

EFFECTS OF QR TRAINING ON READING
COMPREHENSION SCORES OF JUNIOR
HIGH REMEDIAL READING
STUDENTS

By

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CHAPTER I

INTRODUCTION

The Problem

Children in the beginning years of adolescence face a particularly stressful period of life. Just at a time when they must adjust to body changes, changing peer relationships, and changing attitudes toward authority, they are also expected to make the transition from a relatively structured elementary school situation to a far more unstructured junior high school environment. Most young teenagers make the transition smoothly and handle the stress involved with few problems. Students with low reading performances, however, may suddenly experience greatly increased stress as they attempt to adjust to the new environment, to six teachers instead of one, and to at least four textbooks which are above their functional reading levels. The students' responses often become ones of "fight or flight" (physiological reaction patterns first described by Cannon [1914]). The more a student tries to read, the more frustration and stress build, and soon he or she is caught in the proverbial vicious circle. If a simple, quick procedure could be learned which would break the stress reaction pattern, the student might then be able to face

assignments more calmly, and to benefit from instruction more profitably.

One of the problems facing educators is that little research has been done on supportive measures with junior high aged students. Most research of this type has centered around elementary aged children or children in Special Education classes. The present study hopes to contribute information to the void by investigating whether junior high school students who are in a remedial reading class can learn to utilize a simple six second procedure called the Quieting Response (QR).

Rationale

In order to establish the importance of the topic for research, this section will discuss the significance of reading to society, to the educator, and to the student. The following questions will be addressed: What is the prevalence of low readers, and what is their impact on society? What are some of the problems that low readers present to educators? What part does reading play in a student's adult life? What effect is low reading performance likely to have on a student's self-concept?

Prevalence and Impact

Estimates of low readers (one year below grade level in the lower grades, and three or more years below at the secondary levels) (Spache, 1976) among school children range

from 10 to 25 percent. A large proportion of the students who enter junior and senior high school, for instance, have not attained a sixth grade reading level (Bond & Tinker, 1973), and 13 percent of those who graduate from high school have still not progressed beyond a sixth grade level (Wellborn, 1982). Among adults, 23 million Americans, or one in five adults, are said by Wellborn (1982) to lack the reading and writing skills needed to handle minimal demands of daily living. An additional 30 million are only marginally capable of productive work.

The monetary cost to taxpayers of low reading students who become low or non-reading adults is enormous. A recent estimate of the yearly cost of welfare programs and unemployment compensation for these Americans has been placed at 6 billion dollars. Another 6.6 billion is spent yearly keeping 750,000 non-reading adults in jail (Wellborn, 1982). While lack of reading ability is undoubtedly not the sole culprit in unemployment and crime, possession of a minimal level of reading competency may well be one of the key factors in keeping people employed and off welfare (Kirk, Kliebham, & Turner, 1978).

In addition to the dollar price to society, another major concern directly related to reading deficiencies is the possibility that there will not be enough people equipped to handle complex new technology. Businesses are already having increasing difficulty finding employees properly trained in composing or even understanding written sentences. And with

nearly two-thirds of U.S. colleges and universities finding it necessary to provide remedial reading and writing courses for students, it is small wonder that educators and labor experts alike worry that the United States will soon be at a disadvantage in competing with other technologically advanced countries (Wellborn, 1982).

Educators' Dilemma

Students of low reading performance present frustrating questions to educators. How can these students receive the education the school attempts to give all students if they cannot read their textbooks? What can be done to help the low morale which has resulted from years of reading failure? What can be done to alleviate the recurrent disciplinary situations which often result from this low morale?

In addition, reading has also recently taken on another dimension of importance as school boards and school administrators find themselves being sued by former students who contend that they have been deprived of potential lifetime earnings commensurate with their intellectual abilities through not having been taught to read (Bond & Tinker, 1973; Kirk et al., 1978). How are educators to meet this new challenge?

Adult Life

The need for reading does not end when the student leaves school, but continues to be necessary throughout life.

On a practical level, minimal proficiency is required for simple daily life activities such as shopping, transportation, and job hunting. Reading is also a key tool for retaining and maintaining employable skills. This can be a particular problem for high school graduates whose reading abilities are marginal, for they are likely to become the semi-skilled or unskilled workers whose jobs are eliminated by automation. When a low reading high school graduate (or drop-out) is functionally illiterate and loses a job, the minimum reading skills for retraining will not be present. Occupational retraining in present-day society requires a surprisingly high level of reading competency. An army cook, for example, must have a reading level of 7.0; a repairman, 8.0; and a supply clerk, 9.0 (Kirk et al., 1978).

