses, controlled at a relatively low level of the brain (Groves & Lynch, 1972).

Another distinction is the potential for permanent change. Because no learning is believed to occur in habituation or toughening up, reductions in arousal or accompanying fear are considered only temporary.

In contrast, extinction is believed to result in changing the subjects' learned associations between fear producing cues and outcomes. For example, during exposure of maximal intensity, subjects are required to stay long enough to disconfirm their worst fears, not merely fatigue their supportive physiology. The indices used to measure this are both a biochemical, neurophysiological index--a fatiguing or reduction in arousal level, plus a lessening of subjective distress, often measured in a SUDs (Subjective Units of Distress) level.

Therapeutic strategies to supervise subjects so that sufficient duration of exposure occurs is crucial, for according to this theory subjects who exit a fear or anxiety producing situation early will never acquire the necessary learning to disconfirm their initial expectations. Instead, if the subject escapes the fear producing environment before arousal and SUDs levels decrease, reinforcement of old, faulty expectations will occur. This ultimately increases the fear response in the future (Seligman & Johnston, 1973).

There are several major difficulties with the theories outlined thus far. First, they are exceedingly reductionistic. Although supportive neurophysiology and biochemistry probably play a role in fear and anxiety, it is hard to believe that all behavioral and cognitive manifestations of fear and anxiety could be successfully mapped onto these events (Barlow, 1988). Second, there are studies that have clearly documented reductions in fear and anxiety in subjects who have escaped exposure situations before achieving maximal arousal and subsequent fatiguing of response and reductions in SUDs levels (Agras et al., 1968; Emmelkamp, 1982; Rachman, Craske, Tallman & Solyom, 1986). Third, none of these theories clearly and sufficiently describe what is being learned in exposure situations, which ultimately contributes to fear and anxiety reductions. Fourth, there is evidence that suggests it is the transfer of arousal to productive deployment in action that eliminates anxiety--not a reduction in arousal (Zillmann, 1983).

Emotional Processing Theory

Emotional processing theory (Lang, 1985) is based on a bioinformational model. It shares similar roots with habituation, extinction and toughening up in that once again, the main indices of fear and anxiety are measured by the level of neurophysiological and biochemical activity. However, emotional processing theory places a tremendous

emphasis on how learning impacts the supportive physiological events of fear and anxiety.

In fact, Lang has developed a comprehensive theory of emotion, and his treatment of fear and anxiety is to be viewed as just one aspect of this entire theory. Lang believes that the mind stores emotions in the form of elaborate descriptions--or what he terms "propositions" (Lang, 1977, 1985). He divides propositions into three types: "stimulus propositions", "response propositions" and "meaning propositions." Changes in emotion or behavior are possible only through the alteration of propositions.

In order to change the nature of a proposition, Lang believes it must first be evoked; direct or symbolic exposures are the primary methods of evocation. If new information can be processed during these times, the nature of the propositions can change and hence, feelings and behaviors can change.

Although Lang's theory is rich in its descriptive detail, it runs into scientific difficulty on two grounds. First, as with other biologically based theories, arousal is unreliably associated with discreet emotional or behavioral events (Lang, 1977; Rachman, et al. 1986; Vermilyea, Barlow & O'Brien, 1984;). This is extremely problematic for Lang because he believes there is a positive correlation between higher levels of arousal and more complete processing. In contradiction to this, Rachman, et. al. (1986) found that the behavior and experience of subjects involved in

performing a dangerous activity were not correlated with their level of arousal; their arousal was high, yet they did not behave fearfully, nor did they report experiencing any fear. In a similar vein, Vermilyea, et al. (1984) reported that subjects who successfully completed a fear and anxiety reduction treatment showed no decrements in their levels of arousal from pre- to post-measures.

A second problem for Lang's theory is the scientific difficulty of studying "deep structures" of the mind, which Lang refers to as "propositions." To date there is little hard evidence that adequately specifies or supports their existence, let alone supports how their alterations are functionally connected to changes in emotion (Barlow, 1988).

In spite of these difficulties, Foa and Kozak (1986) built a therapeutic approach based on Lang's model. The central concept in their therapeutic approach is to present a subject with incompatible information regarding their propositions while in a fear or anxiety inducing setting. They believed that the processing of the incompatible information, rather than exposure per se, would account for the essential impact on fear and anxiety reduction.

They saw exposure and arousal as merely necessary conditions that evoke the propositions that an individual holds; these propositions are changed according to processing of incompatible information, not because of exposure per se. This therapeutic concept bears some similarities with Wolpe's (1959) notion of "reciprocal

inhibition" -- a behavioral therapy in which responses are conditioned that are incompatible with the response to be eliminated. For instance, Wolpe attempted to condition relaxation, which is a response that is incompatible with anxiety. However, it differs significantly in that the propositions that are evoked in Lang's system are broader and more varied, and allow for far more types of learning; they are not simply couched in terms of relaxation versus anxiety or tension.

Foa and Kozak believe that during exposures, subjects are capable of learning that 1) their anxious discomfort will not last forever; 2) that the probability of harm or danger is low; 3) that negative affect may diminish; and 4) that they are more competent at dealing with the situation than they had previously imagined.

This approach clearly stresses information processing, not simply reciprocal inhibition. There is evidence that in exposures where subjects are distracted, or where misinformation is provided, far less anxiety and fear reduction occurs, thus supporting the notion that it is not exposure itself, but the broad learning potential of an exposure situation that is most significant (Grayson, Foa & Steketee, 1982; Rachman, 1980; Sartory, Rachman & Grey, 1982). The implication of this is that exposure may be helpful only to the degree that successful information processing occurs which alters faulty cognitive processes that are at the heart of anxiety maintenance.

Self-Efficacy -- Bandura

Another theory that focuses on the information giving properties of exposure is Bandura's self-efficacy theory

(Bandura, 1977a,b; 1982a,b; 1984). This theory stresses the impact of experience, which may in turn influence a sense of behavioral mastery. In fact, Bandura hypothesizes that the essential reason for the success of all fear and anxiety reduction treatments is increased self-efficacy expectations (Bandura, 1984). A primary source of mastery information is direct exposure that results in successful outcomes (Bandura, 1977a; 1984).

However, direct exposure is not the only source of such information; much of Bandura's contributions to clinical treatment and research has been in the area of symbolic or vicarious learning through modeling (Bandura, 1977; Bandura & Rosenthal, 1966). Bandura has shown that much of what we learn is through the observation of others. Thus, mastery experience and increases in self efficacy can accrue through alternative pathways. The specific conditions which may produce a higher likelihood of observational learning to occur will be discussed below.

The Role of Self-Efficacy in Fear Reduction

Williams, Dooseman & Kleinfield (1984) and Williams, Turner & Peer (1985) provided evidence that self-efficacy is a better predictor of treatment outcome than arousal. Furthermore, they suggested that treatments that target perceived self-efficacy by arranging conditions to experience mastery will be more effective than exposures without such conditions. Lee (1984), in treating Simple Phobics, reported results that support this position.

Self-efficacy theory has a distinct advantage over emotional processing in that it is more amenable to scientific scrutiny. Because self-efficacy theory relies principally on dependent measures of behavioral performance, difficulties with operationalizing "deep structures" of the mind are avoided.

Furthermore, arousal is not conceptualized as a significant variable other than as motivation. For Bandura, behavioral referents are the only important functional index relative to levels of self-efficacy. Of course, it is possible that alterations in self-efficacy will affect emotions and/or physiological events. It is just that Bandura does not wish to add the cumbersomeness of these variables to his theory as necessary conditions (Bandura, 1984).

From the material presented thus far, it may be concluded that:

1) Performance impaired athletes may belong to a group of individuals who are manifesting a Social Phobia even if subclinical in intensity. A Social Phobia is a condition where the context or setting of being observed or evaluated act to impair functioning by triggering dysfunctional levels of anxiety. Careful differential diagnosis is important to discriminate

this group of individuals from individuals with more severe or varying difficulties, such as Avoidant Personality Disorders or Skills Deficits.

2) Exposure based treatments form the foundation of most treatments for anxiety disorders in general and for Social Phobia in particular. But the exact nature of how exposure is to be applied may vary widely. Exposure has been varied primarily in three ways: direct vs. indirect; mild vs. intensive; with subject control vs. without subject control.

3) Different methods of using exposure have been associated with various positive and negative effects. In general, direct intensive exposures applied with little or no subject control have been associated with significant negative side effects ranging from very high dropout rates to insufficient improvement and greater percentages of relapse. Direct and indirect exposures of mild intensity, which maximize a subject's

sense of control, have been found at least equal to direct intensive procedures and in fact are usually superior.

4) The mechanism of action of exposure has not been adequately explained by theories that emphasize biochemical neurophysiological events and de-emphasize learning. Theories that emphasize learning during exposure capture more of the essential elements that are likely to be involved in reducing fear and anxiety and subsequently improving performance. Recent evidence suggests that even if cognitive processes are not directly targeted in treatment, treatment durability depends on their successful alteration. The significant information that needs to be conveyed during exposure has been theorized as either encompassing the broad domains of Lang's emotional processing theory and alterations in the three hypothesized response propositions or as Bandura's more parsimonious self-efficacy theory, where shifts in

perceived competence or mastery are considered essential.

The Case for Self-Modeling:

These points suggest that effective exposure-based treatments should:

a) directly target cognitive structures that enhance a subject's sense of control or enhance their self-efficacy perceptions;

b) have a mild level of adversity;

c) reduce the amount of therapist contact (especially during exposure periods);

d) provide as full an exposure as possible to the setting variables that stimulate fear and anxiety;

e) provide the subject with an option of control over exposure.

A treatment approach that may have the powers to meet these criteria is self-modeling (Creer & Miklich, 1970; Dowrick, 1976; 1986; 1991; Hosford, Moss & Morrell, 1976). Self-modeling is defined as "a procedure in which people see themselves on video tapes that show only adaptive behavior" (page 109, Dowrick, 1991).

Self-modeling began in the 1970's, and was simultaneously and independently developed by several researchers and clinicians (Creer & Miklich, 1970; Dowrick, 1976; Hosford, Moss & Morrell, 1976). These theoreticians

built a treatment whose roots are to be found in the literature of observational learning and video replay.

The literature generated by studies of observational learning is extensive; its foremost proponent is Albert Bandura (Bandura, 1977a; 1984, 1986). Observational learning occurs via behavior changes that accrue subsequent to viewing similar behaviors performed by others. Of course, opportunities for learning through observation are vast and far outnumber the amount of time learning actually does occur. Many researchers have investigated the factors that enhance the potential of learning (Bandura, 1977 a, b; Fuller & Manning, 1973; Lefkowitz, Blake & Mouton, 1955; Mischel & Grusec, 1966; Muzekari & Kamis, 1975). For example, a model's ability to gain an observer's attention is an obvious prerequisite for learning (Bandura, 1969).

In terms of attentional qualities, it has been shown that individuals respond with greater attention and arousal when viewing moving pictures or videos of themselves (Fuller & Manning, 1973). Another important element that enhances the likelihood of observational learning is status attributions. If high status is attributed to the model, the chances of observational learning have been found to increase (Lefkowitz, et al., 1955). Likewise, a model's level of social power and attractiveness has been associated with the ability to obtain and sustain a viewer's attention and subsequent learning (Mischel & Grusec, 1966).

While these variables have been shown to enhance attention and learning in observers, it has also been found that if the discrepancy between the model and the viewer are too great, attention and learning suffer (Muzekari & Kamis, 1973). Working with these factors, Peter Dowrick (1991) concluded that effective modeling would be likely if the self were given an extra dose of elements such as power, status and attractiveness.

The second major area of research that contributes to the development of self-modeling is video replay (Dowrick 1983, 1991). Some early conceptualizations of the unstructured use of video replay believed that any form of video that provided information could be therapeutic (Stroller, 1969).

