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THE EFFICACY OF IMPLEMENTING  
KIDDIE QR TRAINING WITH PRIMARY-GRADE STUDENTS

by

S. Lynne Ragan

B.A., University of British Columbia, 1971

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF  
THE REQUIREMENTS FOR THE DEGREE OF  
MASTER OF ARTS (EDUCATION)

in the Faculty

of

Education

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ABSTRACT

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## ABSTRACT

There are little data available on the extent to which school-aged children can acquire stress management strategies within a preventive context in a classroom setting. This study was conducted to investigate the effects of Kiddie QR, a self-regulation technique, on the anxiety levels and academic self-concepts of primary-aged students. A total sample of 82 students from four self-contained classrooms (Kindergarten, Grades 1, 2, 3) participated in the Kiddie QR exercises. Instruction was provided by the regular classroom teachers utilizing professionally prepared audio cassette tapes. All four teachers had volunteered to participate in this study. The procedure required 10 minutes of classroom time, three days a week, over a six week period, although the actual procedure followed by each teacher was found to vary. A control group of 37 students from two primary-grade classes took part in pretesting and posttesting but received no treatment. The State-Trait Anxiety Inventory for Children was used to measure anxiety levels and the Student's Perception of Ability Scale was used to measure academic self-concept. Pre- and posttreatment scores were compared to determine group differences. Overall, there was no significant difference between the anxiety levels and the academic self-concepts of children who participated in the program and those who did not participate. The results also indicated that the effects of Kiddie QR training were not moderated by gender of the student. However, grade level was shown to interact with treatment. The Grade 3 students who received Kiddie QR training reported a significantly lower level of trait anxiety from pre-to posttesting. The results are discussed in terms of teacher adherence to the Kiddie QR training program, and suggestions for further research and practical implications for implementing Kiddie QR in a classroom setting are indicated.

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## CHAPTER I

### STATEMENT OF THE PROBLEM

The purpose of this chapter is to provide a rationale for teaching stress management strategies to children within a preventive context. Following a brief introduction to the problem of stress the focus will be on the need for individuals to acquire effective coping strategies in order to prevent adverse consequences associated with exposure to stressful situations. The school system is described as a viable setting for implementing programs directed at teaching such strategies. In particular, the role of the classroom teacher in providing the main instructional input is discussed and supported by recent research in this area.

#### The Problem: Maladaptive Coping

Research has shown that chronic stress (i.e., frequent and prolonged elicitation of the stress response) may be a risk factor for a wide array of physical and mental disorders (see Antonovsky, 1979; Elliot & Eisdorfer, 1982; Everly & Rosenfeld, 1981; Miller, 1980). Moreover, reports of childhood stress-related disorders are beginning to emerge to indicate that children are not immune to the negative consequences of stress (Clarizio & McCoy, 1976; Elkind, 1981; Groen, 1975). Disorders considered to be associated with stress among children include bronchial asthma, duodenal ulcers, migraines, ulcerative colitis, enuresis, and sleep disturbances. In addition, the inhibitory effects of maladaptive stress reactions on learning and social adjustment have been recognized for some time (e.g., Sarason, Davidson, Lighthall, Waite, & Ruebush, 1960).

The link between stress and illness is not a straightforward cause-effect relationship. This point is obvious in that certain stressors are an inevitable part of life, yet many people do not appear to suffer adverse effects. Rather, most current writers in the area of stress agree that the characteristics of the stressor,

the way the individual appraises and reacts to the stressful situation, and the social and personal coping resources available to the individual are important mediating factors in the stress-disorder relationship (e.g., Antonovsky, 1979; Elliott & Eisdorfer, 1982; Coyne & Lazarus, 1980). In particular, a consensus is growing that a major reason for stress-related problems is that many individuals have not developed appropriate strategies for effectively managing stressful situations (cf. Hiebert, 1983; Meichenbaum & Turk, 1977; Simpson, 1980; Stroebe, 1982). As a result, one of the major goals of stress research is to investigate interventions directed at the acquisition of effective coping skills and strategies (Elliott & Eisdorfer, 1982). Although the bulk of research in this area has been addressed to the treatment of stress-related disorders, there has been an increasing interest in the possibility of implementing stress management strategies within a preventive context.

A suggestion often made is that preventive programs be introduced to school-aged children (e.g., Schultz & Walton, 1979; Volpe, 1975). The possibility exists that successful resolution of stressful events in childhood may enhance self-esteem and a sense of competency and thus augment effective coping with stressful situations in adulthood (Elliott & Eisdorfer, 1982). In addition, appropriate strategies learned in childhood may be maintained and practiced throughout life, thus preventing the onset of maladaptive patterns of responding to stress (Hiebert & Eby, 1982; Schultz & Walton, 1979). The results of a few recent studies have provided some support to indicate that patterns of responding to stressors, established in childhood, may be carried over into adulthood (see Elkind, 1981). For example, Matthews (1979) found that fourth and fifth grade males demonstrating Type A behavior (i.e., competitive achievement striving, impatience, aggression) responded to stressful situations in a manner comparable to Type A adults.

Similarly, the responses of Type B boys paralleled those of their adult counterparts. Matthews (1979) suggests from these results that the presence of Type A behavior in childhood may create the basis for coronary heart disease in later life. Although the specific factors linking Type A behaviors to coronary heart disease have not yet been identified, there is evidence to suggest that it is not the heavy work load and faster tempo experienced by Type A individuals that is crucial, but rather, whether or not Type A individuals perceive that they are in control of and able to cope with potentially stressful situations (Frankenhaeuser, 1980). Matthew's research findings thus provide support for the suggestion that stress management strategies be introduced at an early age.

#### Teaching Coping Strategies in the School

A number of current writers in the area of childhood stress suggest that programs directed at teaching stress management strategies within a preventive framework be incorporated in the regular school curriculum (e.g., Clarizio & McCoy, 1976; Frederick, 1980; Hiebert & Eby, 1982; Schultz & Walton, 1979). A major reason for this proposal centers on the concern over a growing disparity between the number of trained mental health professionals and the population in need of service (Clarizio & McCoy, 1976). The schools have access to large numbers of children over long periods of time and if children can learn skills and strategies that will enable them to more effectively manage stress, substantial gains could be made in the promotion of mental health. Some writers argue that education needs to place more emphasis on the affective domain and that learning to cope with stress is in fact an educational function (Dinkmeyer & Dinkmeyer, Jr., 1979; Frederick, 1980).

Another argument in favour of introducing primary prevention in the schools is that teachers would likely also benefit from participating in stress

management programs (Volpe, 1975). Teachers could profit by becoming more aware of and sensitive towards the common stressors faced by students and themselves, and more knowledgeable in ways to promote effective stress management. In addition, because many of the stressors faced by children are school-related, a knowledgeable teacher would be more likely to modify or eliminate unnecessary stressful situations in the classroom.

Dinkmeyer and Dinkmeyer, Jr. (1979) add that stress (i.e., patterns of reacting to potentially stressful events) is contagious; when teachers feel stressed, students feel more stressed also. As such, if children are to become able to cope with stress they must be exposed to teachers who model appropriate coping skills and strategies. A number of studies have provided initial support for the effectiveness of implementing stress management procedures in the classroom and will be discussed in the next section and following chapter.

### Teacher as "Therapist"

Programs designed to teach stress management strategies to children in the school setting would be maximally useful if instruction could be provided by regular classroom teachers with minimal assistance from a resource person (Hiebert & Eby, 1982). Recent studies have investigated the effectiveness of teaching relaxation procedures to students in which the classroom teacher provided the main instructional input. Hiebert and Eby (1982), for example, found that volunteer Grade 12 students practicing relaxation exercises for 30 minutes each day over two weeks reported a significant reduction in anxiety levels as measured by two self-report questionnaires. Instruction was provided by the regular classroom teacher utilizing professionally prepared relaxation tapes. In a similar study, relaxation training via prepared audio tapes was found effective in significantly enhancing self-concepts of students in grades six to eight (Ballenger, 1981). Day

and Sadek (1982) investigated the effects of Benson's relaxation response on the anxiety levels of Grade 5 students. Again, instruction was provided by the regular classroom teacher. The teacher did not utilize prepared tapes but had received training by one of the experimentors in the administration of the relaxation response. The results indicated a significant treatment effect in the direction of lower anxiety levels reported by the students.

The above studies suggest that volunteer students can learn relaxation techniques in a classroom setting and that relaxation procedures can be successfully taught by regular classroom teachers receiving training in the procedure and/or utilizing professionally prepared audio tapes. There is, however, a major caveat to these findings. The teachers involved were all described as willing participants in the programs. It seems likely that this would be a necessary condition in effectively implementing any stress management procedure in the classroom. Yet the possibility exists that not all teachers would be willing participants. Teacher noncompliance would likely result if the particular program and procedure conflicted with (a) the teachers relationship with students, (b) the teachers general philosophy towards stress management and behavioral medicine, and (c) the teachers focus (or more appropriately, lack of focus) on the affective domain and affective development (Torrance, 1962). Furthermore, if students were to learn appropriate coping strategies, they would have to be taught the related concepts by teachers who model effective stress management (Dinkmeyer & Dinkmeyer, Jr., 1979), otherwise the teacher's behavior would likely negate any verbal instructions.