Self-Concept

The poor self-concepts which low readers usually have are reinforced regularly in school. From the students' points of view, assignments are made which they cannot do, and they either fail or have adaptations made which may seem meaningless. Teachers may try to ignore their lack of reading ability, or go to the other extreme and make it painfully apparent to the entire class. Poor readers often find themselves considered lazy because they are unable to keep up with the requirements of the grade. They usually fail to complete assignments, and as a result do not obtain as much information from books as other students. At least a third of their time, and usually more, is spent in classes which require

reading grade level texts. Thus the students find themselves constantly out of place. Several studies have shown that at least 73 percent of school drop-outs reported feelings of inferiority, were ashamed in class, felt disgusted with themselves, or wanted to leave school because of their poor reading ability (Bullock, 1956; Jersild, 1967; Harris & Sipay, 1976).

Boyd and Tinker (1973) point out that not only is normal progress in school blocked for low reading students, perhaps most important are the deleterious effects of reading disability on the personality of the student involved. The feelings of inferiority resulting from lack of success frequently lead to various forms of maladjusted behavior. As the child approaches the adolescent years the emotional problems tend to increase, and by the time the student with a severe reading problem enters the secondary schools, maladjusted behavior often has become a serious personality problem (Kirk et al., 1978). As Smart (1977) has commented, successful children are good at many activities, but the unsuccessful ones have a well established sense of failure and inferiority by the onset of adolescence. Because all of adolescence involves finding answers to "Who am I?", the poor reader is in imminent danger of a permanently damaged self-concept (Smart, 1977).

Theoretical Framework

Human beings have always been subjected to stress, but as civilization becomes more complex, adaptation to stress

becomes more difficult. Stress affects both sexes and all ages, and more and more often is becoming linked with all types of illnesses (Benson, 1975). Most standard medical textbooks attribute anywhere from 50 to 80 percent of all diseases to psychosomatic or stress related origins (Pelletier, 1977). The theoretical framework which follows will offer a brief overview of the physiology of the nervous system involved in stress, an explanation of the fight/flight response, stress responses, adolescent stress, and finally, the quieting reflex.

Physiology

Mental and physical processes form a functional unit, with psychological processes assumed to interact with physical processes partly through the autonomic nervous system, and partly through the endocrine glands, with the hypothalamus serving as a connecting link between the two (Levi, 1967; Pelletier, 1979). Anatomically, the autonomic nerves can be classified into a sympathetic and a parasympathetic system, each with a differing set of functions. The sympathetic system accelerates the activity of the heart and lungs, but inhibits the digestive organs. The parasympathetic acts in reverse fashion, inhibiting the heart and lungs, but stimulating the digestive system. The two parts of the autonomic nervous system are constantly interacting to maintain a state of dynamic equilibrium. Thus, the body adjusts to the demands of life by increasing or decreasing

the relative dominance of one of the two nervous systems (Levi, 1967).

The Fight/Flight Response

The "run or the fight for life" response was first described by W. B. Cannon shortly after the turn of the century as an emergency reaction to fear, pain, or rage (Cannon, 1914). It later became known as the "Fight/Flight" or "fight or flight" response. The physiological changes Cannon observed included: increased blood pressure, increased heart rate, increased rate of breathing, increased metabolism, and a marked increase in the flow of blood to the muscles of the arms and legs. The fight or flight response is assumed to have had evolutionary significance, as the individual with this response could survive more effectively. The innate physiological reactions of the response have not changed, but society has. In earlier times when this response was triggered by a perceived danger, a caveman could run from the danger or he could fight. Modern men and women, however, can neither run nor fight when they find themselves faced with a present day equivalent of danger. The fight or flight response is now brought forth as a response to stressful everyday situations (Benson, 1975). Adults can exercise control to some extent over the number of stressful situations encountered, but adolescents, low reading adolescents in particular, frequently find that they cannot limit the school situations that are stressful.