Theories that held this belief assumed that the more a subject could be confronted with information about him or herself, the better. When Schaefer, Sobell & Sobell (1972) decided to investigate this, they found that alcoholics who were confronted with their drunken behavior on video were actually driven to drink more heavily. This occurred in spite of their initial reactions to video feedback. At first, all subjects expressed distaste for what they saw, and strong motivation to change. Unfortunately, what these authors found was that since no explicit provisions were in place to help convert the subjects' motivation into new coping strategies, the stress of confrontation itself evoked increased drinking behavior.

Video Replay--Self Confrontation

Likewise, Alkire & Brunse (1974) conducted an unstructured video feedback study with couples who were in marital therapy. Unfortunately, their results echoed the Schaefer, et al. (1972) study with an even worse outcome. While no subjects showed significant improvement in this study, several couples separated and one subject went on to commit suicide.

Dowrick (1991) concluded that unstructured video replay now reads like a recipe for disaster. This is not to say that all video replay is dangerous. In fact, with proper safeguards built into video replay, it has been shown to be an extremely successful, low risk approach to many areas of therapy and learning (Dowrick, 1976; 1977; 1979; 1980; 1983, 1986; Franks & Goodman, 1986; 1988; Gonzales & Pigott, 1986; Gonzales, 1988; Schunk & Hanson, 1987; Kahn, et al. 1990).

In essence, it is important to avoid the idea that unstructured feedback, particularly feedback about errors, is helpful. In extensive review of the literature, Dowrick (1991) concluded that all studies that have used video replay with highly negative or aversive effects used video replay to confront subjects with error information and failed to use any adjunctive procedures to ensure that error information was dealt with constructively. This is not to say that all video replay that emphasizes self confrontations are negative. Effective negative confrontations using video replay have been conducted

(Kagen, 1978; McRea, 1983; Probst, Vandereycken & VanCoppenolle, 1988; Whitaker, 1978;).

All of these self confrontational video replays applied careful scrutiny as to whether subjects were capable of effectively acting on error information; the studies also all monitored whether or not adaptive and healthy change occurred.

Negative self confrontation are not the only manner in which video replay can be employed. Positive self review--PSR--for example does not aim to display graphic depictions of error. Instead, PSR is often used to capture low frequency positive behaviors (Johnston O'Connor & Kirschenbaum, 1986; Kirschenbaum, 1984). The selective review of superior performances is believed to lead to the increased likelihood and consistency of those behaviors occurring. Unfortunately, to date these observations are primarily based on anecdotal evidence (Dowrick, 1991).

Self-modeling is another use of video replay that does not confront the viewer with error information. In fact, all errors that may have been present on the video originally can be edited out before replay occurs. The editing or enhancing of raw video tape is an important characteristic of self-modeling. Whereas positive self-review seeks to incorporate the best possible examples of behavior already in an individual's repertoire, self-modeling seeks to display behaviors not yet present (Dowrick

1991; Dowrick & Biggs 1983). As stated earlier, this concept is captured by the term "feed forward."

Behavior presented in feed forward is a graphic depiction of potential future behaviors; it is presented as such--no deception is intended to fool the self viewers. In fact, research has shown that subjects' participation in editing the potential future behaviors enhances the effectiveness of self-modeling (Maile, 1985). In contrast, false feedback is inferior (Gonzales, 1982).

The avoidance of error confrontation makes self-modeling a particularly safe form of video replay. However, in any form of self-reviewing, it is probable that increases in self-focused attention will result (Carver & Scheier, 1981; Duval & Wickland, 1972). Carver and Scheier believed that increases in self-focused attention invariably lead to increases in self- evaluation. For them, if the valence of the self evaluations are negative, avoidance and lowered self-esteem are likely to result.

Negative valence evaluations result from the process of individuals comparing their observed behavior to some standard or goal and perceiving that there is a gap that they feel incapable of closing. If observed self behaviors exceeds standards and ultimate goals, or if the individual believes they are capable of closing the gap, Carver & Scheier predict approach behavior and concomitant rises in self-esteem. Because self-modeling graphically displays

superior performances devoid of errors performed by the subjects themselves, it is predictable that repeated viewings are likely to increase cognitive mediating processes that will enhance self-esteem, a sense of control and self-efficacy expectations. Due to these changes, it is probable that approach behaviors and general improvements in functioning will occur (Dowrick, 1983; 1991).

There is strong evidence that positive perceptions of self- efficacy are essential to mobilizing the access of individuals to their own pre-existing abilities (Bandura, 1984; 1986). Bandura also believes that the ability to cope with adversity and acquire new skills rests on a person's perceived levels of self efficacy. Commenting on the primary functional ingredient of all anxiety and fear reducing therapies, Bandura cites increases in self-efficacy as the most significant and functional mechanism of action (Bandura 1982, 1984). The feed forward procedure of self-modeling directly targets perceptions of self-efficacy by creating a graphic moving picture of sound and color that can be reviewed virtually indefinitely, composed of highly desired behaviors.

A Review of the Literature on Self-modeling

Creer & Miklich (1970) reported a single case study using self-modeling. "Chuck," a 10-year-old boy in a residential asthma treatment center, was extremely disruptive and noncompliant. Chuck would not cooperate with many standards and reasonable institutional routines, and

often acted highly inappropriately for his age. Investigators began by identifying suitable target behaviors and taking baseline observations. Then, two video recordings were made. Both were rehearsed role plays. Chuck was told that he was to star, and that two other boys and an adult staff member would participate. One role play was comprised of only desirable behaviors, which Chuck performed while in familiar settings and situations. The other work was representative of his typical level of noncompliance and inappropriateness.

Two weeks after the role plays were recorded, Chuck began viewing his exemplary self-modeling tape. This was done for five minutes daily over the course of two weeks. His behavior dramatically improved during this time.

During the second phase of treatment, Chuck viewed the videotape of his inappropriate behavior daily for two weeks. Chuck's behavior quickly reversed and returned to typical noncompliant inappropriate levels during this time. A third phase of treatment marked the return of appropriate behavior and compliance while once again watching the exemplary self-modeling tape.

Another single case design was reported by Hosford & Brown (1975), this time working with an adult prison inmate who suffered from chronic stuttering. Self-modeling tapes were generated. The investigators developed a self-modeling tape by first taping many successive role plays. They chose

the best tape of the best role plays to serve as a self-modeling tape.

The subject viewed the tape daily. In less than two weeks, the subject's stuttering behavior significantly lessened. This study extended the findings of Creer & Miklich (1970) to adults, demonstrating that childlike naivete is not a necessary condition for self-modeling to be effective.

In an interesting study conducted by Miklich, Chida & Danker-Brown (1977), subject awareness effects or placebo effects were controlled for and self-modeling was still highly effective. Several of the least compliant and proficient bedmakers in a residential hospital for asthmatics were asked to participate in a "media project" of another patient.

They assumed that a movie was being made of their bedmaking and other activities to help the other patient learn about how actors respond to seeing themselves on videotape. Subjects' bedmaking behavior significantly improved after only several viewings, even though they were not aware of the true purpose of the tape.

In a study where editing played a major role, Dowrick & Raeburn (1977) treated a four-year-old boy who was diagnosed as hyperactive. The child presented with poor concentration, whining for attention, and extreme temper tantrums when he did not receive attention. The child's attention span was almost non-existent during independent

play, yet he could remain significantly more focused while playing in the presence of adults.

The researchers constructed a self-modeling tape by filming the child at play while his mother sat across from him at a table. The camera angle focused only on the child; the replay showed no presence of the mother. In addition, the investigators edited out any inappropriate behavior that the child manifested during the taping so that the final self-modeling tape depicted only solitary and appropriate play. The investigators edited out instances of even slight adult interactions.

The child then watched this self-modeling tape once a day for several weeks. During this time, the child's solitary play behavior improved dramatically. The effects of the self-modeling phase were then compared to several medication phases. In contrast, the child's quality of solitary play remained unimproved during all drug conditions.

This study is particularly important because it is the first instance in which the manipulation of a setting or context variable is used to positively affect a subject's behavior--in this instance, the seeming absence of the subject's mother. By capitalizing on the subject's ability to have greater focus and self-control in the presence of his mother, the researchers were able to generate taped depictions to demonstrate this ability "as if" the child were alone. It could be speculated that during repeated

exposures, where the subject had witnessed himself behave appropriately that self-efficacy perceptions increased.

Another study that employed the manipulation of setting variables was conducted by Dowrick & Hood (1978). Two electively mute 5-year-old children were able to converse freely at home but remained totally silent in school. The researchers first attempted to create a self-modeling tape that depicted the home and school environment as somehow contiguous or compatible. Talking scenes that appeared clearly to have taken place at home were joined to footage of the school environment. This approach did not work. The researchers then made a second tape in which they altered the home environment in order to make it appear as if it were school. The researchers assembled maps for the walls, desks and other school paraphernalia in the children's homes. Scenes were staged and captured on tape of the children speaking in these contrived settings. The children were then exposed to these self-modeling tapes. After a brief number of viewings, both children began to speak freely in school at appropriate levels. These gains were durable and were maintained at a six-month follow-up. The initial failure of this study highliights the need for edited video tape footage to have visual credibility to the subject viewer.

This study employed an alternating single case design; each child viewed the self-modeling tape of his peer during phase I. In effect, this phase may be termed a peer

modeling treatment phase. Phase II employed repeated viewings of the subjects' own tapes, or a true self-modeling phase. Treatment gains were only observed during phase II, or the self-modeling phase for both subjects. This study, in addition to providing evidence for the effectiveness of self-modeling, illustrates the superiority of self-modeling over peer modeling in this particular application.

Pigott & Gonzales (1987) conducted a similar study with a severely withdrawn third grade boy who was electively mute in school for more than four years. In this instance, role plays were staged while the child's mother and younger brother were present in school after hours.

Two self-modeling tapes were generated: one of the child answering questions when called upon by his teacher, and one of the child sitting in his seat and raising his hand in order to participate in classroom activities. The self-modeling tapes were each three minutes long. The child viewed these tapes eight to ten times each in his home over a two-week period. Results indicated that significant improvement occurred in both behavioral domains. Treatment gains were durable and were maintained until the end of the academic year.

The positive effects of this study once again illustrate the significant power of self-modeling, namely to help subjects who have requisite abilities and skills to transfer them to settings in which they have previously been unable to do so. In this instance, the presence of supportive

persons who facilitated desirable behavior could appear to be absent on the self-modeling tape. Perhaps, the repeated viewings that depicted adequate performances, seemingly without support, enhanced perceived self-efficacy, ultimately generating improved performances. Unfortunately no measures of cognitive variables such as self efficiacy were taken.

Dowrick (1979) conducted a single case study employing a withdrawn 5-year-old boy. In order to generate the appropriate social interactions needed for the self-modeling tape, used small doses of Valium, which acted as a disinhibitor for the subject. A multiple baseline design was employed, where footage of verbal interactions were shown during one phase, and footage depicting no verbal interaction was shown during another phase. Gains in socializing were only made during the self-modeling phase where the subject viewed depictions of his competent verbal interactions. These gains were extensive, significant and durable, showing evidence of maintenance at several follow-up observations.

Another application of self-modeling has been to improve the motor performance of developmentally disabled children. Dowrick & Dove (1980) conducted a study with spina bifida children who were learning to swim. This study employed a multiple baseline across subject design. Three subjects participated.

Each subject began by viewing unedited tapes of their swimming performance. After a few viewings over several days, one child was shown a self-modeling tape; the other two children were successively given their self-modeling tape. Self-modeling tapes were constructed by editing out all undesirable behaviors, such as grimacing, crying, or efforts to escape from the water.