### Summary

The literature generally suggests that acquiring a wide range of coping skills and strategies is a crucial factor in preventing adverse consequences associated

with stress. Reports of childhood stress-related disorders indicate that not only many adults but many children as well have not developed appropriate resources for managing stressful situations. As such, programs directed at teaching coping strategies need to be offered to children in both a restorative and preventive sense. These programs would be maximally useful if incorporated in the school curriculum and taught by regular classroom teachers. Research is beginning to provide some initial support for the effectiveness of implementing relaxation training as a stress management strategy in the classroom setting. However, this writer is unaware of any published data systematically investigating various stress management procedures across a wide age range.

This study was conducted to investigate the efficacy of implementing Kiddie QR (Stroebe, Stroebe, & Holland, 1980), a self-regulation procedure, with primary-aged students in a classroom setting. The next chapter includes a further examination of research in the area of childhood stress and stress management, and presents a description of the Kiddie QR program. Chapter 3 describes the sample, the research design, and the measures used. Chapter 4 reports the research findings, and the final chapter includes an evaluation of the results, and identifies practical implications for further research and for applying Kiddie QR in the classroom setting.



## CHAPTER TWO

### THEORETICAL RATIONALE AND LITERATURE REVIEW

This chapter is divided into four sections. The purpose of the first section is to provide a conceptual framework for understanding the nature of stress. The second section focuses on childhood and school-related stress and includes a review of potential sources of stress and the possible consequences of ineffective coping. Section three deals with stress management techniques directed at the physiological component of the stress response and examines a number of studies investigating the effectiveness of these strategies when used with elementary school-aged children. The final section discusses the physiological principles and objectives related to the Kiddie QR program and describes the Kiddie QR technique. In addition, specific hypotheses for the present study are outlined at the end of this chapter.

#### Conceptual Framework

A number of points that are basic to understanding the nature of stress in the context of stress management are presented in this section. First, a definition of stress is provided, formulated from major theoretical models. Next, the physiological, cognitive, affective, and behavioral components of the stress response are described. Third, the concept of stressor will be discussed, followed by an examination of the conditions under which stress might be harmful and lead to disorder.

#### Definition of Stress

Definitions of stress tend to follow one of three basic approaches (Cox, 1978). Stress may be defined in terms of a response, a stimulus, or an interactional event between person and environment. Seyle (1974) taking the response-based approach, defined stress as, "the nonspecific response of the body to any demand" (p. 14).

This definition has been criticized as being too general to be of practical use and the notion of nonspecificity has also been questioned (cf. Cox, 1978; Everly & Rosenfeld, 1981). Others have defined stress in terms of stimulus input. Margetts (1975) for example, suggests that individuals adjust themselves to handle and maintain a reasonable input of stimuli. Excessive or insufficient stimulation can be considered as stress. Lazarus (1978) focuses on the interaction between environmental and internal demands, and the coping resources of the person. He defines stress as, "any event in which environmental or internal demands (or both) tax or exceed the adaptive resources of the individual" (Lazarus & Launier, 1978, p. 296).

In a review of various theoretical models, Cox and Mackay (Cox, 1978) propose the following definition:

Stress is a perceptual phenomenon arising from a comparison between the demand on the person and his ability to cope. An imbalance in this mechanism, when coping is important, gives rise to the experience of stress, and to stress response. The latter represents attempts at coping with the source of stress. (p. 25)

The authors emphasize that it is not the imbalance between the demand per se and the actual capability of the individual to cope that is crucial, but rather, between the perceived demand and the perceived ability to cope. Furthermore, when coping behavior is initiated, it is the individual's perception of the adequacy of the coping attempt that is important. If attempts at coping behavior are perceived to be effective, the stress response will begin to subside. But if the coping behavior is perceived as inadequate, the stress response will likely be prolonged. Viewing stress as an individual perceptual phenomenon appears to be gaining wide consensus in the literature (cf. Everly & Rosenfeld, 1981; Frankenhauser, 1980; Hiebert, 1983; Lazarus & Launier, 1978).

### The Stress Response

The stress response is characterized by a potentially wide range of reactions involving physiological cognitive, affective, and behavioral components. The physiological representations of stress are most commonly described in terms of the fight or flight response or the alarm stage of the general adaptation syndrome (Seyle, 1974). Examples of physiological changes are: increased heart rate, respiration rate, muscle tension; decreased blood flow to the hands, feet, and stomach, and endocrine secretion. The cognitive component of a stress response involves an appraisal of the degree of harm-loss, threat, or challenge involved in the situation (Lazarus & Launier, 1978). A stress response is typically accompanied by a negative self-appraisal of the person's present or future state of well-being; a negative self-evaluation of coping resources and options; and at times a misinterpretation of an otherwise neutral stimulus as stressful (Everly & Rosenfeld, 1981; Lazarus & Launier, 1978). Behavioral representations of the stress response might include stuttering, fidgeting, tics and tremors, and reduced motor dexterity (Nietzel & Bernstein, 1981). Examples of affective reactions would be fear, anger, helplessness, and dread.

### Stressor

Any stimulus, external or internal, real or imagined, that evokes a stress response can be called a stressor (Everly & Rosenfeld, 1981; Hiebert, 1983). The number of potential stressors is unlimited. Some stimuli are inherently capable of eliciting a stress response. Examples are: extreme heat, cold, or noise; caffeine or nicotine; and strenuous exercise. However, in most cases, stress does not reside in the situation per se but rather in the individual's interpretation of the situation and in the individual's perceived ability to cope effectively (Everly & Rosenfeld, 1981; Lazarus & Launier, 1978). If the appraisal of situational demands is consistent with

the individual's capacity to cope, the event will not likely evoke a stress response, and the situation would not appropriately be called a stressor. But if the demands are cognitively misinterpreted and/or accompanied by a perceived inability to cope effectively, the event will likely elicit a stress response, and would appropriately be labeled a stressor. As such, the same stimulus may prove stressful for one individual and not for another. As Seyle (1979) stated:

In the final analysis, aside from their inherent effects per se, the actions of stressors are primarily dependent upon how we take them, upon how we perceive the stimuli and how we react to them as actually being eustressful or distressful. (p. 52).

### The Effects of Stress

When considering the effects of stress it is important to distinguish between transitory and chronic stress (Everly & Rosenfeld, 1981; Hiebert, 1983). Transitory stress refers to the normal reaction to the daily stressors that most people experience. If the demand decreases and/or coping attempts are perceived as effective, homeostasis is restored within a relatively short period of time. A state of chronic stress occurs however, as a result of excessively frequent, intense, and prolonged activation of the stress response. It is chronic stress that can lead to physical and mental disorders.

Disorders considered to be related to chronic stress are: gastrointestinal disorders (e.g., peptic ulcers, ulcerative colitis); cardiovascular disorders (e.g., hypertension, migraines); respiratory disorders (e.g., bronchial asthma); musculoskeletal disorders (e.g., low back pain, tension headache); skin disorders (e.g., eczema); and depression, insomnia, and alcohol and drug abuse (cf. Antonovsky, 1979; Everly & Rosenfeld, 1981; Miller, 1980). A number of theoretical models have attempted to explain which particular structure or organ system will be adversely affected by chronic stress for a particular individual (cf. Everly & Rosenfeld, 1981; Miller, 1980). Most writers agree that a number of

interacting factors are involved such as genetic predispositions, past learning and conditioning; nutritional influences, and social and interpersonal support systems (Kagan & Levi, 1975; Seyle, 1979).

### Summary

Stress can be defined as a complex response to a variety of perceived demands made upon an individual that exceed the person's perceived ability to cope. Excessively frequent and prolonged activation of the stress response, interacting with other variables, can lead to various psychophysiological disorders. It is generally agreed that the main reason that individuals experience inappropriate and prolonged activation of the stress response is that they have not acquired effective coping skills (Hiebert, 1983; Meichenbaum & Turk, 1976; Simpson, 1980; Stroebe, 1982). Following a discussion of childhood and school-related stress, the next section will focus on stress management strategies.

### Childhood and School-Related Stress

This section reviews potential sources of childhood and school stress that are presented in the literature. The possible effects of maladaptive coping are then discussed in terms of academic performance, general behavior, and psychophysiological disorders.

### Childhood Stressors

Moore (1975) distinguished three basic types of demands that children encounter. The first type results from the ordinary tensions of daily life that arise when the needs or goals of the child are unmet or incompatible with his/her environment. The child must adapt by readjusting goals, changing tactics, or exerting further effort. A second type of demand involves developmental crises; stages in the child's life when a decisive step forward must be taken that involves changing previous habits and behaviors, and view of oneself in relation to others.

An example might be a move away from dependency towards increased autonomy. The third type of demand involves life crises such as hospitalization, separation from parents, death of a parent, or birth of a sibling. These events place demands on the child to adapt to unfamiliar situations and alter routines and personal interactions.

Other writers emphasize the role of inappropriate parental behaviors. Chandler (1982), for example, considered maternal overprotection or underprotection as potential sources of stress. Both conditions conflict with the child's need for independence. In addition inconsistent punishment, lack of parental approval, demands for perfection, overly strict standards of right and wrong, and not allowing the expression of emotions would likely also prove stressful (Chandler, 1982). Elkind (1981) adds that parental pressure to achieve, to succeed, and to hurry and grow up overtax the child's coping resources. He states that, unlike previous generations, today's children are being hurried through childhood and forced to tackle the physical, psychological, and social trappings of adulthood before they are intellectually and emotionally prepared to deal with them.

Groen (1975) focused on psychosocial factors and reports a decline in the previously intense communication and support between members of the nuclear family, diminished interpersonal contact, and a general trend towards inhibiting the expression of emotional forms of behavior and tactile communication, as potential sources of stress.