Stress Responses

Stress responses can be of two types, according to Pelletier (1979). A Type I Stress Response is mediated by the sympathetic branch of the autonomic nervous system, and is accompanied by transient occurrences such as increased norepinephrine, epinephrine, glucose, and free fatty acid in the blood. Type I responses are of brief duration and are considered normal. They usually occur when the source of stress is immediate, identifiable, and resolvable. When the situation is resolved, there is a period of compensatory relaxation, or parasympathetic rebound, which was popularized by Benson in 1975 as the "Relaxation Response".

Very few stressful situations, however, are immediate, identifiable, and resolvable. The result is a Type II Stress Response, in which each of the above body changes remains abnormally elevated over time. Most stressors in the course of a typical day are vague and may continue for weeks, months, or in the case of the low reading student--years (Pelletier, 1979). The body apparently cannot easily differentiate between a vaguely perceived threat to its integrity and an immediate life-endangering situation. When the source of stress is ambiguous or prolonged, or when several sources exist simultaneously, the individual does not return to a normal mental or physiological baseline as quickly. He or she continues to manifest a potentially damaging stress reaction (Pelletier, 1977).

Adolescent Stress

Adolescence has often been described as a time of greater storm and stress than other periods of life. Delinquency rates are higher, there is an increase in rebellion against authority, and increased concern about their own identity, their sex roles, and their places in the scheme of things. Adolescents face many conflicting moral and cultural pressures (Jersild, 1967; Smart, 1977), and the low reading adolescent is among those least prepared to cope with these new stressors. Adults are able, to some extent at least, to control the environments that cause stress, but students often have less control. The result is that the fight/flight reaction is repeatedly brought forth as a response to the low readers' daily school situation.

Learning to cope with stress in the early years is particularly important because young people in late adolescence may already be accumulating the physiological effects of stress--effects which may not be overtly manifested as psychosomatic disorders until their forties or fifties. Thus, adolescence may be the period of life where learning to control the autonomic nervous system has its greatest potential. Through the regular use of self-regulatory exercises, it may be possible to maintain health by recognizing and correcting subtle dysfunctions before they become more severe. Children in several European countries, including Germany and Holland, are taught such methods in elementary school as a means of achieving proficiency in stress reduction at an early age (Pelletier, 1977).

Low reading adolescents may learn to overuse the fight/flight response, and inadvertently subject themselves to stress reactions at the slightest aggravation. The stress reaction then can act as a block to learning and performance. Laboratory situations have simulated students being suddenly called on when they do not know how to answer. The results showed that most young people have a quick panic reaction lasting six to ten seconds. The reaction reduces their ability to respond even though they may know the answer (Holland, 1980). Classroom teachers have long commented on how "nervous and panicky" some students become when called upon to read. Stress reactions, such as these, have also been observed on electromyograms when low readers are asked to read a passage (Holland, 1982).

The Quieting Reflex (QR)

As previously mentioned, many adolescents (and adults) develop and maintain a high level of arousal much more often and for much longer than they should. Usually, normal balance is recovered quickly after the initial reaction to stress. This is the body's inherent quieting reflex. But many individuals have unconsciously taught their bodies to override their own natural quieting reflexes until constant tension, anxiety, and tightness begin to seem normal to them. Simply telling students to relax, not to worry, or not to be upset usually does not work. Adolescents, indeed, those at all age levels, need to learn the "how" of not being upset.

The QR training program teaches the "how". It is a reversal of the fight/flight or emergency response (Holland, 1980).

The emergency response involves several specific physiological changes. The first is increased vigilance or paying attention to what is perceived as potentially harmful in the environment. Frequently, and almost simultaneously with this, there is a blush reaction, a wetness in the hands, or a tendency to perspire. Also almost simultaneously, comes a perking of attention and a tensing of the muscles in the face. The face becomes grim. About three seconds into the emergency response there is a catching or holding of the breath, or there is shallow, quick breathing, almost panting. The next change is a change in blood flow, with more blood going to the vital organs. The result is that the feet and hands become cold and clammy. Finally, the jaw is clenched and the whole body musculature tightens and braces (Holland, 1980).

The Quieting Reflex is a reversal of these steps. The first thing that happens with the Quieting Reflex is that the student becomes aware that something is annoying him or her, resulting in tension or anxiety. The student then responds with an inward smile and the suggestion, "I can keep myself calm." Next the student takes an easy deep breath, lets the jaw go limp, and exhales slowly, feeling a wave of heaviness and warmth going down to the toes. The student can then continue normal activity (Holland, 1980).