The children did not improve prior to receiving their self-
modeling tape. Shortly after receiving their self-modeling tape, each child made significant improvement, as noted by independent raters utilizing an operationalized water skills performance rating scale.

Furthermore, one child in the study received a succession of self-modeling tapes. Each of this child's tapes built upon the progress the child made. New tapes were thus generated by recording the child's improvements and applying further editing and illusory techniques, thus producing a tape that exemplified higher levels of performance capability. The new tapes were shown to the child after rating scales indicated a plateau of functioning. Each time a pattern of further progress was noted that was directly linked to the timing of viewing the new self-modeling tape.

These results suggest that self-modeling tapes can provide sources of continuous progress if they are appropriately designed to depict levels of competence in

excess of current contextual functioning. It is questionable what the upper limits of the depiction should be in order to ensure progress. It is possible that too high a level may result in no positive change. What is clear is that tapes may not be stimulating enough when the subject reaches a "plateau" and that the creation of new tapes depicting further competence may act to raise the subject above that plateau.

In another study with disabled learners, Dowrick (1986) designed a self-modeling treatment to assist in the acquisition of safety skills for mentally disabled adults. This population is extremely vulnerable to exploitation because of an inherent deficiency in adequate safety knowledge, judgement and general social skills . Appropriate target skills were identified; role plays were created and then captured on video.

After appropriate editing, individual self-modeling tapes were constructed, lasting three minutes each, and a viewing schedule was set up. Subjects viewed their self-modeling tape three times a week for two weeks.

Post-test evaluation role plays were set up immediately after the two week treatment. Results indicated evidence of positive behavioral change. In addition, interviews with "house parents," two staff members in the group homes where subjects resided, provided further validation that subjects were indeed engaging in safer behavior in the community.

Follow-up reports on the behavior of subjects revealed that maintenance effects were extremely long lasting and significant. In fact, several years after the study was terminated, subjects reported that they continued to use the strategies they had learned. A significant contributing factor to the long-term maintenance effects is the inherent attribute of video tapes, which are a virtually permanent record that can endlessly be reviewed.

Many of the subjects questioned reported that they enjoy watching the self-modeling tape and do so every couple of weeks. Of course, the mentally handicapped nature of this sample may contribute unique factors that account for the continual enjoyment rather than boredom with frequent, repeated viewings. Yet it is conceivable that less frequent repeated viewings of skills captured on video tape may be enjoyable and meaningful to both mentally handicapped and intellectually normal populations.

Unfortunately, while it is clear from these results that the self-modeling intervention improved performance, it is not clear why. To demonstrate that self-modeling positively affected essential cognitive processes, it would be necessary to take baseline and follow-up measures to assess whether changes occurred along any of these dimensions of thought.

Several studies have compared the relative efficacy of self-modeling with alternative treatments. One such comparison was noted with peer modeling (Dowrick & Hood,

1978). This study was cited earlier, and involved the treatment of two electively mute children. It should be pointed out that in addition to both the subjects being exposed to peer modeling tapes that produced no positive changes during one phase of treatment, both children had been exposed almost daily to peer models in their regular classroom. These daily exposures were also ineffective. Additional studies that found self-modeling superior to peer modeling include Hosford & Polly's (1976) study pertaining to teacher training, Murray's (1982) study of the treatment of ADDH children, and McCurdy & Shapiro's (1988) study on the treatment of disruptive classroom behavior in children.

Contingency management is another treatment modality that has been studied in comparison to self-modeling; Dowrick & Hood (1981) conducted the only study to date on this comparison. They utilized a between-groups design, and studied the effects of each intervention on a group of 15 subjects in a skills training course housed in a sheltered workshop. The researchers analyzed relative productivity as a dependent measure.

Subjects were randomly assigned within their disability level to one of three groups: cash incentives, self-modeling or attention control. Attempts were made to hold professional contact time equal between all groups. Both active treatments were found superior to the attention control group, although the greatest magnitude of change was observed in the self-modeling group. Outcome status was

maintained at a four-month follow-up. Self-modeling was compared to cognitive behavior therapy and a relaxation treatment for the treatment of depression in adolescents (Kahn, Kehle, Jenson & Clerk 1990): These researchers conducted a two-phase study. Phase I was designed to accurately assess the prevalence of depressive symptomology among adolescents 13 to 15 years of age attending middle school. Phase II was designed to assess the relative efficacy of three active interventions for depression in contrast to a wait-list control group. The active treatments were: 1) self-modeling; 2) cognitive behaviorial therapy; and 3) relaxation therapy.

A pre-test, post-test randomized groups design was applied. An assumption was made that internal events, such as thought processes and feelings, are subject to the same laws of learning as overt behavior.

In the self-modeling intervention, subjects were instructed to act out role plays that typified incompatible behaviors with the symptomology of depression. These behaviors included smiling, positive self-statements, initiation of social interactions, appropriate eye contact, pleasant tone of voice and pro-social self-attributions, among others.

Subjects were coached during role plays and instructed to practice their non-depressive behaviors. As a result, the quality of most of the self-modeling tapes was high; they required little editing or illusionary enhancements.

Subjects each viewed their self-modeling tape eight times over a two-week period. The tapes were ten minutes in length. During this time, the other two interventions were applied.

Results at post-testing and one month follow-up indicated that the cognitive behavior treatment was most effective and that both self-modeling and relaxation treatments were significantly more effective than the attentional control condition. Furthermore, the self-modeling and relaxation treatments demonstrated enough gains to ameliorate all clinically significant signs of depression for each subject. On measures of self-concept, subjects in the three active interventions showed substantial and significant improvement compared to subjects in the attentional control group.

A significant factor, the authors point out, is that of all three active interventions, the self-modeling treatment was by far the most time and manpower efficient; it required the least amount of subject and staff involvement. In all, the subject involvement was only 120 minutes for the self-modeling treatment. In contrast, the Cognitive Behavior Therapy treatment and Relaxation intervention consisted of twelve 50-minute sessions, or five times as much time. Though perhaps the most significant aspect of the Kahn et al (1990) study is that it demonstrates the effectiveness of self-modeling for altering cognitive and emotional patterns in addition to overt behavior.

Summary of the Case for the Use of Self-modeling With Behavioral and Setting Enhancements

It is predicted that the use of video self-modeling will be an effective treatment for a large number of reasons:

1) Increase self-efficacy and control. Repeated viewings of the self performing competently should increase self-efficacy and elevate a sense of control.

2) Reduce anxiety and fear. Viewings of competent behavior in anxiety producing settings should reduce anxiety and fear.

3) Improvement in attentional deployment. As self-efficacy increases and anxiety decreases, there should be an increase in task focus and a decrease in negative self-evaluative focus.

4) Improve cognitive self appraisals. Specifically, self-modeling videotapes target cognitive appraisals through a visual depiction of mastery.

5) Enhanced settings. Regarding the exposure to threatening settings, such as being observed by an audience and evaluators, these content elements can be edited to depict audience and judge approval, thereby reducing negative expectency.

6) Reduced therapist contact. Self-modeling treatments require comparatively less therapist

contact time and are therefore less likely to foster dependency.

7) Lower levels of adversity. Because subjects are symbolically exposed to the fear-producing setting variables while their behavior is being controlled to appear as if only desirable behaviors are being performed and audience and judges reactions controled to appear positive, much lower levels of adversity during exposure is probable. This translates into the probability of lower dropout rates.

8) Infinite reaccess to the powers of treatment. The permanent nature of the videotape document that will be created for this treatment allows a virtually endless reaccess capability to the treatment if the subject so wishes.

9) Self as model. The videotape allows the performance-impaired athlete to be used as his/her own model, thereby increasing identification.

10) Increase of attention. Attention is necessary for learning and because the individual is the model, attention should be increased.

11) Increase of self attractiveness. Because editing enables us to add an extra dose of power and competence, the attractiveness of the model

should be increased, thereby also increasing attention.

HYPOTHESES

The primary purpose of this study was to address the problem of performance decrement in a competitive setting compared to a practice setting in young karate athletes. Three behavioral self-modeling treatment conditions and a wait-listed control condition were employed to test the effectiveness of self-modeling in improving competitive karate performance and increasing perceived self-efficacy. Across the three treatment conditions there was a systematic increase in the amount of contextual information. The expectations were that greater contextual information across the treatments would lead to increased self-efficacy and greater reductions in karate performance impairment. The increases of contextual information were conceptualized as incrementally higher doses of a potent drug. Further, it was predicted that changes in self-efficacy would be causally related to reductions in karate performance impairment.

The primary hypotheses for the study were:

I. There will be a systematic improvement in Perceived Self-Efficacy for Competitive Karate Performance across the four treatment groups (Control Group and three Self-Modeling Groups from pretest to posttest. After controlling for age, sex, level of Karate skill and performance decrement, each successive treatment condition will produce a dose-response increment of

improvement in perceived self-efficacy to perform in competitive settings

A. Improvements in Perceived Self-Efficacy will be causally related to behavioral gains as measured by actual Competitive Karate Performance.

II. There will be a systematic improvement in Competitive Karate Performance across the four treatment groups (Control Group and three Self-Modeling Groups with increasing amounts of contextual information) from pretest (before treatment) to posttest (after treatment). After controlling for age, sex, level of karate skill and performance decrement, each successive treatment condition will produce a dose-response increment of improvement in competitive performance.

III. There will be a systematic degree of skill recovery (ie., improvement in performance) between pretest Practice Setting Karate Performance and posttest Competitive Setting Karate Performance across the four treatment groups. After controlling for age, sex, level of Karate skill and performance decrement, each successive treatment condition will produce a dose-response increment of skill recovery.

The secondary hypotheses for the study were:

A. At pretest, Perceived Self-Efficacy for Practice Karate Performance will be higher than Perceived Self-Efficacy for Competitive Karate Performance.

B. There will be a high positive correlation between actual karate performance decrement (decrement defined as the percent decrease in competitive versus practice performance) and the difference in scores between Self-efficacy in Practice and Self-Efficacy in Competition.

C. The participant attrition rate for this study will be lower than the average attrition rate (12%) for treatment of anxiety disorders.

D. There will be improvement in perceived Self-efficacy for Practice Karate Performance from pretest to posttest only for the group that received practice setting information in their treatment. In other words, there will be an interaction effect by treatment group.

METHODS

Sample

The final sample was comprised of 54 subjects, 35 males and 19 females. The subjects ranged in age from 7-17 years, with a mean age of 11.5 years. The subjects were all competitive karate athletes, ranging in rank from Yellow to Black belt. There were no subjects of white or red belt levels. Specifically included were 7 levels, ranked here in order from lowest to highest:

1. Yellow Belt (1)
2. Orange Belt (2)
3. Blue Belt (7)
4. Green Belt (7)
5. Purple Belt (4)
6. Brown Belt (18)
7. Black Belt (15)

Subject recruitment

Phone contact followed by a letter was made with karate coaches in the Long Island, New York area by the investigator. The investigator requested that coaches refer active karate competitors under age 17 who had a history of performing worse under competitive conditions than in practice. It was explained that some of these athletes would be eligible to participate in a videotaped training program being studied for its effectiveness to reduce such problems. These coaches were provided with consent forms,

which followed APA guidelines for conducting research with human subjects (See Appendix A).

A total of 164 referrals were made by coaches. Once informed consent was obtained from the subjects and their guardians, selection screening procedures were commenced. The primary criterion for participation was a performance decrease of 10% in competition compared to practice. The fulfillment of this criterion was judged based on a screening videotape of each athlete performing a solo karate routine (kata) in both a Competitive Setting and a private Practice Setting. Selection criteria also included not being on psychotropic medication or in psychological treatment or counseling at the time of the study.