The results of a few recent studies have added to the list of childhood stressors. Defining stress as the cognitive or worry component of anxiety, Crowley (1981) investigated the worries of elementary school-aged children. The dominant worries expressed were grades, homework, injury to self, injury or death of loved ones, being yelled at, and fighting. Injury to self and injury or death of loved ones

were the prevalent worries for children at the Grade 3, 4, and 5 level. Sandler and Ramsey (1980) investigated the stressors related to adjustment problems in inner-city primary-aged school children. They found that two dimensions discriminated maladapting children from children not exhibiting adjustment problems: family troubles (i.e., parental arguments, family financial problems, loss of job by parent); and entrance (i.e., addition of new elements to the social field of the child such as a new sibling or as a result of moving to a new environment).

### School-Related Stressors

Stroebe (1983) reports that "evidence of physiological stress generally begins to appear as children experience the pressures of structured educational settings and the competitive milieu of their peer world" (pp. 1-2). A number of writers have attempted to delineate the demands and pressures that are specific to the school setting. Phillips (1978) distinguished between academic and social stressors. In a study of fourth-grade children he found that the major sources of academic stress appeared to be: ineffective verbal communication on the part of the teacher (i.e., the children said that they often wish the teacher would slow down until they understood what she was saying better); the competitiveness involved in schoolwork; making mistakes while reciting; test-taking; meeting teacher expectations; keeping up with the rest of the class in academic activities; and parental expectations for a good report card. Sources of social stress included: parents not being involved in school social activities; and anticipation of or actual rejection, hostility, and disapproval from peers and teachers.

A major source of school stress outlined by Jackson in 1968 is unfortunately just as relevant today. Jackson (1968) reported that as a result of crowded conditions in the classroom, children spend excessive time waiting for schoolwork to be checked and questions to be answered. They continuously must wait their

turn and delay their actions. Often requests are denied and raised hands ignored. In addition, the repetitive and routinized aspect of classroom life can be stressful.

The demands placed upon children entering kindergarten have been addressed by Chandler (1982) and include separation from mother, obeying new rules, sitting quiet, and taking turns. Furthermore, learning academic skills may be stressful for those children with developmental delays. Academic competency becomes equated with self-competency and as a result academic failure may lead to doubts about self-worth (Chandler, 1982).

### Summary

The number of potential stressors is unlimited. However, common to each of the above stressors is either an accompanying fear of failure or a sense of loss of control over a situation. An underlying theme is also apparent. Each of the potential stressors involves a new and unfamiliar situation, or a demand or challenge, that threatens to exceed the child's available coping skills and resources.

Two additional points related to childhood stress should be noted. First, the response to a particular stressor, if maladaptive, can in turn become a new source of stress (Chandler, 1982; Phillips, 1978). For example, being rejected by peers might result in a lowered tempo of academic activity and performance in school work, which in turn might lead to parental disapproval for low grades. Second, there is evidence to suggest that the experience of multiple stressors has an interactive effect such that the presence of one stressor initiates the adverse effects caused by another (Rutter, 1979). Most current writers in the area of childhood stress agree that children typically have fewer resources and options for managing stressors than most adults and need to acquire a wide repertoire of coping skills and stress management strategies (Chandler, 1982; Crowley, 1981; Frederick, 1980; Schultz & Walton, 1979).



### The Effects of Childhood Stress

Academic performance. Negative correlations between anxiety and measures of intelligence and academic performance are found consistently in the research (e.g., Cowen, Zax, Klein, Izzo & Trost, 1965; Lunneborg, 1964; Stevenson & Odom, 1965). This relationship might suggest that children who score high on measures of intelligence are more capable of coping effectively with stressors. However, the data generally support the notion that highly anxious children have greater difficulty in attending to and retaining information, and that anxiety interferes with test-taking per se, thus inhibiting performance on achievement and intelligence tests (cf. Phillips, 1978). Phillips (1978) reports that high-anxious students tend to perform at a level below that which would be predicted based on knowledge of their academic ability.

Phillips, Martin, and Meyers (1972) found that stress causes greater interference and is more detrimental in the initial skill acquisition phase of learning than in the later stages of learning, perhaps due to an initial fear of failure. The degree of task difficulty also determines the effects of anxiety on performance (Gaudry & Spielberger, 1970). Although a high level of anxiety may facilitate performance on simple tasks, learning new skills is relatively difficult for most students and as such a high level of anxiety will generally lead to performance decrements.

A number of studies also indicated that whereas anxiety will debilitate performance early in learning, it may facilitate learning in the later stages of skill acquisition (e.g., Lekarcyk & Hill, 1969). Papay, Costello, Hedl, Jr., & Spielberger (1975) also demonstrated that some degree of arousal in the learning environment is necessary to motivate low-anxious students to perform at an optimal level.

To summarize, the effects of stress and anxiety on academic performance are complex and involve such factors as the degree of task complexity, the degree of threat to self-esteem in the testing situation, and the particular stage of the learning process. Although a certain degree of anxiety may facilitate performance under certain conditions, excessive anxiety likely would debilitate learning and performance.

Problem behavior. Sarason et al. (1960) suggest that children who are highly anxious in school situations typically do not demonstrate hostile, aggressive, acting-out behavior. Rather they can in most cases be characterized as dependent, unaggressive, direction-seeking, and conforming. Others suggest that high-anxious children are less inclined to explore unknown and familiar situations (Penny, 1965), engage in more daydreaming activity (Singer & Rowe, 1962), and tend to be rejected by peers (Cowen et al., 1965). Schultz and Walton (1979) report that an inability to manage stressors may produce emotional reactions such as anger, hate, depression, fear, and guilt; and behavioral responses such as restlessness, fidgeting, criticizing, quarreling, lying, and crying.

Chandler (1982) has attempted to organize the variety of behaviors that have been linked to stress and anxiety and suggests four common maladaptive patterns of responding to stressors. The first is a dependent response. The child demonstrates regressive habits and childish mannerisms, is overly-sensitive to the evaluations of others, lacks independence in many areas of school and home life, and seeks constant approval from others. A second response pattern is reflected in impulsive behavior. The child is easily excitable, restless, impulsive, subject to temper tantrums, and generally overactive. The third pattern, the passive-aggressive response, is characterized by underachievement and procrastination. While some children adopt an obstinate, uncooperative attitude, others are overly

compliant but fail to follow through on requests and assignments. The fourth response pattern involves repressed behavior. The child tends to be quiet, shy, withdrawn, overly-fearful, often worried, and prone to excessive daydreaming. Chandler (1982) points out that most children show variations and shifts in patterns of responding that change with time, age, and circumstances.

Psychophysiological disorders. Disorders that are considered to be related to childhood stress include: bronchial asthma, duodenal ulcers, migraines, and ulcerative colitis (Groen, 1975). In addition, Clarizio and McCoy, (1976) report a number of studies that have also linked obesity, sleep disturbances, (i.e., nightmares, night terrors, sleepwalking, difficulty falling asleep), and enuresis to childhood stress.

### Summary

The foregoing review indicates that a wide variety of behavioral, psychological, and physiological disorders are related to chronic exposure to stress. Again, however, a common element appears to be either a lack of appropriate coping strategies or the presence of maladaptive response patterns. The next section will examine a number of stress management strategies that are available for use with children.

### Stress Management

Stress management is aimed at changing the person's reactions to demands, threats, or challenges such that the reaction is experienced as less stressful. Although a stress management strategy may be directed primarily at altering the cognitive, physiological, or behavioral component of a stress response, typically change in one component will be accompanied by change in the other two (Hiebert, 1983; Schultz & Walton, 1979). Because the stress management strategy being investigated in the present study can be categorized as a physiological

intervention, this review will focus on stress management procedures that address primarily the physiological component of the stress response.

The goal of physiological interventions is to reduce inappropriate and/or prolonged activation of the stress response by developing a physiological response that is incompatible with the emergency fight or flight response (Hiebert, 1983; C. Stroebe, 1979, 1982). Physiological interventions include such procedures as: progressive relaxation (Jacobson, 1938); autogenic training (Luthe, 1977); transcendental meditation (Denniston & McWilliams, 1975); Benson's relaxation response (Benson, 1975); the Quieting Reflex (C. Stroebe, 1982); and biofeedback training. These procedures are based on the concept of self-regulation: the endeavor to modify voluntarily one's own behavioral, cognitive, and physiological activity. Research has established that it is possible to consciously control autonomic physiological processes such as heart rate, blood flow and pressure, gastrointestinal functions, muscle tension, and body temperature (see Budzynski & Peffer, 1980).

Reports of self-regulation techniques being used with elementary school children are relatively scarce. However, some data are beginning to emerge to suggest that young children can learn such skills. This section will present a review of the available studies in this area. Research investigating the effectiveness of biofeedback, progressive relaxation, and meditation training with children has been documented and will be examined.

#### Biofeedback Training

Studies on biofeedback training with young children have generally shown that children can learn relaxation with the aid of electromyographic (EMG) feedback and that biofeedback training can be effective in reducing problem behaviors. Volpe (1975) reported that pretest trials at the Institute of Child Study,

University of Toronto, showed that children old enough to "develop an awareness of feeling between subjective reality and the external indicators of muscle activity, can successfully learn relaxation with the aid of an electromyograph" (p. 209). The critical age was hypothesized at about six years. Hunter, Russell, Russell, and Zimmerman (1976) demonstrated that learning-disabled and normal children aged 7 to 9 years were able to learn fingertip temperature control through biofeedback training. Treatment consisted of one 15 minute period for five consecutive days with three trials per period. Interestingly enough, the younger children in this study performed better than the eight and nine year old children. The authors suggest that young children may have more confidence in their ability to learn self-control of autonomic functions, whereas older children may be more inclined to question and doubt the possibility of thermal self-control. Wilkinson (1976) found that children in the upper elementary grades could be taught to relax using either autogenic training or EMG biofeedback, although biofeedback training was shown to be more effective in reducing muscle tension.