With progressive practice, students can acquire a virtually automatic reflex ability to produce a set of

behaviors which are exactly contrary to the fight/flight, or emergency response. Since the two behaviors cannot happen together, the students learn a new adaptive state in which an emergency reaction is not brought forth unnecessarily. With repeated practice, the quieting response becomes the body's automatic and unconscious response to stressful situations, and is called the Quieting Reflex (Holland, 1980).

Summary

The prevalence of disabled readers in junior high schools continues to be a problem to educators. Adolescent disabled readers are a problem to themselves as well. They usually have a poor self-concept, and tend to be in a chronic state of stress. Each time they are asked to read aloud or are given a reading assignment, a fight or flight response is likely. This stress reaction, in turn, interferes with their ability to read. This study will investigate whether teaching low reading adolescents a six-second relaxation technique called the QR to replace their maladaptive emergency responses will improve their reading comprehension.

Limitations

1. This study was designed to study the effects of QR training on the reading comprehension scores of students enrolled in remedial reading classes at Central Jr. High school. Thus, the results of this study cannot be

generalized beyond the class in which the research was conducted.

2. This study is not considered experimental research, but action research. The findings should be judged accordingly.

CHAPTER II

REVIEW OF LITERATURE

One of the most active areas in psychology and in medicine has become the development of nonpharmacological, non-invasive means of combating stress, particularly excessive sympathetic arousal or excessive elicitation of the defense-alarm, or fight/flight response (Blanchard & Epstein, 1978). There are a number of ways to teach voluntary self-regulation of stress--one of the newest methods being the Quieting Response. The Quieting Response, as a relative newcomer to the field of stress combat, has little research yet to be reviewed. It does, however, share theoretical orientations with several self-regulation techniques currently in practice, such as meditation, autogenic training, progressive relaxation, and biofeedback. These techniques will be reviewed in this chapter, and their relationships to the Quieting Response will be discussed. Recent research studies on anxiety, reading achievement, and relaxation training during early adolescence will be reviewed next. The chapter will close with a summary and the research hypothesis for the present study.

Related Theoretical Literature

Meditation

Meditation is an experiential exercise which has been part of daily existence in Eastern cultures for centuries. It has been defined as, "a practice that moves the consciousness gradually toward a more holistic and serene state, opening up the higher spiritual faculties" (Abdulla, 1979, p. 105). In Eastern practice and tradition, the meditator works toward a psychological state which is termed transcendental awareness. There are two basic methods by which this state is achieved: (1) restriction or focusing of attention on an object of meditation such as a mantra, and (2) opening up of attention, in which the meditator places himself in a state of undistracted receptivity to external and internal stimuli, as in Zen meditation. Mastery of attention is the fundamental process underlying both these two methods (Pelletier, 1977).

Meditation has no identity with any religion or dogma, although many religions view meditation and contemplation as the direct path to spiritual development. Numerous forms of meditation exist, each suited to different people in different cultures at different times in the history of man (Abdulla, 1979). Yoga, for instance, has been a part of Indian culture for thousands of years, and is the culmination of ancient Hindu efforts to give man the fullest possible control over his mind (Benson, 1975). Yoga practices

range from those which produce a state of lowered arousal and relaxation to those which advocate a state of high arousal and extreme active involvement. The forms of meditation which have been most widely used in Western culture, however, are only of two kinds: Zen meditation, known largely through the work of Alan Watts and D. T. Suzuki, and Transcendental Meditation (TM), introduced to this country by Maharishi Mahesh Yogi. The latter two forms teach the induction of states of deep physical relaxation in order to set the stage for altered states of consciousness (Pelletier, 1977, 1979).

Eastern mystics have long known of the therapeutic effects of meditation, but the therapeutic functions were never considered central to meditation's purpose. Over the years, however, travelers to the East brought back increasing numbers of dramatic reports of meditators' phenomenal control of physiologic functions. Inevitably, the possibility of therapeutic application of meditation occurred to early researchers in medicine and psychology. There was much speculation about the practices, and some incorporation of meditation into therapy techniques. It is only in recent years in the West, however, and in some scientific establishments in India that scientific research has begun on meditation alone as a therapeutic tool (Benson, 1975; Abdulla, 1979). Yoga techniques, in particular, always seemed to fascinate Western man as paths to voluntary self-regulation, but apparently were resisted because of the imagined rigors and mysticism involved in their practice.