Of the athletes referred for participation, 10 were excluded during screening procedures because of their inability to comply with scheduling. Of the remaining 154 athletes, 91 were excluded because they did not demonstrate the required 10% performance decrease in the Competitive Setting. All 63 of the remaining athletes met the selection criteria. In general the subjects came from white middle-class homes. All families resided in communities in Long Island, New York.

Apparatus and Setting

Videotape Equipment and Settings

Editing Equipment and Cameras. The video cameras employed were two A.G. 450 Panasonic Super VHS Cameras usually set on a standard tripod. Infrequently, hand-held

footage was captured. Initial capture of all footage was accomplished in 1/2 inch VHS equipment. An A and B roll editing system was employed which allows for three-machine editing. Two JVC 860 Broadcast deck playback units connected to a Sony 9850 recorder were utilized. All decks utilized 3/4 inch video tape. These three machines were governed by a computerized control unit. The Calloway Editor for CMA type editing was used. This allowed for computerized control of cuts and special effects. The playback and transfer deck, which was utilized to transform 1/2 inch footage to 3/4 inch footage and back to 1/2 inch footage, was primarily the JVC HRS 850 1/2 inch video deck.

Special Videotape/Editing Materials. There were some special materials used in capturing videotape footage and in performing video editing: 1) Gray art paper 9 feet in height; 2) Four 1000-watt ceiling-mounted studio lighting fixtures; 3) Upbeat music suited to general aerobic workout.

Creation of a "Limbo Setting". Transfer of video footage from the practice non-competitive setting to the actual competitive setting was an integral part of this study. Since these settings typically contain totally different backgrounds, transfer presented a visual "credibility problem". In order to be able to edit the videotapes in a way to maximize visual credibility, preparatory sessions were arranged at the studio where the Practice Setting screening footage was to be shot. A skilled video editor, a camera person, the head karate coach

of the studio and the investigator attended. After these sessions and several additional meetings, it was determined that all Practice Setting footage should be shot in a "limbo setting".

A limbo setting seeks to minimize all distinguishing characteristics of the actual background in which the footage is captured. Thus, while clearly depicting subjects' movements, the background was to appear nondescript and almost dreamlike. This dreamlike quality was intended to aid subjects' acceptance of the disparate settings. The limbo setting was constructed by employing four strategies:

1) Backdrop. Gray art paper was installed to the walls surrounding the practice ring, thereby creating a neutral background.
2) Lighting. Four ceiling 1000-watt studio lights were installed in each corner of the ring, while all other room lights were turned off. This technique further distracted from background artifacts while highlighting within-ring action.
3) Background music. Workout music was edited onto the second stereo audio track of the videotape. This was done to enhance the continuity of disparate footage that had been edited together. In addition, it was believed that the incorporation of uptempo music would add to the

attention-getting and general motivation-enhancing quality of the tapes.

4) Motion timing. A decision was made that all footage transferred from this "limbo setting" to actual competition would be done in slow motion at 50% of real time. This slow motion further emphasized the incorporation of these inserts. Because the breach of real time signaled a change to the viewer, the context of these inserts were more acceptable to the subjects.

A small pilot test of the limbo setting was conducted with two karate athletes not being screened. Edited tapes were made which transferred footage captured in the limbo set to a competitive setting. The athletes accepted the transfer as a credible "dreamlike" depiction which had adequate perceived continuity.

Materials and Measures

Karate Performance Specifications

Karate setting and scoring specifications were conducted in accordance with the Official United Tournament Karate Rule Book 1991(UTK):

1) Acceptability of kata styles: Japanese/Okinawan/Chinese and Korean are acceptable so long as the kata reflects the "essence and traditional values of the division name in which they are competing." (UTK Rule Book 1991, P. 19)
2) The awarding of scores: Ten (10.00) reflects the highest score (a perfect kata). Scoring gradations are in intervals of tenths proceeding from zero.
3) Ring Size: Youth size karate ring was an 18 foot by 18 foot ring which is clearly marked (a black taped perimeter was used).
4) Uniform: A standard karate uniform (gee) with subject's appropriate level belt color was worn.
5) Judging Criteria: Katas were judged on the bases of balance, power, speed, stability, proper technique formation, coordination, flexibility, stamina, timing, and technique skill.
6) Judges' Qualifications: Judges must have achieved at least a first-degree black belt

performance level. For the purposes of this study judges must also have had at least two years judging experience and achieved an acceptable level of interrater reliability.

Creation of Screening Videotapes

Two types of video footage were utilized to screen each athlete for inclusion in the study: Competitive Setting footage and Practice Setting footage. The production of each footage type is described below.

Practice Setting screening karate performance. Practice Setting Screening footage (Screen-Prac) of 164 subjects took place in a karate studio in Long Island, New York. While several karate instructors and studios were involved in subject referral, one studio served as the primary base of operations. The studio which was utilized has its main ring area in a large private room in the back. This area is large enough to hold three ring areas and approximately 300 spectators. In the front of the studio, there is a waiting area, several practice rooms with mats, and a series of offices.

The practice setting was lighted with four 1000-watt studio ceiling lamps, and the walls were covered with 9-foot-high gray art paper to create a "limbo" setting. The ring area was 18 feet by 18 feet, and marked by tape affixed to the wood floor. The only people present in the ring area were the subject, 2 camera persons and the investigator.

Video taping was accomplished using two AG 450 Panasonic VHS Video cameras mounted on standard tripods.

Potential subjects, along with at least one parent, were contacted by their instructors and invited to attend the Screen-Prac "shoot". Prospective subjects were instructed by their coaches to wear their competitive gees (karate uniforms), and be prepared to perform their kata in front of videotape cameras and equipment. A total of 164 athletes attended the Screen-Prac shoots. Videotaping was completed in two consecutive days and a third day approximately 10 days later. This schedule was dictated by the availability of the karate studio.

Subjects were scheduled to arrive at the studio in groups of 15 approximately two hours apart to avoid long wait times. After written instructions were read by the investigator, consent forms, if they had not been previously received, were distributed, signed and collected. The investigator read instructions to groups of approximately 15 subjects at a time in a waiting area (separate from the ring area) of the studio. The instructions explained what would be expected of each subject in the private ring area in the back of the studio.

Upon entering the ring area, each subject was given up to 5 minutes to "feel comfortable" in this setting. The subject was then videotaped performing his/her kata twice in the ring. After the kata run-throughs, each subject chose one or two series of moves from the kata which he/she felt

could have been performed better. Subjects were then videotaped performing these series of moves up to four times. The length of the videotaped katas ranged from 35 seconds to 132 seconds.

Competitive Setting Screening Karate Performance. Within four weeks after shooting the Screen-Prac videos, Competitive Setting screening footage (Screen-Comp) was shot by camera and experimental personnel at two competitive karate events in the Long Island, New York area. Of the original 164 subjects, Screen-Comp footage was obtained on 154 . Ten subjects were dropped from the study owing to their inability to attend either of these competitions. Each athlete was videotaped performing his/her kata during the competition. All subjects performed the same kata in the Screen-Comp shoot as they had in the Screen-Prac shoot. Each competition was attended by approximately 300 spectators along with numerous judges and officials. The length of each Screen-Comp Kata ranged between 33 seconds and 130 seconds,

Karate Performance Scoring

Judging the screening videos. Two official karate judges (one holding a second degree black belt with 15 years judging experience, the second holding a first degree black belt with three years judging experience) were asked to score the Screen-Prac performances of all prospective subjects. Karate judges' inter-rater reliabilities were fairly good. To test reliabilities, 10 katas were randomly

selected from the 154 Prac-Screen katas which were taped. For the Screen-Prac judgments, with two raters, the correlation was 0.93.

The judges independently viewed the Screen-Prac videotapes and scored each kata in accordance with U.T.K. rules (UTK Rulebook, 1991). The rules include using a perfect score of 10.00 as an ideal and intervals of tenths proceeding from zero. Each judge scored each subject's Screen-Prac kata performance using one overall score (e.g., 8.2 or 5.9, etc.) for each entire run-through;. Each subject's performance was, thus, assigned two independent scores, one score from each judge.

Several weeks later, these same judges received the Screen-Comp videotapes containing the competitive setting katas for all subjects. The videos were scored independently by the judges according to the same scoring rules. Each judge's independent score for each subject's kata in the competitive condition was summed with the remaining judge's score. Thus the kata score from Judge One was added to the kata score from Judge Two to form a single score.

The performance decrement score. Admission to the study was contingent on a decrement in performance of 10% or greater from the screening practice performance to the screening competitive performance. This decrement was conceptualized as the operationalization of anxiety caused by the competitive setting. For the sample referred a 10%

decrement was chosen as a percentage that realistically could provide enough subjects and also be reflective of a clinically significant problem. The judges' scores for the Screen-Prac and Screen-Comp performances were compared to assess performance decrement.

First, each subject's poorer practice performance score was determined. Of the two Screen-Prac katas performed, the one with the lower score (of the two judges' summed scores) was chosen as representing the poorer performance, hereafter called Prac-Low. Next, the percentage difference between this Prac-Low score and the subject's Screen-Comp score (sum of two judges' scores) was calculated. If the difference was 10% or greater favoring the Practice Setting score, the subject was considered performance impaired and admitted into the study. The lower scored practice setting kata was used to insure that the actual differences between performances were due to setting variables and not to random skill variations. In reviewing score variations between the two Practice Setting performances, only 15 subjects exceeded a 5% difference from their first to second performance. In seven instances, this was because the subjects temporarily forgot their katas. The stability of practice performance scores adds weight to the premise that the deterioration in these subject performances in the competition setting is due to setting variables and not to random skill variation.

Creation of Behavioral Self-Modeling Videotapes

Four experimental conditions were employed in this study -- a control group and three different Behavioral Self-Modeling (BSM) treatment conditions. Individualized treatment videotapes were created for subjects assigned to each of the three BSM conditions. The three conditions and creation of the videotape for each are described below.

Behavioral Self-Modeling condition. The BSM videotapes were designed to show the subject performing a kata with video-edited behavioral enhancements to provide a demonstration of "optimal performance". Four techniques were utilized to produce these videos.

First, each subject's better Screen-Prac kata performance was selected to serve as the BSM Kata. The Screen-Prac scores of Judge 1 and Judge 2 were added for each kata. The higher summed score determined the kata selected, kata one or two.

Second, behavioral enhancement was achieved by substituting footage of superior movements for the weakest continuous series of movements in each subject's BSM Kata. A qualified karate judge (as determined by the U.T.K. Rule Book) viewed subjects' videotapes and chose the weakest section of the BSM Kata by affixing a score to it. This judge was then shown videotaped alternative examples of the same series of movements performed by the same subject taken from other portions of the subject's Screen-Prac video. When an example was found that achieved a higher score as

determined by the judge, it was used as insert footage. This footage was inserted in slow motion at a rate of 50% of real time.

Third, workout music was added which ran the length of the tape. The music was meant to facilitate continuity between editing cuts in the video and increase attention and motivation.

Fourth, an eye-catching karate logo served as a leader before the subject's BSM Kata was displayed. The length of this logo was 6 seconds. The length of inserted action footage ranged from 12 To 22 seconds. The total length of the BSM tapes ranged from 35 to 133 seconds.

Behavioral Self-Modeling Plus Setting Enhancement 1 (BSM+SE1). These self-modeling training tapes contained techniques two, three and four just as described above for the BSM condition. In replacement of the first element, the better screen-Prac Kata, each subject's Screen-Comp Kata was utilized. The presence of an audience, their favorable reactions and the presence of judges (without their evaluations) appeared in the background. These elements actually appeared in the setting at the time of each subject's Screen-Comp performance. The presence of these elements comprised a setting enhancement (positive exposure). In addition, the lowest scored continuance series of behaviorals was replaced by superior footage. Transfer footage was captured on video tape during the

Screen-Prac performance, which was shot in the limbo setting. This comprised the BSM enhancement for this group.