With regard to the treatment of behavioral disorders, EMG biofeedback has been shown to be effective in: reducing overall levels of hyperactivity in children diagnosed as hyperkinetic (Hampstead, 1979); reducing muscle tension and activity in a six-year old boy with severe symptoms of hyperactivity (Braud, 1975); and increasing the attention span and internalizing locus of control in hyperactive children (Linn & Hodge, 1980).

Biofeedback training has also been shown to be effective in the treatment of children with asthma. In a review of the data, Erskine-Milliss and Schonell (1981) concluded that biofeedback-assisted relaxation can produce subjective improvements as well as clinically significant improvements in respiratory function. The authors added that autogenic training, transcendental meditation, and systematic desensitization are also effective, although muscular relaxation alone appears to be largely ineffective in the treatment of asthma.

Schultz and Walton (1979) in a review of the research on biofeedback training with children suggest that biofeedback can help children to: learn relaxation skills; reduce anxiety related to self and the school environment; and gain a greater degree of self-discipline and confidence in their ability to control their behavior in school. Several biofeedback pilot projects have been conducted in school settings with reasonable success (cf. Englehardt, 1976.) However, implementing biofeedback training in the school system carries a number of drawbacks. The procedure is time-consuming, cost of the equipment would likely be prohibitive for most schools, and considerable training is required before operating the equipment. In addition, a difficulty lies in motivating young children to endure the training program (Volpe, 1975). Therefore, other more cost-effective procedures warrant exploration.

#### Relaxation Procedures

A number of studies have shown that young children can learn various relaxation procedures and that these procedures can be effective in reducing anxiety and stress-related problems. Weil and Goldfried (1973) reported that progressive relaxation training via audio tapes used at bedtime was effective in treating insomnia in an 11 year old child. Treatment effects were maintained after the use of the tapes was phased out and substituted with self-relaxation. The authors suggested that relaxation procedures are more effective in treating insomnia if presented within a self-control framework. Relaxation training has also been shown to be effective in reducing off-task behavior and increasing attention skills associated with reading tasks in elementary school students (Culbertson & Willie, 1978). Treatment involved six 20-minute sessions.

Other studies have combined relaxation training with other procedures such as autogenic training, attentional training, and the use of imagery. For example, Little and Jackson (1974) found that relaxation training alone was not effective in

the treatment of test-anxiety in Grade 7 and 8 children unless combined with attentional training directed at the cognitive component of anxiety. In a study involving Grade 4 and 5 students, Rossman and Kahnweiler (1977) demonstrated that children of this age group were able to benefit from a combination of relaxation training with imagery, breathing exercises, and exercises in expanding body awareness. Ballenger (1981) found that muscle relaxation combined with autogenic training was effective in significantly enhancing the self-concepts of sixth to eighth grade students. Treatment involved the use of prepared audio tapes and consisted of 30 minute sessions per day for five consecutive days.

Meditation training has also been found to benefit children in Grade 3 (Linden, 1973). Treatment consisted of thirty-six 20 minute sessions and the results indicated that children who practiced meditation training became significantly more field independent and less test anxious.

Day and Sadek (1982) investigated the effectiveness of Benson's relaxation technique on reducing the stress levels of Grade 5 Lebanese children. The classroom teacher provided practice in relaxation each morning for 10 minutes over a six week period. Although the results of this study demonstrated that learning Benson's response was effective in reducing anxiety, a three-week follow-up study during which time the teacher had discontinued further practice, revealed that the treatment effects had disappeared.

The foregoing studies provide some initial support for the effectiveness of various relaxation procedures in reducing anxiety and stress-related problems in young children. However, all of these strategies require regular and continued practice to ensure maintenance of treatment effects (Day & Sadek, 1982; Hiebert, 1983; C. Stroebe, 1982). On the other hand, C. Stroebe (1982) reports that the Quieting Response (QR) once learned, does not require continued practice to

maintain the effect. Recently, an adaptation of the QR procedure has been developed for use with children, namely, Kiddie QR (Stroebe, Stroebe, & Holland, 1980). The next section will present the physiological principles and objectives related to the Quieting Response and describe the children's version of QR.

### Kiddie QR

This section will begin with a description of the adult Quieting Response technique. Next, the objectives of the children's version of QR, the Kiddie QR program, will be outlined, followed by a description of the program and technique. Finally, the procedure involved in implementing Kiddie QR in the classroom setting will be discussed. This chapter will conclude with an outline of the research hypotheses for the present study.

### The Quieting Response

The Quieting Response (or Reflex) concept was developed by C.F. Stroebe (1979, 1982) as a consequence of his work using biofeedback to treat stress-related disorders. QR is a relatively easy to learn six-second response that is incompatible with and interrupts the fight or flight response, or alarm stage of the general adaptation syndrome. Training in QR consists of practice in increased discrimination of arousal cues and faulty muscle bracing; easy abdominal breathing; and elements of relaxation training, autogenic training and rational emotive therapy. The first step of the six-second response involves the awareness of tension and arousal cues. Step two consists of inward smiling to promote loosening of tense facial muscles, and the use of positive self-suggestion (e.g., "Alert amused mind, calm body"). The final steps require 2 four-count breaths. While exhaling the second breath, the jaw and shoulders are allowed to go limp and a feeling of a wave of warm relaxation flows through the body to the toes.



Once learned, the Quieting Response can be used at anytime when an individual is stressed. QR allows a six-second pause during which the individual can determine whether or not body arousal is appropriate for a given situation and so precludes inappropriate activation of the stress response. Using QR can also assist an individual in restoring homeostasis within a relatively short period of time following the fight or flight response and so precludes prolonged activation of a stress reaction (Stroebe, 1979, 1982).

Stroebe (1982) claims that QR offers a number of advantages over other self-regulation strategies. First, QR can be used instantaneously the moment a potentially stressful situation is perceived. Second, QR is effective in assisting the individual not only to achieve lower levels of arousal but to adjust arousal levels to adapt to the task at hand. Third, training in QR takes relatively little time and does not require the support of an instructor or the use of expensive equipment. Finally, once the QR technique is learned, daily practice is no longer necessary. Rather, the Quieting Response becomes an automatic Quieting Reflex.

Initial data have provided some support for the effectiveness of the Quieting Response as a stress management strategy with adults. In a study by Stroebe, Ford, Strong, and Szarek (1981), QR training was found effective in treating primary disorders (e.g., vascular and muscle contraction headaches, Raynaud's disease, irritable colon) in an outpatient clinic population. The overall success rate for 340 outpatients was 55 percent. The results of this study were compared to the results of a similar study that investigated the effectiveness of QR training in the treatment of secondary psychophysiological disorders, similar to the primary disorders of the outpatient population, of hospitalized psychiatric inpatients (Ford, Stroebe, Strong, & Szarek, 1982). The overall success rate was 51 percent for all inpatients receiving QR training. Although the inpatients received approximately twice as many sessions ( $\bar{X}=12.1$ ) as the outpatients ( $\bar{X}=6.7$ ), QR training was shown

to be as effective in treating the secondary psychophysiological disorders in all but the most severely disturbed inpatients as it was in treating the outpatient sample. It should be noted however, that treatment also included frontalis EMG and thermal biofeedback training.

### Objectives of Kiddie QR

Kiddie QR (Stroebe, Stroebe, & Holland, 1980) was developed for use with elementary school-aged children. Based on the same physiological principles as the adult QR procedure, Kiddie QR divides the adult technique into 16 experiential exercises. The objectives of Kiddie QR are to assist children to:

1. Pause and discriminate body arousal states.
2. Gain an increased awareness of high arousal cues.
3. Differentiate between faulty muscle bracing and the warm and heavy sensations of relaxation.
4. Acquire some understanding of the interaction between thoughts, feelings, and behaviors.
5. Distinguish when a high level of arousal is appropriate and when it is not.
6. Learn that an inappropriate and/or prolonged stress response is incompatible with a healthy mind and body.
7. Gain reassurance in their ability to control and manage their physiological response to stressful situations.
8. Accept that basic emotions such as worry, fear, and anger are common and allowed and can be balanced with unstressful emotional states.
9. Acquire a coping technique (i.e., QR) that can be used to shift arousal levels in order to restore and maintain homeostasis, or stable balance (Stroebe, Stroebe & Holland 1980).

### Program Description

The Kiddie QR program uses child-oriented images and metaphors to assist children in gaining an understanding of the physiological representations of the fight or flight response, the general adaptation syndrome, and faulty muscle bracing

or dyspnea. Through a story technique, QR is presented as a constant friend who lives inside the child's body along with a number of other imaginary body friends. In each exercise QR introduces the child to a new body character. Some of these body friends are bothersome. For example "Fifty Fists" represents the discomfort of faulty muscle bracing and "Body Bike Cycle" represents a state of hyperactivity. Other body friends are helpful. "Magic Breathing Holes" assist in relaxing skeletal and smooth muscles and "Magic Jaw String" helps to reduce facial tension. "Finger Balloon" and "Octopus" work to increase blood flow to the fingers. Children learn that they can choose the appropriate body friend to adapt to the situation at hand and so maintain a healthy balanced state or "My Very Own Good Feeling Self".