This picture rapidly changed with the introduction of TM to the Western world in 1960 (Stroebel, 1979). By 1977 there were over 400 studies and articles on the psychophysiological changes that occur during meditative practice. Early research was conducted primarily with Zen masters and Indian yogis, but more recently research has concentrated on Western meditators who practice TM, and on an Indian practice call Shavasana, or the "corpse pose" (Pelletier, 1977).

An effect of all the approaches which use the classic tradition of inducing states of deep physical relaxation before exploring states of consciousness is a sustained period of diminished sympathetic activity with an attendant increase in parasympathetic activity. Pelletier (1979) speaks of decreased sympathetic activity as an integrated hypothalamic response that was first described by Walter R. Hess and termed the "trophotropic response" to distinguish it from the "ergotropic response", which is equivalent to Cannon's fight/flight activity and is characterized by increased sympathetic reactivity. The trophotrophic response is mediated by the parasympathetic nervous system and results in relaxation of the skeletal muscles, decreased blood pressure and respiration rate, and pupil constriction. As early as 1957 Hess noted that the response seemed to be a protective mechanism against "overstress", and that it apparently promoted restorative responses.

Benson (1975) has popularized the concept of parasympathetic rebound, or trophotrophic response, as the

"Relaxation Response." The Relaxation Response, according to Benson, has always existed in the context of religious teachings, particularly in Eastern cultures which use passive meditation. It is an innate and protective mechanism against "overstress" which allows the harmful bodily effects of the fight-or-flight response to be turned off. Evoking the Relaxation Response is said to be extremely simple if a short set of instructions is followed. Four essential elements are incorporated:

. . . (1) a quiet environment; (2) a mental device such as a word or a phrase which should be repeated in a specific fashion over and over again; (3) the adoption of a passive attitude, which is perhaps the most important of the elements; and (4) a comfortable position (Benson, 1975, p. 27).

Underlying all the systems of deep relaxation and meditation is the common element of quiet, which provides the individual with the opportunity to listen to the body and become sensitive again to inner direction (Pelletier, 1979). Meditation's well-known calming effects on the central nervous system are often quite dramatic, which has led to its extensive application in the treatment of many stress-related and anxiety-related disorders (Abdulla, 1979).

Autogenic Training

Autogenic training has features in common with Zen Buddhism, TM, and techniques used by yogis (Yates, 1980). It has been characterized as a psychophysiological form of therapy, i.e., it involves the body and the mind simultan-

simultaneously through postures, exercises, and a set of standardized phrases. The activities are autosuggestive in nature and designed to help individuals gain voluntary self-regulation over a variety of bodily functions (Green & Green, 1977; Stroebel, 1980).

Autogenic training was developed in the early 1900's by J. H. Schultz, a German neurologist who had been looking for therapy techniques that would not produce, as conventional hypnotherapy often did, a lack of self-responsibility and passivity in the patient. The reports of self-regulation as practiced by Indian yogis, and the "prophylactic rest-autohypnosis" exercises of Oscar Vogt and K. Brodman were of particular interest to Schultz because of the self-directed nature of these phenomena. Vogt, for instance, had observed that his auto-hypnotic exercises, if practiced several times daily, could overcome effects of stress such as tension and fatigue, prevent headaches, and seemingly improve overall functioning (Green & Green, 1977). By combining his research with Indian meditation, the foundations laid by Vogt and Brodman, and his own investigations on hallucinations, Schultz gradually evolved a system of exercises which became the basis for autogenic training.

Schultz had noticed the reports of his hypnotized subjects that feelings of warmth and heaviness in the extremities were basic factors in bringing about a hypnotic state. He also found that people not under hypnosis could bring about the same feelings through self-suggestion. These

observations led to the development of two series of verbal formulas. The first series consists of six exercises focused on (1) the neuromuscular system for relaxation of the striate musculature, (2) the vasomotor system for relaxation in the vascular system, (3) the heart, (4) the breathing mechanism, (5) warmth in the abdominal area, and (6) cooling of the forehead. The second series consists of seven meditative exercises which focus on mental functions. When both the standard and the meditative exercises have been mastered, a series of special exercises is introduced involving reduction of internal and external stimuli, the mental repetition of verbal formulas, and the ability to engage in passive concentration (Green & Green, 1977; Yates, 1980).