The procedure used to accomplish this was to have each subject's Screen-Comp performance evaluated by an official karate judge. The judge selected the continuous series of movements which he believed was the most poorly performed within the kata and affixed a score to this section. Alternative examples of the same series of movements performed by the same subject captured during the Screen-Prac performance was shown to the judge. When an example was found that received a higher score as determined by the judge, it was used as insert footage. This footage was transferred in slow motion at 50% of real time. Insert footage length ranged from 14 to 23 seconds. The entire BSM+SE1 training tapes ranged from 36 to 124 seconds.

Behavioral Self-Modeling Plus Setting Enhancement 2 (BSM+SE2). Each subject's self-modeling training tape in this group was created in the same way as the BSM+SE1 tapes with the addition of a judge's evaluation insert at the conclusion. At each of the two competitions during the screening phase of the study, positive evaluation vignette scenes were staged and videotaped. Three judges were asked to act as if they had just witnessed a kata performance, and to act as if they were actually scoring it. They were asked to hold up scores which ranged between 9.2 and 10.00. These scores would be reflective of very positive evaluations since no prospective subject in the study has ever received

a score in this range. Information on subjects' past performance scores was obtained from discussions with their coaches.

At the end of the BSM+SE2 kata, the staged positive evaluation was inserted. The evaluation insert was chosen to match the Screen-Comp event at which each subject's performance was videotaped. This matching was necessary for the staged evaluation insert to be believable. After the insert footage the tape faded to black. The length of this scoring insert was either 7 or 9 seconds. The behavioral enhancement inserts for the BSM+SE2 videos ranged from 10 to 26 seconds. The entire BSM+SE2 training tapes ranged from 38 to 134 seconds.

Self-Report Measures

Social anxiety. The Social Anxiety Scale for Children-Revised (SASC-R) and its adolescent version (LaGreca, et al., 1988; LaGreca & Stone, 1992) is a self-report inventory comprised of 22 questions presented in a 5-point Likert scale format. The author indicates that the SASC-R may be used as a reliable and efficient general screening instrument for social anxiety in children and adolescents by examining total scores (LaGreca, 1993). Internal consistency reliabilities for the three SASC-R subscales have been reported as: FNE, r = .86; SAD-New, r = .78; SAD-G, r = .69 (La Greca, unpublished manuscript). Total scores above 50 are associated with risk for clinically significant levels of social anxiety in children and adolescents, while

scores below 37 are not associated with such risk. For the purposes of this study score interpretation of the SASC-R employed these total score parameters. Therefore, subjects with total scores less than 37 were considered non-problematic for social anxiety, and subjects whose total scores were above 50 were considered at risk.

Self-Efficacy. The Kata Performance Self-Efficacy Questionnaire (KPSEQ) was developed using the technology of Bandura (1986) and Zimmerman and Martinez-Pons (1990) which suggest that when assessing self-efficacy, varying levels of a task should be sampled. Further, these authors recommend the creation of specific self-efficacy questions tailored to the exact contextual needs of the research being conducted.

The specific area of interest in this study was perceived self-efficacy for performing a karate kata in two differing settings: 1) alone in practice; and 2) being observed by an audience and judges in an important competition. Three self-efficacy questions were developed which asked subjects to estimate how sure they were of: 1) performing the easiest moves in their kata; 2) performing the average or medium difficulty moves in their kata; and 3) performing the hardest moves in their kata.

Subjects were asked to rate their certainty of being able to perform the three levels of moves "at their best, with full power, speed and accuracy". Ratings were made on a scale from 0 (completely unsure) to 100 (completely sure of performing their best). Subjects rated their self-

efficacy for both a practice setting (SE-Prac) and a competitive setting (SE-Comp).

Item reliabilities were performed, separately for the SE-Prac and SE-Comp conditions, to measure cohesion among the different levels of difficulty. Two reliability scales were constructed for the six practice items (three for pretest plus three for posttest in each condition) and the six competitive-setting items. Alphas for for the two scales were quite high, .9458 and .9693, respectively. The mean inter-item correlations were .74 and .84, respectively. With one exception, deletion of any of the items did not improve the alpha statistic; for the pretest "easy" question in the practice condition, alpha increases slightly to .9488 upon deletion.

Procedure

The study comprised several phases, including a subject selection screening phase, a pretest competitive event, application of the Behavioral Self-Modeling treatments, and a posttest competitive event. The design employed was a repeated measures pre-test/post-test design with randomized assignment of subjects. The procedures utilized at each phase are described below.

Subject Selection

Of the 154 athletes who completed both the Screen-Prac and Screen-Comp screening performances, 63 subjects were eligible to participate in the study based on the criterion for 10% performance impairment and other criteria outlined earlier. These subjects were notified by phone that they were accepted into the study and that they would be randomly assigned to one of the four groups; three of which would receive a video training tape during the study and one which would not receive a tape until after the conclusion of the study. Subjects were then randomly assigned to one of four treatment groups.

Group 1: Control Group (CG). A total of 16 subjects (9 males, 7 females) were assigned to the CG. After attrition, 13 subjects (7 males, 6 females) completed the study. The CG participated in all experimental procedures, including the pretest competitive event, treatment phase and posttest competitive event. They did not, however, receive a self-modeling training tape. They were told that because

of being randomly assigned to the CG they would have to wait until the conclusion of the study to receive a training tape.

Group 2: Behavioral Self-Modeling Group (BSM). The BSM group began with 16 subjects (13 males, 3 females). A total of 14 (11 males, 3 females) completed the study. The BSM group participated in all experimental procedures. In addition, each subject received a self-modeling (SM) videotape with behavioral enhancements, as described earlier.

Group 3: Behavioral Self-Modeling Plus Setting Enhancement I (BSM+SE1). The BSM+SE1 began with 15 subjects (10 males, 5 females), which decreased to 14 (9 males, 5 females) by the end of the study. The BSM+SE1 subjects participated in all experimental procedures. In addition, each subject received a BSM+SE1 videotape to view during the treatment phase.

Group 4: Behavioral Self-Modeling Plus Setting Enhancement II (BSM+SE2). The BSM+SE2 group began with 16 subjects (10 males, 5 females), and decreased to 13 (8 males, 5 females). The BSM+SE1 subjects participated in all experimental procedures and received a BSM+SE2 videotape to view during the treatment phase.

Pretest Competitive Event

After editing of the self-modeling treatment videotapes was completed, subjects were contacted by their instructors and by experimental staff, and requested to perform their

katas at a competition held at the karate studio which served as the base of operations for the study.

This competition which served as the pre-test measure for the study, had over 200 competitors, and was attended by over 300 spectators. Of 63 subjects, 59 attended this competition. The four subjects who could not attend included two subjects who were ill, and two who had family conflicts. These subjects were dropped from the study.

Before performing on the day of the competition, subjects met with the investigator in small groups of 2-10 to fill out self-report questionnaires. There were two self-report questionnaires: 1) Social Anxiety Scale for Children-R (SASC-R) (LaGreca 1992). An adolescent version of the SASC was used for subjects above 12 years; 2) Kata Performance Self-Efficacy Questionnaire (KPSEQ). Meetings took place in a private room in the karate studio. Written instructions were read by the investigator for each of the two self-report measures.

Self-report measures were scored and recorded by a Master's level Reading specialist with over five years experience scoring educational and diagnostic evaluations. The scoring and recording of data was assigned to experimental staff other than the investigator to control for any potential bias effects. All experimental staff and judges, except the video editor and investigator were held blind to the group assignment of each subject.

Treatment Phase: Viewing the Training Tape

After performing their katas at the pre-test competition, each subject in an active treatment (Groups 2, 3, and 4) was given their individual self-modeling tape. Each subject given a tape was instructed to try and view the tape no less than twice a day each day until the next competition. This would total 14 days of viewing. Subjects were instructed to view the tape carefully, and get as much out of each viewing as possible. If any subject felt uncomfortable viewing his or her tape, they were instructed to turn the tape off for a while and attempt to view it again later in the day. Each subject was asked to record any uncomfortable experiences, which stopped them from watching the tape. Subjects were also asked not to watch the tape more than a total of 20 minutes per day. The investigator called each subject twice a week to check if the instructions were being followed.

Subjects in the control group were reminded that their placement in the control group was randomly determined, and that they would be getting a training tape of themselves after the study was concluded. All subjects were reminded to attend the next competition in two weeks. All subjects were asked to keep a record of any competitions or competition-like experiences they may have had between the pretest and posttest competitions. This was done in order to account for any possible effects due to self-initiated exposure.

Posttest Competition. The post-test competition took place at the same studio and the same procedures were applied as the pre-test competition. A total of 54 subjects of the 59 who completed the pre-test participated in the post-test competition. Among the five subjects who failed to participate, three had family conflicts, one had a sprained ankle, and one was ill. These subjects were dropped from the study. No subject reported dropping out due to discomfort generated from the treatment.

Posttest Questions for the Subjects. The only additional procedure applied at posttest was a series of three questions read by the investigator at the conclusion of each small group self-report measure session. The questions were:

1. Has anybody competed in or been in a situation that was like a competition with many people watching you perform since we met at the last competition two weeks ago.
2. Has anyone who has a training tape been unable to view their tape at least twice a day?
3. Has anyone watched their training tape more than twenty minutes each day?

There were no affirmative replies to these questions.

Judges for the Pretest and Posttest. Six judges were contacted before the competition date by the investigator. They were asked if they could attend and judge katas in this and one subsequent competition to be held two weeks later at

the same studio. These six judges all hold at least first degree black belts, and have no less than two years judging experience. The scores of 10 subjects chosen randomly were used to run interrater reliability checks, all of which were at acceptable levels. For the Pre-Comp pretest judgments, with three raters, the correlations were: rater one and rater two, r = .84; rater one and rater three, r = .75; and rater two and rater three, r = .96. For the Post-Comp judgments, with three raters, the correlations were: rater one and rater two, r = .69; rater one and rater three, r = .74; and rater two and rater three, r = .84. The average correlation was .82.

Each subject pretest competitive performance score was obtained by summing three judges's scores to form a single numerical value. The score of each judge is based on a perfect score of 10.00 and precedes at intervals of tenths from zero. (Scoring procedures and criterion are described in more detail in the Apparatus section of this paper.) Performance scores were recorded by experimental staff volunteers with more than one year's experience assisting in the administration of Karate tournaments.

Study Personnel

General personnel

1) The investigator: Third level doctoral student enrolled in the Department of Educational Psychology at C.U.N.Y.

2) Six karate judges: Each judge met official U.T.K. Rule book, (1991) requirements for judging. In addition, each had at least two years experience and had attained acceptable levels of interrater reliability as determined by running an interrater reliability study.

Video personnel

1) Camera person and editor - A member of the C.U.N.Y. audio/visual Support Services Department with over 15 years experience in professional video camera work, technology and editing.
2) Consultant - Head of the C.U.N.Y. audio-visual Support Services Department.
3) Camera person and consultant - Professional camera person with over seven years experience in commercial video and film work.
4) Video Editor - Professional video and film editor with over ten years experience in editing full length features and commercial projects.

Scoring of Self-Report Measures

1) Masters level Reading Specialist with at least five years experience administering and scoring psychoeducational tests.

Karate Administrative Volunteers

1) Three young adults of high school age with over one year administrative experience coordinating karate competitions and general karate school functions.

RESULTS

Pretest to posttest change. For all of the results presented in this section four variables were used as control variables, or covariates--age, sex, level of karate expertise and the degree of decrement from the Practice to the Competitive setting exhibited during the study's screening phase. Multiple regression analyses were conducted, in which the control variables that surpassed the minimum threshold criterion (alpha = .05) were entered into the regression equation. Next, the variable of interest was forced to enter the equation in order to assess its degree of predictiveness.