Through understanding and practice of these exercises the child learns the QR technique: 2 four-count breaths with the jaw sagging and the feeling of a wave of warm relaxation flowing through the body and out the "Magic Breathing Holes".

#### Procedure

The Kiddie QR program consists of 16 separate exercises or elements that provide a kinesthetic learning experience in which the children participate through physical and verbal responding. Instruction is presented through the use of professionally prepared audio cassette tapes and can be supplemented by class discussions, and drawing and coloring pictures that illustrate QR concepts. Each taped exercise requires approximately 10 minutes of classroom time.

Detailed instructions for implementing Kiddie QR are presented in a series of booklets and include the objectives, physiological principles, teaching suggestions, and a format for the application of each individual exercise. Teachers are encouraged to read the introductory booklet which describes the rationale for Kiddie QR, as initial preparation before introducing the program. Stroebel, Stroebel, and Holland (1980) suggest that the teacher can then learn along with the students. As such, preparation time is not overly time-consuming. Before

introducing each new element, the teacher need only scan the objectives and physiological principles and consider the teaching suggestions offered in the booklets.

### Conclusion

Most current writers in the area of childhood stress emphasize the need for children to acquire appropriate coping skills and strategies both in a restorative and preventive sense. Although research in the area of stress management with children, particularly within a preventive context, is relatively scarce, studies are beginning to emerge to indicate that children can learn a variety of procedures directed at reducing the physiological component of the stress response. The suggestion has been made that programs directed at teaching stress management strategies be incorporated in the school system. The Kiddie QR program appears to offer a viable cost-effective stress management procedure that could be implemented in the classroom setting by the regular classroom teacher with minimal assistance from a resource person. The purpose of the present study was to investigate the effectiveness of Kiddie QR in this context. Specifically, the following hypotheses guided the investigation:

1. There will be no significant differences between the anxiety levels and academic self-concepts as evidenced by pre- and posttest score comparisons of primary-grade students receiving Kiddie QR training and primary-grade students not receiving Kiddie QR training.
2. Gender and/or grade-level of primary-grade students does not significantly influence treatment effects as evidenced by pre- to posttreatment score comparisons of females and males in Grades 1, 2, 3, and kindergarten receiving Kiddie QR training.

## CHAPTER THREE

### METHOD

This chapter contains a description of the present field test of the Kiddie QR program. First, the procedure that was followed in enlisting and training teachers in implementing the Kiddie QR program is described. Next, a description of the student sample that participated in this study is presented. The dependent measures that were used are then examined, followed by a discussion of the assessment procedure. Finally, the treatment procedure as reported by the teachers involved in the program will be outlined.

#### Teacher Recruitment

The principal of a large elementary school in Maple Ridge, British Columbia, was contacted regarding the possibility of implementing the Kiddie QR program in the school curriculum. An introductory half-hour meeting was held in which the Kiddie QR program was briefly described, by the psychologist who would be supervising the project, to the principal and a number of teachers. Following this meeting, teachers indicating interest in the program agreed on a date for attending a workshop that would provide instruction in integrating Kiddie QR into the regular classroom curriculum.

At this time, an introductory letter was sent to parents. A description of the Kiddie QR program and information regarding the questionnaires that would be used in this study were provided. Confidentiality of results was also assured. Parents were encouraged to attend a scheduled information meeting regarding the program and/or contact the principal of the school or the psychologist supervising the project should they have any questions.

Four parents attended the meeting conducted by the psychologist. A discussion of childhood stress and the rationale for Kiddie QR was followed by

practice in a number of the QR exercises. Questions were answered and the few parents who attended the meeting indicated support for the program.

### Teacher Training

The principal of the school and interested teachers attended a three-hour workshop conducted by a registered psychologist with extensive research and consultation experience in the area of stress management. The agenda included: placing the QR concept in the context of stress management; explaining the rationale for the Kiddie QR program; introducing and providing practice in the exercises that comprise the program; and presenting instruction and suggestions on incorporating Kiddie QR into the regular classroom curriculum. An emphasis was placed on conceptualizing Kiddie QR as an arousal shifting technique rather than a relaxation technique.

A timetable was established and four interested teachers agreed to use the program in the classroom three times a week for five weeks. Pre-testing would take place the week prior to initiating the program and posttesting the week following completion of the exercises. The teachers were also encouraged to contact the psychologist or the research assistant involved in the project should they have any further questions or encounter any difficulties. Throughout the project, the research assistant was available at the school at least twice a week to answer any questions.

### Teacher Characteristics

The four female teachers from Grade 1, 2, 3 and kindergarten who volunteered to participate in this field test were all certified teachers with an average of 15 years teaching experience, ranging from 10 to 20 years. Each of the teachers stated that they felt that their students would benefit from participating in a stress management program. One of the teachers also expressed interest in

acquiring a stress management strategy for her own personal benefit. It should also be noted that the Grade 2 teacher had indicated some initial skepticism towards the use of "behavioral modification" procedures in the school.

### Sample

A nonequivalent control-group design was used. The experimental group consisted of 82 students (45 females, 37 males) from four self-contained classrooms: morning kindergarten, Grades 1, 2, and 3. The majority of students were considered by the principal and teachers to be of average academic ability. A selection process in the beginning of the school year had allocated students in Grades 1 and 2 believed to be of above average ability to a separate Grade 1/2 combined class. Therefore, the remaining students in the Grade 1 and Grade 2 classes were considered to be of average academic ability. The Grade 3 class was described by the teacher and principal as including a relatively large number of rambunctious children. The kindergarten class, in turn, was characterized as comprised of a large number of relatively young children (mean age in September was 5 years, 1 month). All of the students in each classroom were encouraged, although not forcedly instructed, to participate in or at least quietly attend to the exercises as part of the regular classroom curriculum.

The control group included 37 students (20 females, 17 males) from the afternoon kindergarten class and the Grade 1/2 combined class. The control group took part in the pre- and posttesting but did not receive classroom instruction in either Kiddie QR or any other stress management strategy. The total 119 students attended a large suburban elementary school situated in a predominantly middle-class area.

### Dependent Measures

Two self-report questionnaires were used to assess the effectiveness of the Kiddie QR program: the State-Trait Anxiety Inventory for Children (Spielberger,

1970), and the Student's Perception of Ability Scale (Boersma & Chapman, 1977).

#### State-Trait Anxiety Inventory for Children

The State-Trait Anxiety Inventory for Children (STAIC) was developed as a research tool for the study of anxiety in elementary school-aged children (Spielberger, 1973). Items on the STAIC address both cognitive and physiological representations of the stress response. The STAIC consists of two separate self-report rating scales: a 20-item A-State scale, and a 20-item A-Trait scale. The A-State scale measures state anxiety; a transitory state characterized by subjective feelings of apprehension, tension, and worry (Spielberger, 1973). The A-Trait scale measures trait anxiety; a relatively stable personality trait characterized by anxiety proneness or the tendency to respond to psychological stress with elevations in A-State (Spielberger, 1973). Accordingly, on the A-State scale children are asked to report how they feel "right now, at this very moment" on a three-point rating scale. Each item begins with the stem "I feel" and is followed by three alternatives (e.g., "very worried, worried, not worried"). The A-Trait scale requires children to report how they "usually" feel on a three-point scale (e.g., "I worry about school . . . hardly-ever, sometimes, often").

The STAIC manual (Spielberger, 1973) reports evidence of reliability. Test-retest reliability coefficients for the A-Trait scale were moderate (.65 for males, .71 for females). For the A-State scale test-retest correlations were low (.31 for males, .47 for females). However, Spielberger (1973) explains that low test-retest correlations for the A-State scale were anticipated in that the A-State scale is intended to reflect fluctuations in anxiety level. Evidence of internal consistency was adequate. Cronbach alphas ranged from .78 to .87.

With regard to concurrent validity, the A-Trait scale correlated .75 with the Children's Manifest Anxiety Scale (Casteneda, McCandless, & Palermo, 1956). Low



correlations between the A-State scale and the Children's Manifest Anxiety Scale ( $r=.25$ ) and low correlations between the A-State and A-Trait subscales ( $r=.35$ ) provide evidence that the STAIC is measuring two distinct types of anxiety (Nelson, Kendall, Finch, Jr., Kendall & Nelson, 1974). Further evidence of construct validity is reported in the manual. In one study, 900 students were administered the A-State scale under "norm" conditions (i.e., standard instructions) and then under "test" conditions (i.e., students were asked to respond according to how they believe they would feel just before a final examination). The mean scores for the A-State scale were considerably higher under the "test" condition. In addition, each individual item significantly discriminated between the "norm" and "test" conditions for both males and females (Spielberger, 1973).

Although the STAIC was developed for use with 9 to 12 year old children, Spielberger (1973) states that the STAIC may be used with younger children. The STAIC was used in a study involving first and second grade students and the results provided additional evidence of the construct validity of the STAIC as an instrument for the measurement of anxiety (Papay, Costello, Heldt, Jr., & Spielberger, 1975).

Normative data, presented in the manual, are based on a large sample of United States elementary school-aged children in Grades 4, 5, and 6. In addition, and for purposes of this field test, the study by Papay et al. (1975) provides data based on 267 first and second grade students randomly selected from 15 elementary schools representing a full spectrum of socioeconomic levels.