Wolfgang Luthe, a student of Schultz's and the leading proponent of autogenic training since Schultz's death, explains that the key therapeutic factor of autogenic training lies in a "self-induced (autogenic) modification of subcortical interrelations", which enables natural forces to regain their otherwise restricted capacity for self-regulatory normalization (Green & Green, 1977, p. 26). If autogenic exercises are practiced several times a day, eventually individuals are readily able to shift to a low arousal (trophotropic) condition whenever they wish to do so. This trophotrophic condition has effects which are the opposite to those produced by stress (Luthe, 1982).

Opinions differ sharply on the results of clinical

applications of autogenic training. Enthusiasts state,

Clinical results have demonstrated that Autogenic Training has helped in the treatment of disorders of the respiratory tract, disorders of the cardiovascular system and vasomotor disturbances, disorders of the gastrointestinal tract, and disorders of the endocrine system. It has been effective in the treatment of 60 to 90 percent of patients with long-standing disturbances such as insomnia, headache, bronchial asthma and chronic constipation, and has proved helpful in behavioral and motor disturbances such as stuttering, writer's cramp, bed-wetting, anxiety, and phobias (Green & Green, 1977, p. 27).

More conservative authors have said,

Autogenic training has frequently been used in conjunction with biofeedback training, thus effectively confounding both, and it appears that no scientific studies of autogenic training as such have ever been carried out (Yates, 1980, p. 6).

Progressive Relaxation

The foundation for both biofeedback and progressive relaxation began around the turn of the century. Bair, with the research he published in 1901, is credited by Yates (1980) with anticipating most of the important methodological aspects of modern research in biofeedback. Bair's research showed that voluntary control of the retrohens¹ muscle could be achieved, provided use was made of associated muscles which were already under voluntary control. Bair also pointed out the necessity for concentrating on the movements to be made, and at the same time ignoring movements

¹Retrohens is a term no longer used. The present designation for that particular muscle is the auricularis posterior (Dorland, 1946).

which are not to be made. Also in 1901, Woodworth reported his studies on the voluntary control of the force of movement. He provided his subjects with feedback by letting them view a record of the upward movement force, and concluded that direct feedback from the muscle sense is necessary and is the critical factor in improving performance to a set criterion (Yates, 1980).

The role of muscle tension in the voluntary control of many body functions remained high over the succeeding years, with particular emphasis being directed toward the maladaptive effects of abnormally high levels of tension, and the beneficial effects of reducing such high levels. The most important work during this time period may have been that of Jacobson, whose research began in the 1920's. He is considered the pioneer of progressive relaxation training, and one of the earliest researchers in the use of feedback in muscle-relaxation training. As early as 1939 Jacobson raised a specificity/generalizability issue similar to that which Bair had noted in 1901 in his research on voluntary control of the retrohens muscle. While investigating the role of muscle tension in blood pressure by using implanted electrodes, Jacobson found that patients were able to relax forearm muscles better after training in total skeletal musculature relaxation training. His experiments gave encouragement both to the further use of biofeedback, and to the use of biofeedback in conjunction with relaxation training (Yates, 1980).

Jacobson's relaxation therapies, also called

"educational methods of energy conservation" or tension control, are based on the premise that brain and neuromuscular action are simultaneous, and that upon neuromuscular relaxation, the corresponding brain centers also discontinue their activity. The term "relaxation", as used by Jacobson, always includes the lengthening of muscle fibers following their purposeful contraction. Progressive relaxation was the original method of tension control used by Jacobson, but he now uses an offshoot method called "self-operations control" as an alternative. A patient is trained in one or the other, but not both, although the aim of both is increased accomplishment through economy of energy (Jacobson, 1970).

In teaching progressive relaxation, the muscular sensation of Bell is called the "sensation of tension" or "tension"; while in teaching the method of self-operations control, the muscular sensation of Bell is called the "control sensation." Progressive relaxation teaches individuals how to recognize tensions in their various muscle groups in serial order, and how to relax these muscles while guided by electrical measurements. Instruction is given first in the lying posture, then in the sitting posture, and finally during activities that are part of their everyday habit patterns. Individuals thus learn to observe tension patterns requisite to each act, and are trained to relax differentially (Jacobson, 1970).