Separate tables summarizing the regression results for each of the independent variables are found in Tables 1 through 5. Means for the pre- and posttest measures of each of the independent variables are found in Appendix E. Difference scores for the pre- and posttest measures, which served as the basis for regression analyses, are found in Appendix F.

Competitive karate performance overall clearly improved from the pre- to posttest condition, $F(1,52) = 14.44$, $p < .001$, $R^2 = .214$, despite a slight drop in performance for the control group (20.7 to 20.5). This improvement was affected by treatment group, $F(3,50) = 5.51$, $p < .01$, R^2 (adj.) = .203. In addition, a linear trend was found such that higher "levels" of treatment corresponded to increased

improvement in competitive performance $F(1,52) = 14.57$, $p < .001$, R^2 (adj.) = .204 (See Table 1). (The quadratic component was also tested and was found to be less strong than the linear component. The analysis of the quadratic component is reported in each of the tables where a linear component was found to be significant.)

SE-Comp likewise improved from the pre- to posttest condition, $F(1,52) = 18.62$, $p < .001$, $R^2 = .260$. Treatment group assignment contributed powerfully to the degree of pre- to posttest gains, $F(3,50) = 8.75$, $p < .001$, R^2 (adj.) = .305 (See Table 2). Change in the competitive self-efficacy response was highly predictive of change in subjects' actual competition performance; $F(1,52) = 25.41$, $p < .0001$, R^2 (adj.) = .315. Once again, a strong linear compoent was found; $F(1,52) = 14.72$, $p < .0001$.

While overall pre- to posttest gains were found for SE-Prac, $F(1,52) = 8.97$, $p < .01$, $R^2 = .145$, the interaction with Group, after controlling for level of competence, was not significant, $F_{change}(3,49) = 1.43$, $p > .05$. Thus treatment condition appears to have less of an effect on the SE-Prac response overall. Group 2 was found to improve more than the Control Group, $F(1,25) = 4.26$, $p < .05$, $R^2 = .146$ (See Table 3). However, improvement for Group 2 was not greater than Groups 1, 3 and 4 combined. In addition, SE-Prac was found to be substantially higher than SE-Comp, $F(1,52) = 37.2$, $p < .001$.

An overall pre- to posttest gain was observed for the social anxiety measure, $F(1,52) = 8.97$, $p < .01$, $R^2 = .145$. The interaction with group was not significant, $F(3.50) = 1.24$, $p > .05$ (See Table 4).

Screening practice to posttest competition changes. Lastly, an assessment of whether the difference between athletes' Screen-Prac performance and their Post-Comp performance was affected by treatment condition showed that gains were affected by treatment, after controlling for subjects' age, the only control variable that passed the minimum threshold for entry into the regression equation, $F_{change}(3,49) = 2.72$, $p = .05$, $R^2_{change} = .116$. In other words, the extent that subjects were able to achieve their competitive potential, as indicated by their performance in practice, was determined by the type of treatment. A follow-up trend analysis further revealed that higher levels of treatment tended to bring them closer to their original practice performance, $F_{change}(1,51) = 7.53$, $p < .01$, $R^2_{change} = .105$. (See Table 5)

Table 1

Pretest to Postest Change for Competition: Regression Results

Independent Variable	df	R^2	Adj. R^2	p	R^2_{change}	F_{change}	p_{change}
Group	3,50	.248	.203	.0024	.248	5.51	.0024
Linear Component	1,52	.219	.204	.0004	.219	14.57	.0004
Quadratic Component	1,52	.186	.170	.0011	.186	11.89	.0011

Table 2

Pretest to Postest Change for Self-efficacy (Competition): Regression Results

Independent Variable	df	R^2	Adj. R^2	p	R^2_{change}	F_{change}	p_{change}
Group	3,50	.344	.305	.0001	.344	8.75	.0001
Linear Component	1,52	.221	.206	.0003	.221	14.72	.0003
Quadratic Component	1,52	.186	.170	.0011	.186	11.89	.0011

Table 3

Pretest to Postest Change for Self-efficacy (Practice): Regression Results

Independent Variable	df	R^2	Adj. R^2	p	R^2_{change}	F_{change}	p_{change}
Level	1,52	.074	.056	.0466	.074	4.15	.0466
Level + Group	4,49	.149	.079	.0904	.074	1.43	.2458
Group 2 vs. Control	1,25	.146	.111	.0496	.146	4.26	.0496
Level + Group 2 vs. 1, 3 & 4	2,51	.078	.041	.1274	.004	0.20	.6554

Table 4

Pretest to Postest Change for Social Anxiety: Regression Results

Independent Variable	df	R^2	Adj. R^2	p	R^2_{change}	F_{change}	p_{change}
Group	3,50	.069	.014	NS	.069	1.24	NS

Table 5

Pretest to Postest Change for Practice/Competitive Posttest: Regression Results

Independent Variable	df	R^2	Adj. R^2	p	R^2_{change}	F_{change}	p_{change}
Age	1,52	.185	.170	.0012	.185	11.84	.0012
Age + Group	4,49	.302	.245	.0013	.116	2.72	.0545
Age + Linear Component	2,51	.290	.262	.0002	.105	7.53	.0083
Age + Quadratic Component	2,51	.280	.252	.0002	.095	6.73	.0123

Comparisons between treatment groups. Planned comparisons, i.e., orthogonal contrasts within the overall treatment effect, were performed for each of the significant Pre- to Posttest by Group interactions to examine whether higher treatment levels corresponded to an increased improvement in posttest scores. Thus, Group 2 is contrasted with the Control Group, Group 3 with Group 2, and Group 4 with Group 3.

Performance in competition improved more from pre- to posttest for each treatment group than its lower level contrast group: for Group 2 vs. the Control Group, $T(1,50) = 3.594$, $p < .001$; for Group 3 vs. Group 2, $T(1,50) = 3.654$, $p < .001$; and for Group 4 vs. Group 3, $T(1,50) = 3.654$, $p < .001$.

SE-Comp also improved more for each treatment group than its lower level contrast group, with the exception that Group 2 improved more than Group 3. For Group 2 vs. the Control Group, $T(1,50) = 4.727$, $p < .0001$; for Group 3 vs. Group 2, $T(1,50) = -2.579$, $p < .05$; and for Group 4 vs. Group 3, $T(1,50) = 3.099$, $p < .01$. The pretest mean for Groups 1, 2 and 4 was 203.11 with an average standard deviation of 58.08. The pretest mean for Group 3, in contrast, was 253.64 with an average standard deviation of 30.92. This suggests the possibility of a ceiling effect for Group 3. Despite the random assignment of subjects to groups, somehow Group 3 turned out to be a very high self-efficacy group.

Nonetheless, the overall linear component reported above was up. Since Group 2's mean was higher than Group 3's, a post-hoc comparison between Groups 2 and 4 was run to check for a difference that was not originally hypothesized. There was no difference in SE-Comp between Groups 2 and 4, $F_{change} = 0.46$, $p > .05$, $R^2_{change} = .02$.

Another hypothesis was that for the self-efficacy question in the Practice condition the pre- to posttest improvement would be greater for Group 2 than the Control Group. This was verified by regression, where none of the control variables surpassed threshold for entry into the regression equation; $F(1,25) = 4.26$, $p < .05$, $R^2 = .146$ (See Table 3).

There was no interaction between level of decrement and treatment effectiveness. Decrement in performance from practice to the actual competitive situation was expected to correlate with a difference in self-efficacy between the practice and the competitive condition at the pretest time. This was not found ($r = .053$).

Planned comparisons were also performed for the significant Screen-Prac to Post-Comp by Group interactions to examine whether higher treatment levels corresponded to increased skill recovery. Skill recovery was higher for each treatment group than its lower level contrast group, with the exception that Group 2 showed more skill recovery than Group 3. For Group 2 vs. the Control Group, $T(1,50) = 2.587$, $p < .05$; for Group 3 vs. Group 2, $T(1,50) = -2.079$, $p < .05$; and

for Group 4 vs. Group 3, $T(1,50) = 2.054$, $p < .05$. Since Group 2's mean was higher than Group 3's, a post-hoc comparison between Groups 2 and 4 was run to check for a difference that was not originally hypothesized. There was no difference between Group 2 and 4, $F_{change}(2,24) = 1.41$, $p > .05$, $R^2_{change} = .043$.

DISCUSSION

The results support the efficacy of self-modeling with behavioral and setting enhancements for the treatment of Performance Impaired Karate athletes. The results also establish a causal link between self-efficacy expectations and actual Karate behavior. On the measure of Competitive Karate Performance, (K-Comp) as predicted a perfect dose response effect was established. Unfortunately, on the two remaining measures, Competitive Self-Efficacy (SE-Comp) and Skill Recovery, a perfect dose response was not found although all active treatment groups were superior to the control group. Specifically, there were three primary hypotheses. Each stated that there would be successive levels of improvement as context variables were systematically added to treatment. The systematic addition of context variables to treatment was conceptualized aws similar to increasing the dosage of a potent drug. Imbedded within the three primary hypothese was a fourth hypothesis, which held that SE-Comp would act as a causal influence on Competitive Karate Performance.

In terms of earlier research, the positive findings of this study build upon the work of Greer and Miklich (1970); Dowrick (1976; 1979; 1983; 1986; 1991); Dowrick & Dove (1980); Dowrick & Hood (1978); Dowrick & Raeburn (1977); Franks & Maile (1991); Gonzales (1982); Gonzales & Pigott (1986); Hosford, et. at. (1976); McCurdy & Schapiro (1988); Miklich, et. al. (1977); Murray (1982); Pigott & Gonzales (1987); and

Schunk & Hanson (1987). The study extends the understanding of self-modeling in three important ways:

1. Self-modeling was effective in remediating performance impairments in competitive Karate athletes.
2. The documentation of self-efficacy as an underlying causal mechanism.
3. The effects of systematically varying the amount of contextual information.

With respect to the effective remediation of Performance-Impaired competitive Karate athletes (No. 1 above), as indicated above, the three active self-modeling treatments have all been found superior to the control group in favorably altering Competitive Self-Efficacy (SE-Comp), Competitive Karate Performance (Karate-Comp) and Skill Recovery. Among the three active treatments, effectiveness increased with higher amounts of setting enhancements as predicted for Competitive Karate Performance. When analyzing pretest to posttest differences among the groups, not only did the Control Group (CG) not improve, as predicted, but it actually worsened on competitive self-efficacy (SE-Comp) and competitive karate performance (Karate-Comp), while all active treatment groups improved.

Differences between groups were all highly significant at posttest and a linear component analysis revealed that there was a very high correlation between the group number (one, two, three, four) and: 1) the amount of Competitive Karate

Performance (Karate-Comp), Competitive Self-Efficacy (SE-Comp) improvement from pretest to posttest; and 2) the amount of skill recovery from the Screening Practice Karate Performance to the posttest Competitive Karate Performance. Planned comparisons supported the hypothesis that each successive group was superior in pretest to posttest change on Karate-Comp. In contrast, the changes in SE-Comp from pretest to posttest and amount of Skill Recovery from Screen-Prac to Posttest produced equivocal results as they pertained to the expected dose-response effects.. Specifically, these results were that Group 2 improved more than Group 3 and on post-hoc contrasts Group 4 was not superior to Group 2.

With respect to SE-Comp. operating as a causal variable (No. 2 above), since cognitive and behavioral measures were taken in a specific temporal sequence, SE-Comp first, Karate-Comp second, support for causality was demonstrated. Furthermore, since previous competitive performances for all groups were impaired (as demonstrated by the decrement from screening practice performance to the screening competitive performance and from there to the pretest competitive performance) the history of this impaired behavior is not a likely alternative cause.