#### Student's Perception of Ability Scale

There is evidence to suggest that self-concept is related to stress in children (e.g., Lipsitt, 1958; Phillips, 1978). The Student's Perception of Ability Scale (SPAS) was developed for assessing academic self-concept in elementary school-

aged children (Boersma & Chapman, 1979). Although, an instrument measuring general self-concept would also have been appropriate, the particular format and items on the SPAS indicated that this instrument would provide more valid results with younger children than other available general self-concept questionnaires.

The SPAS contains 70 "yes-no" items relating to feelings and attitudes about school performance and academic ability in four basic academic areas (i.e., reading/spelling, arithmetic, penmanship) and school in general (i.e., general ability, school satisfaction, and confidence). A high full-scale score and high scores on each of the six sub-scales are indicative of high academic self-concept (Boersma & Chapman, 1979).

The SPAS manual (Boersma & Chapman, 1979) provides estimates of reliability and validity. Test-retest reliability over a four to six week interval for the full-scale SPAS was .83, whereas subscale coefficients ranged from .71 to .82. Estimates of internal consistency determined by Cronbach's alpha ranged from .68 to .85 for the subscales and the average full-scale alpha was .92. With regard to discriminant validity, low correlations (.03 to .08) between the SPAS and the Piers-Harris Children's Self-Concept Scale (Piers, 1969) suggests that the SPAS measures academic self-concept as distinct from general self-concept. Evidence of external validity was demonstrated by a moderate relationship between SPAS scores and corresponding report card grades.

#### Assessment Procedure

The SPAC and STAIC were administered in small groups of two to five children in a quiet room other than their regular classroom and in the absence of their teacher. The test administrator was a graduate student in instructional psychology. At the beginning of the session the examiner explained that she was going to ask the children some questions about how they feel about school and

other things for work that she was doing at university. The examiner emphasized that the questionnaires were not tests, that there were no right or wrong answers, that the results would not go on their report cards, and that their teachers and parents would not see how they answered the questions.

The SPAS was administered first. The standard instructions as well as each item were read aloud by the examiner to accommodate the higher oral comprehension level as opposed to reading comprehension level of primary-aged children. (The children did not answer the questions orally however, but marked their responses on answer sheets.) Practice items were presented first and any questions were answered until the examiner was confident that each child understood the instructions. For Grade 1 students, the phrase "working with numbers" was substituted for items on the SPAS referring to multiplication and times tables as the students were not yet familiar with these operations.

The A-State scale of the STAIC was then administered followed by the A-Trait scale, a procedure recommended by the test developer. Again, standard instructions and each item was presented orally. Practice items were provided and time was spent ensuring that the children understood that they were required to consider all three alternatives before responding to each item. In addition, before administering the A-Trait scale, the examiner ensured that the students were able to differentiate between the terms "hardly-ever", "sometimes", and "often". Limited assistance with vocabulary difficulties on the A-State scale was provided. The majority of children had difficulty with the following words: "jittery", "satisfied", and "rested". A brief and standard definition was presented to each group of children.

The Grade 3 students were given the SPAS and STAIC in one sitting and in groups of five. The entire procedure required approximately 40 minutes. The

Grade 2 children required approximately 50 minutes to complete both instruments. With regard to the Grade 1 children, the examiner and teacher determined that administering both instruments in one sitting would prove too tiring for this age group and accordingly, the SPAS and STAIC were given in two separate sittings of approximately 25 minutes each and in groups of four.

Only the A-State scale of the STAIC was administered to the kindergarten children. It was decided after an initial attempt with a small group of children in the morning kindergarten class that a large number of items on the SPAS were not meaningful, and that the majority of children would also likely have difficulty distinguishing between the alternative responses on the A-Trait scale of the STAIC. The kindergarten students were administered the A-State scale in groups of two and three and the procedure required approximately 20 minutes. In addition, the answer sheet was modified to accommodate the fact that the kindergarten children were not yet reading. An answer sheet was developed which consisted of a set of circles, squares, and triangles representing the three alternative responses.

The conditions and instructions at posttesting were similar to those at pretesting. Because the children were familiar with the instructions for both instruments, less time was required for practice items. Posttesting took place seven to eight weeks after pretesting.

#### Treatment Procedure

Two of the four teachers introduced the Kiddie QR program to their classes in the last week of April and two in the first week of May. Each teacher was asked to keep a written diary of the date, element number, activity, and student and teacher response as they progressed through the program. These reports indicated the following progression. The Grade 3 class required six weeks to complete the 16 elements. Each element was presented once and two to three new elements per

week were introduced. The teacher reported that "in general all children participated part of the time and quite a few all of the time". The teacher joined the children in actively participating in the exercises which were sometimes followed by class discussion.

The Grade 1 class took eight weeks to complete the 16 elements. Again, each element was presented once. Elements #1 through #13 were introduced at the rate of three per week although a period of two and one-half weeks lapsed before elements #13 to #16 were presented. The teacher explained that numerous activities in the last months of school had made it difficult to find time to complete the remaining elements. The Grade 1 teacher actively participated in the exercises and reported that all of the children in the class attended to and followed the taped instructions. Use of the tapes was supplemented by class discussion for each element.

The Grade 2 class required four weeks to complete elements #1 through #7 on the basis of one to three elements per week. Element #8 was introduced three weeks later and use of the instructional materials was then discontinued. Although the teacher reported that the students were participating in the exercises and becoming more receptive towards the program following an initial response of "silliness", she herself felt that the prepared audio tapes were inappropriate for the age group of the students and decided not to continue the program. She stated that the pace was too slow and the language used too childish. However, because she agreed with the basic rationale underlying the Kiddie QR program she continued to provide practice in breathing exercises using her own voice and instructions. In particular, she suggested that the students use the breathing exercise when they encounter difficulty falling asleep at night.

Similarly, early in the program, the kindergarten teacher determined that the "pace of the tapes was too slow and the tone of voice used too monotonous". She reported that the children were having difficulty attending to the taped instructions and spent the time fidgeting and appeared restless. She discontinued use of the program following element #2 and then presented the students with elements #3 and #4 in the last week of the project.

### Summary

Although all four teachers indicated initial interest and support for the Kiddie QR program, the motivational level of the kindergarten and Grade 2 teacher declined soon after the exercises were introduced. Both teachers stated that their change in attitude was due to the slow pace and monotonous or childish tone of voice present in the cassette tapes. Although the research assistant provided encouragement and a rationale for the mode of presentation, the teacher's attitude in this regard did not change. All four teachers stated that in retrospect they would have preferred to implement the program earlier in the school year. They explained that the increased curriculum demands in the last quarter of the school year prevented them from spending as much time on each element, and generalizing the concepts to other school settings, as they otherwise might have and would have liked to do.

The Grade 1, 2, and 3 teachers reported that overall, the majority of students participated in the exercises as intended.

The next chapter will present the results of the field test.

## CHAPTER FOUR

### RESULTS

This chapter will discuss the findings relevant to the previously stated research hypotheses. That is, there will be no significant difference between the anxiety levels and academic self-concepts of children receiving Kiddie QR training and children not receiving Kiddie QR training, and gender and/or grade level of students does not significantly influence treatment effects. Descriptive statistics for all groups on each dependent variable at pretest and posttest are first summarized. The analytic techniques used to test group differences are then described in terms of the reasons for using each technique and the assumptions underlying their use. Finally, major findings are identified and interpreted.

Data analysis was conducted using the Statistical Package for the Social Sciences (Nie, Hull, Jenkins, Steinbrenner, & Brent, 1975). Unfortunately, because the kindergarten teacher was not able to provide instruction in Kiddie QR as intended, and discontinued use of the instructional materials early in the program, the data collected from the kindergarten children ( $n=32$ ) were not included in the analysis. The difficulties encountered by the kindergarten teacher will be discussed in the final chapter.

#### Missing Data

Missing data occurred because three students were not available at the time of posttesting. Cases containing missing values were deleted from all computations. In addition, two outliers (i.e., extreme scores more than two standard deviations above the mean) were removed from the analysis of STAIC scores. In both cases the reliability of test scores was considered suspect.

### Hypothesis #1

#### Statement

There will be no significant differences between the anxiety levels and academic self-concepts as evidenced by pre- and posttest score comparisons of primary-grade students receiving instruction in Kiddie QR and primary-grade students not receiving instruction in Kiddie QR.

#### Data Analysis

The pretest and posttest means and standard deviations on the dependent measures are summarized in Table 1. The data collected from the Grade 3 experimental group were not included in the analysis of results related to the first hypothesis because the sample did not include a comparable Grade 3 control group. From an examination of Table 1, it is worthwhile to note that the STAIC-S mean scores for all groups at pre- and posttesting were relatively low compared to the norms provided in the STAIC manual (Spielberger, 1973), and data provided by Papay, Costello, Hedl, Jr., and Spielberger (1975) in a study involving students in Grades 1 and 2. This suggests the possible influence of floor effects.

The homogeneity of variance assumption was tested using the Bartlett-Box F. Significant results were found for STAIC-T scores. The consequence of violating the homogeneity of variance assumption in this case (i.e., unequal sample sizes and the larger variance is associated with the larger sample) is that the F-test will be too conservative, and a more liberal procedure might be necessary (Hinkle, Wiersma, & Jurs, 1979).