Earlier, in speculating about the causal mechanism which operates in a self-modeling treatment, Dowrick (1991) suggested that it might be self-efficacy which is altered and which in turn mediates behavior. The present study is among

the first self-modeling studies to document that self-efficacy does change and improve as a function of self-modeling treatments. These findings confirm Dowrick's speculation and further support Bandura's contention that effective amelioration of behavioral impairments due to anxiety (among other disorders) are mediated by alterations in self-efficacy through learning (Bandura, 1977b, 1986).

The effectiveness of the active treatments in this study (and the results which document that self-efficacy acts as a causal variable) weakens the position that anxiety is best treated with direct, intensive exposures which work to condition or habituate the individual's responses. (Seligman and Johnston, 1973; Rescorla, 1979; Gray, 1985). In contrast, the results of this study support the position of Bandura (1977b, 1986;) Barlow (1988); Lang (1985); Rachman (1980); Rachman, et. al. (1986); and Zillman (1983) that higher-order learning and its impact on cognitive variables, such as self-efficacy, ameliorates anxiety and enhances performance.

With respect to the systematic varying of the amount of contextual information (No. 3 above), although the findings have two anomalies, Group 2 unexpectedly improved more than Group 3 and Group 4 was not found superior to Group 2, their systematic manipulation allowed for these manifestations to be observed. The specificity with which each treatment group differed was based upon a conceptual analysis of the important stimuli delineating the competitive environment. Using this

analysis, treatment differences were tightly defined and clearly observable. This methodology has been rare in the testing of self-modeling treatments and provides valuable ground work for future studies.

For example, Dowrick & Hood (1978) and Pigott & Gonzales (1987) have both discussed the importance of context in self-modeling treatments. However, they have failed to systematically vary, or "dose" context variables, which they have included in treatment. For example, in working with electively mute children, Dowrick & Hood (1978) point out that the simulated school environment in the home was ineffective until sufficient school stimuli were included. Yet, they did not quantify or operationalize the stimuli which were essential. Nor did they look at instances of how more or partial stimuli could have adversely affected improvement.

Several possible explanations for the unexpected better performance of Group 2 vs. 3 can be offered. First, the exposure of Group 3 to partial contextual stimuli (judging with the absence of evaluation) may have been enough to elicit negative anxiety without providing enough new stimuli to counteract negative anxiety and increase self-efficacy. If this is the case, it supports Lang's (1985), concept that sufficient new information must be presented during the evocation of anxiety to counteract the impairment.

A second alternative explanation involves the unusually high self-efficacy expectations which characterize Group 3 in

contrast to the other groups. In spite of random assignment, which should have equalized groups on dependent measures, Group 3 was unusually high in its self-efficacy ratings. This unusual quality may have interacted with the treatment and accounted for the unexpected results. A replication of this study, where randomization does yield equalized groups relative to self-efficacy, might produce a different outcome. Perhaps the expected outcome would occur whereby improvement progresses directly in relationship to the upward dosing of the contextual enhancements.

A third possible explanation is that when taking into account the inhibiting potential of a ceiling effect (if it were operating), the self-efficacy gains of Group 3 may have represented a more positive theraputic change than the gains of Group 2. This explanation is supported by the actual improvement observed in the Competitive Karate Performance of Group 3.

With regard to Group 2 performing statistically as well as Group 4 on measures of SE-Comp and Skill Recovery, several explanations can be offered. First, it is simply possible that the inclusion of contextual information is unneeded for self-modeling treatments to be effective when working with this population.

Second, since the positive evaluation vignettes were not tailored to each subject's level of competence, they may have been perceived as lacking credibility to somme of the

subjects. Positive evaluation vignettes in a future study should be gauged to represent an optimally high score for the specific rank and performance of each subject rather than a set ideal. This strategy would provide a superior fit to Dowrick's (1991) concept that effective self-modeling operates through adding an extra dose of competence.

Third, although Group 4 was not statistically better than Group 2, its improvement, especially on the measure or SE-Comp., may have been clinically more significant.Support for this position may be found in Group 4's superior Competitive Karate Performance. No matter how small the shift was in SE-Comp, it may have been this shift which potentiated Group 4's actual behavioral improvement.

Bolstering the position that Group 4 has made the most significant clinical gains, it was observed in post experimental inspection that the groups were negatively correlated between their percentage of recovery and initial amount of behavioral impairment. This relationship strengthens the effectiveness of active treatments and particularly emphasizes the powers of Group 4.

The specific amount of Skill Recovery for each group was the following:

Group 1 (CG) recovered 1.4%.

Group 2 (BSM) recovered 6.21%.

Group 3 (BSM+SE1) recovered 4.34%

Group 4 (BSM+SE2) recovered 7.76%.

Since this study is among the first to have assessed the dosing effects of systematically increasing contextual information in a self-modeling treatment, it is premature to make a strong case for which of the above explanations is correct. Replication studies are essential so that patterns of results can emerge, which would assist in identifying the correct explanation.

As presented in the methods section, subject selection was determined by a behavioral decrement of 10% or greater from the Screening Practice Karate Performance (Screen-Prac) to the Screening Competitive Karate Performance (Screen-Comp). As predicted, there was an analogous drop in perceived self-efficacy from the alone to the competitive condition at pretest. Unfortunately, contrary to prediction, there was no correlation between the initial behavior decrement and this drop in self-efficacy. In contrast, there was a high correlation between SE-Comp change and behavioral change between pretest and posttest as indicated by the results of the regression analysis. This suggests that self-efficacy is a better predictor of behavior than the reverse. There may be two reasons for this. First, self-efficacy may be a more sensitive measure than behavioral history, because it takes into account the internal state of the subject in addition to the knowledge the subject has of his or her past behavior. If this is the case, it supports Bandura's (1984) position that self-

efficacy is a generally better predictor than behavior. Second, since the self-0efficacy measure was taken in close temporal proximity to the behavioral performance, it may have yielded more accuracy than the behavioral decrement, which was taken several months preceding the efficacy measure . Future research should attempt to analyze if self-efficacy is a consistently better predictor than behavior by controlling for temporal effects. This could be done by recording both measures in close temporal proximity.

An important opportunity was overlooked in this study. Additional data chould have been collected to test the relationship between self-efficacy and behavior if upon screening all subjects were administered a self-efficacy questionnaire. This methodological change would provide an opportunity to examine whether a relationship exists between subjects who were rejected due to insufficient behavioral decrement and their self-efficacy ratings. If a positive correlation was found, validity would be added to the position that self-efficacy is predictive of behavior.

An additional methodological change for self-efficacy ratings concerns the numerical scale employed. It may be superior to have subjects estimate their self-efficacy based on the identical scale on which their competitive performance is judged. Because the subjects are familiar with this scale, their self-report ratings may become more reliable and valid.

The results of the change in Practice Self-Efficacy (SE-Prac) for Group 2 from pretest to posttest was surprising. Contradictory to the experimental hypothesis for Group 2, SE-Prac changed less than SE-Comp. This occurred in spite of the content of Group 2's self-modeling training tape, which presented optimal behavior in a practice setting. Even a followup planned comparison of Group 2 with Groups 1, 3, and 4 relative to changes on SE-Prac from pretest to posttest was negative. Only the planned comparison of Group 2 with Group 1 yielded positive results regarding this measure.

While ceiling effects may posibly explain these findings, an alternative explanation suggests itself. Perhaps the knowledge which all subjects had of the purpose of this study to remediate impaired competitive performers, slanted the impact of the treatment of Group 2. If this were the case, cognitive mediating effects may have interacted with and potentiated the generalization of treatment gains in Group 2 from the practice setting to actual competitive performance.

Future research may seek to control for this effect by comparing subjects who are held blind to the treatment with subjects who are informed. If informed subjects are able to transfer treatment gains, it may provide aditional evidence for the influence of higher order cognition on learning.

As predicted a pre- to post-treatment interaction was observed for the competitive self-efficacy measure. (SE-Comp.) This finding supports the notion that the primary focus of active treatments successfully targeted SE-Comp.; however, without doing further research where subjects are held blind, we cannot be sure if expectancy was delineating the target of treatment or the substance of the active treatments. We do know that expectancy was not sufficient in itself. If it were, the control group would have also improved. What we are unsure of is whether there was an interaction between treatment expectancy and actual treatments effects.

This study explored a "limbo setting" as an effective source of edited footage for the creation of self-modeling training tapes. A "limbo setting" attempts to neutralize the background environment. (See Methods Section for definition and description). The results of this study confirm that a limbo setting may be used to facilitate a "displaced outcome" strategy (Dowrick, 1991). The benefit to be drawn from this finding is that in instances where it is impractical or impossible to match exact backgrounds to action sequences for editing purposes, a limbo setting may be used as a viable alternative. This qualifies the work of Dowrick & Hood (1978). They were unable to achieve effective self-modeling when the environment was not a credible simulation.

The relationship between performance impairment and general social anxiety in children and adolescents was an exploratory aspect of the present study. For this reason, the Social Anxiety Scale for Children-Revised (SASC-R) (LaGreca 1992) was employed as a dependent measure. While investigating if a relationship exists between performance impairment and at-risk scores in the SASC-R, it was also determined to assess if any treatment gains made in behavioral impairment would have generalized to the broader category of social anxiety covered by the SASC-R. Results indicated a very strong relationship between performance impairment and being at risk for problematic levels of social anxiety as measured by the SASC-R. Using the total score guidelines for children and adolescents considered at risk for social anxiety (LaGreca, 1993), not one subject in our sample fell in the non-problematic range (below 37). Eighteen subjects fell into a gray area above the non-problematic range, but below the cut-off point for substantial risk (between 37 and 50). Thirty-six subjects fell clearly in the at-risk range (above 50). It is striking that using the narrow behavioral measure of performance impairment identified so many children and adolescents who are at risk for problematic levels of social anxiety. Unfortunately, treatment gains were not generalized to the SASC-R, as indicated by the presence of

simple main effects on the SASC-R pre-to-post but no interaction effect by treatment group.

It was hypothesized that attrition rates would be comparatively lower in this study than the average attrition rates found in most treatments for anxiety disorders. The drop-out rate for this study was approximately 10%, which is only very slightly below the average drop-out rate of 12% reported in the literature (Jansson & Ost, 1982). While this finding appears to contradict the experimental hypothesis of lower drop-out rates, on closer inspection, it does not. First, all but five of the subjects were lost before treatment procedures were applied. Secondly, the five subjects who were lost after treatment procedures were applied (after the pretest competition) did not report discomfort with the treatment. In fact, not one of the subjects was lost from the study because they wished to discontinue participation. Rather, all subjects who were lost were dropped because they could not comply with the experimental scheduling. Since no subject claimed to be unpleasantly affected by treatment, it appears that the initial hypothesis is actually correct. The treatment did not cause drop-out, rather the inflexibility of the study's scheduled meetings did. Indeed, the evidence suggests that if the scheduling could be more flexible in a future study, drop-out rates could be quite low, as predicted.

Although this study has provided preliminary support for the efficacy of self-modeling for the treatment of performance impairment, generalization of these findings must be made with caution. For example, there were no subjects in this sample whose behavioral decrement was extreme. Most subjects only degraded in their behavior from the Screening Practice Karate Performance to the Screening Competitive Karate Performance in the 15-20% range. The average level of decrement was 17%. Therefore, there is no evidence that the effective treatments in this study would be effective with individuals who have more extreme levels of behavioral impairment. Further research is needed to test if more highly impaired subjects will benefit from self-modeling treatments with setting enhancements.

Educational Implications

The findings from this study could have a profound impact on psychological, athletic and educational evaluations and interventions performed within schools. These findings suggest that significant positive changes in self-efficacy and behavior can be acomplished through the use of self-modeling treatments. The qualities of these treatments included brevity, convenience, privacy, pleasantness, limited professional contact, and limitless reaccessibility.

An intervention with these qualities lends itself to the educational setting where the client roster is often very large and the professional staff and student population have limited time. Given these factors, self-modeling interventions could represent a particularly well suited form of treatment which can effectively maximize the staff's serving potential without sacrificing success.

Although this treatment modality uses technologically sophisticated video equipment, it does not require lengthy or expensive training. Within the typical public school, suitable equipment is freequently available and what is not can be rented. (Video Labs within many of the public schools have full service systems.) Children in today's society are visually oriented and preconditioned to interact with video technology. Unlike children from prior generations, the average school child engages in video

games; therefore, video self-modeling constitutes a comfortable fit.

This study did not employ the children in the production of their own self-modeling tapes; however, it has been indicated in the literature (Dowrick, 1991) that subject participation in editing and constructing of their own self-modeling video tape can enhance effectiveness. Therefore, the staff and student population could participate in a cooperative learning situation.

Specific findings generated by this study suggest what should be helpful in improving the performance of competitive athletes and the identification of children at risk for general social anxiety problems within the school population. A large majority of schools in the United States maintain an athletic program. The potentially positive effects of sports on physical health, socialization and self-image provide a sound rationale for their inclusion in the school. It is not unusual for the participants to place great importance on the quality of their performance and to react poorly when their performance is not representative of their optimal ability. If disappointed often enough due to Performance Impairment, a child is likely to turn away from participation and lose many of the benefits which sports can provide.

Furthermore, since this study presents preliminary data that demonstrates a strong relationship exists between

impaired athletic performance and at-risk children for social anxiety, it can be argued that it is especially important for these children to receive effective treatment. If treatment is effective, it may result in increasing the likelihood that these children will not turn away from participation and instead will remain in a peer group activity in which they may come to perceive themselves as successful. This, in turn, might have an effect on reducing the risks for future difficulties with social anxiety. An awareness of the above association may also serve as a signal for educators to be on the alert for more extensive social difficulties in this population. Thus, the identification of Performance Impairment may be able to act as a broad screening device within school settings, which should signal the need for further evaluation.

In closing, this investigator believes based on previous findings and the preliminary data of this study that there is very little to lose and much to be gained in helping children perceive themselves behaving with an extra measure of power, competence and attractiveness. Self-modeling treatments suggest themselves as an excellent method to accomplish this task.

Appendixes

Appendix A

Consent Form

What this study is all about:

The study that your child will be participating in is being conducted to determine the effectiveness of using various video tape training aids to help enhance athletic training procedures which are preparing your child for competition.

There are four groups in this study:

The study will be comprised of four groups, three active training groups and a wait-list group. Your child will be randomly assigned to one of these four groups.

There are four phases to this study:

I. The Screening Phase: Video tapes will be utilized in order to determine if your child is likely to benefit from video tape training. Two video tapes will be made, one in a practice setting, and one in a competative setting to see if your child has difficulty performing at his/her maximum potential in a competative setting. It will take approximately one hour to create both of these video tapes, but they will be made in two different sessions.

II. The Editting Phase: An edited video tape will be created of each child's athletic routine. Footage of your childs performances which were captured during the screeening phase will serve as the basis for creating a final edited training tape. These video tapes will be designed to portray your child performing optimally.

Children assigned to the wait-list group will not view their edited training tape until the conclusion of the study.

The active training groups will differ as to the amount of background information to be edited into the training video tape, which each child is to observe during the viewing sessions phase of this study. The background information which will be varied, will include the presence or absence of an audience, judges, and judge's evaluations.

III. Viewing Sessions Phase: Two weeks prior to your child's competitive event, he/she will be required to watch his/her video training tape everyday for each of the two weeks equaling a total of fourteen (14) viewings. The length of each video tape will range between one and three minutes depending upon the length of your child's athletic performance. The viewing of these video tapes will take place in your home.

IV. Competitions Phase: It will be necessary for each child participating in this study to compete in a total of three Karate competititions-- one competition during the screening phase, one competition immediately before the viewing phase, and one competition immediately after the viewing phase. Immediately prior to each of the last two competitions, questionaires pertaining to how your child feels about competing will be administered. Your child's competitive performance for each competition will be evaluated by official Karate judges.

There is no charge for this study:

The study will last for approximately six (6) months. There will be no charge for participation in this study. This study is being conducted by Ralph Bieber, a doctoral student at the City University of New York, and a licensed School Psychologist by the Board of Education, City of New York, All information obtained will be kept confidential. Participation is voluntary and withdrawal is possible at any time. Upon conclusion, each child, and his/her family will attend a private meeting to explain results and answer any questions.

If your child is taking any form of psychiatric medication or being treated by a psychologist he/she is not eligible to participate in the study.

If alternative help with competative performance is desired, refferals to appropriate clinics or private professionals will be made upn request.

If there are any questions regarding the study, do not hesitate to contact:

Ralph Bieber
2114 Donna Drive
Merrick, NY 11566
(516) 223-9034

Parent/Guardian Signature _____ Participant Signature _____ Date _____

Appendix B

Instructions for Practice Setting Shoot

The following instructions were read by the investigator to each group of perspective subjects while they were in the front waiting area of the karate studio in which the practice setting footage was shot. (There were approximately 15 prospective subjects in each group. Latecomers either received their instructions in the next group or individually.)

"Thank you for coming. When you are called into be videotaped, please take up to five minutes to get comfortable performing in front of the two cameras. When you feel ready to perform your kata, let the camera people know.

"Please run through your competitive kata, the same one you plan to do in competition, twice. You may rest up to five minutes between run throughs to get your energy back. Try to use you full force, power and accuracy on each of the run-throughs.

"After you finish your two run-throughs, you may choose up to two series of moves that you feel you could have performed better and perform those sections of your kata again. You may do those sections up to four times each. Do them at least two ways: 1) slowly and deliberately so you get everything technically as perfect as possible and 2) with full force and power.

"You may use the time between now and when you are called to warm-up and practice. I or one of the instructors will let you know when you are the next person to be videotaped.

"Please remember the exact Gee you are wearing for this taping. You must wear the same exact gee next time you perform in this study if you are selected as a subject." (This was necessary to enhance the continuity of edited footage.)

A brief time for questions was allowed.

Appendix C

Instructions for the Karate Performance Self Efficacy Questionnaire:

"I am going to ask you some questions about how you feel about performing different types of moves in your kata -- easy moves, medium difficulty moves and hard moves. For each type of move, estimate how sure you are that you will perform those moves at your best level with full power, speed and accuracy. Give your best estimate by choosing a number between 0-100. If you are completely unsure of how you will do, answer 0. If you think you may do well, but are not sure, answer 50. If you are completely sure you will perform your best, answer 100.

"You must write your answer in 10 seconds or less. It is important that you do not guess but give a real estimate of how well you believe you will do.

"I will ask for your estimate in two different situations, first when you are practicing alone and no one is watching you and second when you are performing in an important competition and you are being watched by judges and a large audience."

Setting I

When you are practicing your kata alone and nobody is watching you, please estimate how sure you are of performing the easiest moves in your kata at you best level.

When you are practicing your kata alone and nobody is watching you, please estimate how sure you are of performing the moves of average or medium difficulty in your kata at your best level.

When you are practicing your kata alone and nobody is watching you, please estimate how sure you are of performing the moves which are the hardest in your kata at your best level.

Setting II

When you are performing in an important competition and you are being watched by judges and a large audience, please estimate how sure you are of performing the easiest moves in your kata at your best level.

When you are performing in an important competition and you are being watched by judges and a large audience, please estimate how sure you are of performing the moves of average or medium difficulty in your kata at your best level.

When you are performing in an important competition and you are being watched by judges and a large audience, please estimate how sure you are of performing the moves which are the hardest in your kata at your best level.

Appendix D

Means Table

Dependent Variable		Group 1	Group 2	Group 3	Group 4
Age	Mean	12.00	12.43	10.57	11.00
	Std Dev	2.61	3.50	2.50	1.68
Level	Mean	6.46	6.43	5.36	5.46
	Std Dev	2.15	1.90	2.27	1.98
Decrement	Mean	2.51	2.79	2.76	2.93
	Std Dev	.51	.56	.35	.38
Practice[1]	Mean	8.03	8.18	8.01	8.01
	Std Dev	.57	.46	.46	.35
Competition,					
pre	Mean	6.91	7.10	6.71	6.89
	Std Dev	.44	.58	.66	.47
post	Mean	6.84	7.21	6.98	7.16
	Std Dev	.46	.62	.74	.52
Social Anxiety,					
pre	Mean	52.15	56.50	50.79	52.46
	Std Dev	5.38	13.04	8.56	8.88
post	Mean	51.54	53.50	48.07	49.23
	Std Dev	6.35	11.99	9.60	8.88
Self-Efficacy (Alone)					
pre	Mean	248.92	252.79	265.00	243.46
	Std Dev	31.67	37.56	32.99	52.15
post	Mean	248.46	256.50	274.00	256.23
	Std Dev	30.87	35.75	24.44	30.36
Self-Efficacy (Competition)					
pre	Mean	203.62	196.57	253.64	209.15
	Std Dev	59.95	56.46	30.92	57.82
post	Mean	197.77	211.79	262.57	228.62
	Std Dev	53.99	52.21	24.59	44.89

[1]The means reported here are the average ratings of two judges for the practice variable and three judges for the competition variable.

Appendix E

Pre- and Posttest Means for the Independent Variables

Self-Efficacy Alone, Easy					
pre	Mean	90.92	91.29	93.71	89.54
	Std Dev	9.3	13.0	14.0	13.7
post	Mean	90.8	91.7	97.2	92.2
	Std Dev	9.4	11.8	6.1	9.3
Self-Efficacy Alone, Medium					
pre	Mean	79.9	85.0	89.3	80.5
	Std Dev	15.0	13.0	13.7	20.7
post	Mean	81.5	86.2	91.7	85.8
	Std Dev	12.5	12.2	10.7	9.7
Self-Efficacy Alone, Hard					
pre	Mean	78.1	76.5	82.0	73.4
	Std Dev	12.2	14.8	18.0	19.2
post	Mean	76.2	78.6	85.1	78.2
	Std Dev	14.3	13.5	12.0	13.2
Self-Efficacy Competition, Easy					
pre	Mean	80.5	78.4	92.5	77.6
	Std Dev	17.9	17.0	6.0	16.4
post	Mean	77.7	82.9	95.6	85.3
	Std Dev	16.3	14.5	4.5	11.3
Self-Efficacy Competition, Medium					
pre	Mean	67.2	66.4	81.0	70.1
	Std Dev	20.4	22.4	14.5	19.1
post	Mean	64.8	72.1	84.5	75.8
	Std Dev	19.5	18.7	11.6	16.1
Self-Efficacy Competition, Hard					
pre	Mean	55.8	51.8	80.1	61.5
	Std Dev	24.3	19.8	18.7	24.3
post	Mean	55.2	56.8	82.5	67.5
	Std Dev	22.1	21.5	13.7	20.2

Appendix F

Difference Table
Pre- to Posttest Mean Difference Scores[1]

Dependent Variable		Group 1	Group 2	Group 3	Group 4
Competition	Mean	-.07	.11	.27	.27
	Std Dev	.26	.24	.21	.29
Competition Posttest minus Practice	Mean	-1.20	-.96	-1.03	-.84
	Std Dev	.38	.45	.45	.37
Social Anxiety	Mean	-.62	-3.00	-2.71	-3.23
	Std Dev	4.44	4.24	3.58	3.22
Self-Efficacy (Alone)	Mean	-.46	3.71	9.00	12.77
	Std Dev	4.68	5.73	9.51	27.84
Self-Efficacy (Competition)	Mean	-5.85	15.21	8.93	19.46
	Std Dev	9.27	15.05	10.87	17.46

[1]These difference scores served as the basis of the regression results.

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