Inferential Statistics. Kenny (1975) states that the validity of any mode of analysis for the nonequivalent control group design depends to a large extent on the process of selection into groups. If selection is based on intact group differences, and if the effects of these differences are stationary over time (i.e., the groups



TABLE 1

Mean STAIC-S, STAIC-T, and SPAS Scores for Grade 1 and Grade 2 Groups

Measure	Group	n	Pretest		Posttest	
			M	SD	M	SD
STAIC-S	Grade 1:					
	Experimental	20	30.55	8.65	30.00	8.80
	Control	9	25.33	4.58	27.22	5.50
	Grade 2:					
	Experimental	23	27.70	7.58	25.78	4.23
	Control	10	26.60	7.09	28.60	9.54
STAIC-T	Grade 1:					
	Experimental	19	33.32	7.98	30.79	5.86
	Control	9	37.78	3.30	38.22	6.26
	Grade 2:					
	Experimental	23	33.39	7.73	33.48	6.74
	Control	10	32.80	4.73	33.40	5.54
SPAS	Grade 1:					
	Experimental	20	51.35	10.15	51.65	11.27
	Control	9	53.89	9.16	51.22	12.79
	Grade 2:					
	Experimental	23	52.78	12.72	52.35	12.88
	Control	10	58.90	6.37	53.50	14.36

Note: High STAIC scores indicate higher anxiety level. High SPAS scores indicate high academic self-concept.

differ equally on the pretest and posttest) then raw change score analysis for repeated measures is appropriate. On the other hand, covariance analysis presumes that pretest differences diminish since persons belong to the same population and group means should regress to a common mean. Because it was not clear which mode of analysis was appropriate, both analysis of covariance (ANCOVA) and analysis of variance for repeated measures (ANOVAR) were conducted. The results were similar and research findings will be presented based on ANCOVA results.

The assumption underlying ANCOVA is homogeneity of regression coefficients. This assumption was assessed by conducting the test for regression parallelism using the multivariate analysis of variance program (MANOVA). The interaction between covariate and treatment effect was found to be not significant for all dependent measures, and the hypothesis of homogeneity of regression was not rejected.

Findings. The data were analyzed using one-way ANCOVA with the pretest as the covariate. There were no significant main effects for treatment on the STAIC-S, STAIC-T, and the full-scale SPAS. There was however, a significant treatment effect on the SPAS school satisfaction sub-scale,  $F(1,59)=4.274$ ,  $p<0.05$ . The experimental group reported a higher level of school satisfaction at posttesting than the control group, although the difference was small in terms of practical significance (7.98 vs. 7.53). Table 2 presents mean SPAS sub-scale scores for all groups.

The  $F$  value obtained in the analysis of STAIC-T scores,  $F(1,57)=2.63$ , did not warrant the use of a more liberal procedure to adjust for unequal variances, as discussed earlier.

TABLE 2

Mean SPAS Sub-Scale Scores for Experimental and ControlGroups under Grade-Level

Sub-Scale	Grade	Experimental		Control	
		Pretest	Posttest	Pretest	Posttest
School Satisfaction	1	$\bar{n}=20$ 7.30 (3.51)	7.05 (3.38)	$\bar{n}=9$ 8.11 (2.09)	6.44 (3.28)
	2	$\bar{n}=23$ 9.00 (2.94)	8.78 (2.56)	$\bar{n}=10$ 10.40 (2.41)	8.50 (3.63)
	3	$\bar{n}=23$ 7.57 (2.39)	7.04 (2.55)		
General Ability	1	$\bar{n}=20$ 8.65 (2.25)	8.60 (2.33)	$\bar{n}=9$ 9.67 (1.87)	9.67 (2.00)
	2	$\bar{n}=23$ 7.96 (3.18)	8.39 (3.40)	$\bar{n}=10$ 9.60 (2.27)	9.20 (2.90)
	3	$\bar{n}=23$ 8.26 (2.90)	7.61 (2.76)		
Confidence	1	$\bar{n}=20$ 7.05 (2.40)	7.65 (1.42)	$\bar{n}=9$ 6.11 (2.26)	7.33 (1.50)
	2	$\bar{n}=23$ 5.83 (2.19)	5.70 (2.27)	$\bar{n}=10$ 7.80 (1.40)	6.80 (2.15)
	3	$\bar{n}=23$ 6.09 (2.60)	5.39 (2.68)		

Note: Higher scores indicate higher academic self-concept. Numbers in parentheses indicate standard deviation.

TABLE 2 (CONTD)

Mean SPAS Sub-Scale Scores for Experimental and Control

Sub-Scale	Grade	<u>Groups under Grade-Level</u>			
		<u>Experimental</u>		<u>Control</u>	
		Pretest	Posttest	Pretest	Posttest
Arithmetic	1	$\bar{n}=20$ 9.85 (2.25)	9.25 (2.38)	$\bar{n}=9$ 9.78 (2.11)	9.44 (2.07)
	2	$\bar{n}=23$ 10.26 (2.47)	9.78 (2.76)	$\bar{n}=10$ 11.10 (1.10)	10.00 (2.63)
	3	$\bar{n}=23$ 9.17 (2.84)	9.26 (2.60)		
Reading/ Spelling	1	$\bar{n}=20$ 9.50 (1.47)	9.65 (2.32)	$\bar{n}=9$ 11.00 (1.12)	10.00 (2.45)
	2	$\bar{n}=23$ 9.74 (2.24)	10.22 (2.20)	$\bar{n}=10$ 10.50 (1.84)	10.50 (2.27)
	3	$\bar{n}=23$ 9.78 (2.26)	9.00 (2.26)		
Penmanship	1	$\bar{n}=20$ 9.50 (2.48)	9.45 (2.06)	$\bar{n}=9$ 9.44 (2.96)	8.33 (3.32)
	2	$\bar{n}=23$ 9.87 (2.58)	9.48 (3.44)	$\bar{n}=10$ 9.70 (2.79)	8.90 (2.96)
	3	$\bar{n}=23$ 9.57 (2.13)	9.96 (1.78)		

Note: Higher scores indicate higher academic self-concept. Numbers in parentheses indicate standard deviation.

## Hypothesis #2

### Statement

Gender and/or grade-level of primary-grade students does not significantly influence treatment effects as evidenced by pre- to posttreatment score comparisons of females and males in Grades 1, 2 and 3 receiving instruction in Kiddie QR.

### Data Analysis

Data collected from the control group were not included in the analysis because the number of students in the control group (n=19) was considered too small to divide into subgroups. A comparison of pre- to posttreatment mean scores for males and females in Grades 1, 2 and 3 are summarized in Table 3. Females in Grades 1 and 2 reported the lowest levels of state anxiety (STAIC-S) on the pretest. The mean scores were below the norms provided by Spielberger (1973) which suggests, as noted before, that floor effects may have imposed limits on the amount of change that could be shown.

Inferential statistics. Data were analyzed using a three-way ANOVAR. The between group (independent) factors were gender with two levels and grade with three levels. The within (dependent) group factor was Time with two levels (i.e., pretest, posttest). To accommodate unequal sample sizes the ANOVAR computations were performed using the unweighted means procedure. There were no significant main effects for Time and the tests for interaction did not reveal a significant difference, indicating that treatment effects were not influenced by gender of students, grade-level, or the interaction of both factors.

To further clarify within group effects on the dependent measures, (because each grade level did not receive the exact same treatment procedure), correlated

TABLE 3  
Mean STAIC-S, STAIC-T, and SPAS Scores for Experimental Groups under  
Grade-Level and Gender

Measure	Group	n	Pretest		Posttest	
			M	SD	M	SD
STAIC-S	Grade 1: F	10	28.80	7.96	27.30	5.67
	M	10	32.30	9.38	32.70	10.73
	Grade 2: F	13	24.69	3.23	23.62	2.30
	M	10	31.60	9.83	28.60	4.60
	Grade 3: F	12	31.33	6.13	31.17	6.55
	M	11	30.00	6.26	30.36	5.64
STAIC-T	Grade 1: F	10	33.20	6.03	32.40	6.42
	M	9	33.44	9.94	29.00	4.90
	Grade 2: F	13	33.46	7.23	32.54	8.09
	M	10	33.30	8.73	34.70	4.57
	Grade 3: F	12	37.58	9.66	33.33	8.50
	M	11	34.18	7.11	31.09	6.04
SPAS	Grade 1: F	10	54.90	7.92	53.90	8.25
	M	10	47.80	11.25	49.40	13.74
	Grade 2: F	13	57.54	12.14	56.39	12.82
	M	10	46.60	11.13	47.10	11.49
	Grade 3: F	12	49.67	12.96	48.08	12.91
	M	11	51.09	9.02	48.36	8.71

Note: Higher STAIC scores indicate higher anxiety level. Higher SPAS scores indicate higher academic self-concept.

t-tests were conducted comparing pre-to posttreatment means for each grade level. A significant difference in the direction of decreased trait anxiety (STAIC-T),  $t(22)=2.55$ ,  $p<0.05$ , was found for Grade 3 students.

### Conclusion

No significant differences were found between the anxiety levels and overall academic self-concepts of children who participated in Kiddie QR and children who did not. As discussed previously, the influence of floor effects may have restricted the amount of change that could be shown on STAIC-S scores. This suggests that self-report measures of anxiety may be insensitive to change produced by Kiddie QR in children who already report normal levels of anxiety.

The test for interaction did not reveal a significant difference, indicating that neither boys nor girls reacted more positively or negatively to the treatment conditions. The Grade 3 students however, reported a significantly lower level of trait anxiety (STAIC-T) as posttreatment. It is interesting to note that the Grade 3 STAIC-T pretest scores were relatively high, thus allowing for change. This finding suggests that in the absence of experimentally induced anxiety, the STAIC-T subscale may have been more sensitive in detecting the effects of Kiddie QR in children who report normal levels of state anxiety.

Although few significant results were found on the dependent measures, verbal reports by the children following posttesting, indicated that the majority of students benefitted in some way from participation in Kiddie QR training. Approximately two-thirds of the Grade 3 class stated that they had enjoyed and benefitted from the program. Some of the comments were: "it makes my bones feel warm", "helps me settle down", "makes me feel relaxed", "feels good after running", and "helps me cool down when I get mad". One boy stated that he felt he

has "more control over himself". In addition, five girls reported that they had used QR outside of the classroom: three, to help them fall asleep at night; one, when frightened; and one when angry. The remaining one-third of the class stated that they thought the exercises were silly and boring and a few children reported that they did not like talking about their feelings in class.

The majority of Grade 1 students also reported that they enjoyed the Kiddie QR exercises and two children, one boy and one girl, stated that they used QR to help them fall asleep at night. Some of the comments were: "it makes me feel happy", "I like having QR inside of me", and "it makes me feel good". Again, a few children explained that they didn't like talking about their feelings in class and one girl stated that she didn't like closing her eyes.

The Grade 2 class also expressed favourable opinions and their comments were largely directed at how using magic breathing holes and magic jaw string helped them to loosen their muscles which made them feel good.

The final chapter will evaluate and interpret the research findings.



## CHAPTER 5

### DISCUSSION

This study investigated the efficacy of implementing the Kiddie QR procedure with primary-grade students in a classroom setting in which the main instructional input was provided by the regular classroom teacher. The dependent measures included self-reports of state and trait anxiety (STAIC), and academic self-concept (SPAS). This chapter provides a summary and evaluation of the reasearch findings, and examines practical implications for further research and for implementing the Kiddie QR program in a classroom setting.

#### Summary of Results

Overall, the results indicated that there was no significant difference between the experimental and control groups on self-report measures of anxiety level and academic self-concept following exposure to the Kiddie QR program. Although a significant difference was found on the school satisfaction subscale of the SPAS, the difference in terms of practical significance was small (i.e., less than a one point difference). The test for interactions between gender of student and treatment effects did not reveal a significant difference. However, grade level of student was found to interact with treatment effect. Specifically, the Grade 3 students who received Kiddie QR training reported a lower level of trait anxiety (STAIC, A-Trait) at posttesting. This finding could also be attributed to the fact that the Grade 3 students received instruction in all 16 elements of the program.

#### Evaluation of the Results

The lack of positive results may have been influenced in part by the relatively low levels of reported anxiety at the onset of the study. In particular, low pretest means on the trait anxiety scale of the STAIC indicated that floor effects may have restricted the amount of change that could be shown at

posttesting. It is interesting to note that the significant treatment effect found for the Grade 3 students was accompanied by a relatively high level of trait anxiety at pretesting, thus allowing room for change. This suggests that self-report measures of anxiety may be insensitive to detecting change in individuals who already report normal levels of anxiety. Spielberger (1973) also notes in the STAIC manual that STAIC scores will likely be relatively low if the instrument is administered in nonstressful situations.

Another factor which may have influenced the research findings pertains to Horan's (1980) notion of The Treatment Deployment Myth. That is, first, interventions employed in research are frequently neither standardized nor implemented as intended according to the theoretical principles on which they are based, but rather vary on all conceivable dimensions. Second, the possibility exists that experimental subjects may not participate in the treatment as intended or may even ignore the procedure altogether. As a result, when a potentially effective treatment is not "deployed as purported" a null effect ensues. In this study, the diaries kept by the four teachers indicated that only two of the teachers introduced all 16 elements of the Kiddie QR program to their students. The procedure that was followed also varied in terms of the amount of time that elapsed between introducing each element and the amount of classroom discussion and additional practice that supplemented the taped exercises.

The teachers also reported that although the majority of students appeared to be participating in the exercises it is difficult to determine whether or not these students were in fact participating as intended relative to the objectives of the program. Horan (1980) states that before the question of the effectiveness of a particular intervention can be answered, the researcher must be confident that the treatment was actually received and practiced by the subjects. Because the

procedures followed by the teachers participating in this study were monitored, the conclusion can be made that the Kiddie QR procedure was not received by all of the students. As a result, the effectiveness of the Kiddie QR procedure cannot be determined on the basis of these research findings.

The results of this study do not concur with previous research findings that support the efficacy of implementing stress management strategies in a classroom setting. However, in Day and Sadek's (1982) study, the relaxation response was practiced by the students each morning for 10 minutes over a period of six weeks and observations in the classroom by the experimenter indicated that all of the students appeared to be following the teacher's instructions. In addition, the subjects were Lebanese children considered to be experiencing stress reactions as a result of being exposed to war and combat conditions, and therefore likely experiencing relatively high levels of anxiety. (It is little wonder that treatment effects were not maintained in a follow-up study at which time combat conditions had escalated.) In the study by Hiebert and Eby (1982), the data collected from students who did not adhere to the relaxation training program were not included in the analysis, thus the problems associated with The Treatment Deployment Myth were addressed. It should also be noted that the students in the above studies had all volunteered to participate in the programs, whereas Kiddie QR training was not offered to the children in this study on an optional basis. As such, motivational factors may have also accounted for the different research findings.

#### Practical Implications

A number of implications for further research and for applying the Kiddie QR program in the classroom can be noted from the present study. Specifically, the Kiddie QR program will be evaluated in terms of cost-effectiveness, teacher adherence to the program, transfer of training effects, and possible disadvantages inherent in the program that could be rectified.

Cost-effectiveness. Two points support the cost effectiveness of the Kiddie QR program. First, Kiddie QR training can be offered to an entire class of students at the same time, thus making it possible for many children to benefit. Although the teachers reported that a few students did not attend to all of the taped exercises, these same students engaged in quiet activities so as not to disturb and distract those who were participating in the exercises. Second, the teachers were able to follow the procedure and utilize the prepared audio tapes after minimal training.

Teacher Adherence to the Program. The lack of adherence to the Kiddie QR program by two of the teachers appeared to be more a manifestation of the teacher's attitudes towards the principles underlying training in the self-regulation technique rather than to difficulties in following the procedure. More intensive teacher screening would be necessary to rectify this problem. Anecdotal data collected from the teachers in this study suggest a number of teacher characteristics that may be necessary in successfully teaching stress management strategies: (a) an attitude supporting the necessity of acquiring coping skills to manage stressors; (b) a belief in the importance of and an ability to focus on the affective domain; and (c) a willingness to interrupt the busy academic activities of the school day with a quiet time in which the students attention is directed away from the teacher and towards the instructions presented in professionally prepared audio tapes. Teacher adherence to the program might also be enhanced if the Kiddie QR procedure was implemented in the beginning months of the school year. All four teachers stated that competing curricular demands in the last quarter of the year had prevented them from spending as much time as they otherwise might have in practicing the exercises and generalizing the technique to school settings outside of the classroom. In addition, they stated that they felt that they would

have benefitted more from their efforts if they had been able to draw upon the QR technique throughout the school year. A further means of promoting teacher adherence would be to schedule Kiddie QR activities at regular time periods during the school day in order to prevent other curricular demands from taking priority. Each taped exercise requires only 10 minutes of classroom time and additional practice would involve even less time.

Transfer of Training Effects. Anecdotal data collected from the children following posttesting indicated that some of the children had used the Kiddie QR technique outside of the classroom setting (e.g., to help them fall asleep at night, when frightened at an aunt's home, when angry at peers, after running in the playground). This indicates that the program has built-in transfer of training capability. It would appear that QR and the various body friends were conceptualized by some children as being inside their bodies and a part of themselves that remain with them both in and outside of the classroom setting. However, conceptualizing QR as being inside their bodies appeared to depend on whether or not the children received training in all 16 exercises. The comments made by the Grade 2 students, who had only participated in the first eight elements, largely focused on the physiological benefits of being able to use the "magic breathing holes" and "magic draw string" to enable them to loosen their muscles. None of the Grade 2 students reported that they perceived QR as being inside their bodies or that they had used QR outside of the classroom setting. It would appear then, that training in all of the 16 elements is necessary in order to meet all of the objectives of the program. In particular, elements #13 to #16 emphasize the notion that QR and the various body friends are inside the child and also illustrate a variety of situations in which use of QR and each body character is appropriate.

Disadvantages. In regard to possible disadvantages inherent in the program, a few children stated that they did not like talking about their feelings in class and one child explained that she did not like closing her eyes. These problems could be rectified however, by assuring students that they need not close their eyes or talk about their feelings in front of the class if these practices make them feel uncomfortable. Furthermore, participation in the Kiddie QR exercises should be offered to children on an optional basis.

In addition a few Grade 3 students stated that they thought the exercises were silly and boring. A version of the Kiddie QR program that has been developed for use with older children may be more appropriate for some Grade 3 students.

#### Conclusion

Further research on a larger sample of primary-grade students is warranted. Although few statistically significant results were found, the majority of children stated that they benefitted in some way from Kiddie QR training. The professionally prepared materials that are part of the Kiddie QR program were shown to be usable by teachers with minimal training in the area of stress management. The problem of teacher adherence to the program could be rectified by a more careful screening of teachers and by scheduling training sessions at regular time periods during the school day. Student participation in the exercises should also be monitored to ensure that the experimental subjects are receiving and practicing the exercises as intended. Additional empirical consideration should be given to the matter of how extensively the Kiddie QR technique generalize to settings outside of the classroom. Finally, self-report measures of anxiety and academic self-concept should be supplemented with behavioral and physiological measures of anxiety and stress.

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