In self-operations control, individuals learn to operate their organisms as they would learn to run any other

complicated apparatus, namely, efficiently. Using the analogy of a motor car, emphasis is placed on impressing the individuals that just as there are controls in the motor car, so there are controls which they can learn to operate in themselves. In the human organism, the controls are in the muscle fibers, and can be perceived through the muscle sense. Recognition of the control sensation in each of the principal muscle groups is taught successively, as in progressive relaxation. Jacobson stresses that in both methods of tension control, each step of the teaching procedure is taken from the standpoint and the viewpoint of the patient, not the therapist. The patients must learn to observe for themselves what they really do at the moment of anxiety tension, and must recognize when they become unduly tense. They must then learn to relax such tension for optimum accomplishment (Jacobson, 1970).

One criticism of progressive relaxation has been that many patients may view it by itself as being somewhat simplistic. Stroebe (1979) has suggested that it may be outside of the belief structure of Western man that progressive tensing and relaxing of body muscles could lead to the relief of any symptoms.

Biofeedback

Several of the newer relaxation methods, notably the Relaxation response of Benson (1975), the Quietening Response of Stroebe (1979), and the relaxation model of biofeedback

training (Ray, Raczynski, Rogers, & Kimball, 1979) are based on the premise that the organic responses of the fight/flight reaction (Cannon, 1914) can be brought under voluntary control with appropriate training, practice, and motivation. Since Cannon's research is of theoretical importance to these relaxation methods, a brief review of his often quoted study is presented as a prologue to this section on biofeedback.

Approximately 60 years before the advent of the above relaxation methods, Cannon and de la Paz began their investigations of the physiology of animals when in fear, pain, rage, or asphyxia. Although Cannon's name usually is associated with the "Fight or Flight" response, Cannon credited McDougall and Crile, among others, with recognition of fear as being associated with the instinct for flight, and anger with the instinct for fighting or attack. These instincts, or ingrained reactions, were assumed to have developed through "phylogenetic association" to favor the survival of the organism. Cannon (1914) theorized that the bodily reactions to pain and to emotion-provoking objects are of the nature of reflexes,

. . . they are not willed movements, indeed they are often distressingly beyond the control of the will. The pattern of the reaction in these as in other reflexes, is deeply inwrought in the working of the nervous system, and when the appropriate occasion arises, typical organic responses are evoked through inherent automatisms (pp. 360-361).

Cannon (1914) concluded that at times of great stress, the adrenal glands pour forth an excessive secretion which causes

. . . the cessation of activities of the alimentary canal (thus freeing energy for other parts); the shifting of the blood from the less insistent abdominal viscera to the organs immediately essential to life itself, such as the lungs, the heart, the central nervous system and, at critical moments, the skeletal muscles as well; the increased cardiac vigor; the quick abolition of the effects of muscular fatigue, the mobilizing of energy-giving sugar in the circulation . . . (p. 372).

Cannon's research was influential in later stress theories such as Selye's in the 30's, as well as to biofeedback in the the late 60's and the relaxation methods of the 70's.

Biofeedback research and practice is barely 12 years old, but during these 12 years there has been an enormous growth in the field. Studies of biofeedback as a research technique have appeared in the major journals in fields ranging from psychology through physiology and medicine to dentistry (Ray et al., 1979).

Biofeedback means providing a person with immediate and continuous information regarding physiological processes about which the individual would normally be unaware. The basic premise in biofeedback training is that if an individual is given information about his biological processes and changes in their level, he can learn to regulate this activity. With appropriate conditioning and training techniques, the individual can then presumably learn to control body processes which were long considered to be automatic and not subject to voluntary control (Andreassi, 1980). Information about the individual's body processes are made observable to him by attaching suitable sensors (electrical, thermal, or pressure) to electronic, audiovisual, or tactile feedback

signals (Stroebel, 1979).

There is no one model of biofeedback which is presently universally accepted by those who research and practice biofeedback therapy. There are, instead, a number of different and distinct modes of treatment that are currently being considered under the single rubric of biofeedback therapy. Currently, two distinct models are usually presented as rationales for clinical biofeedback work. These are the learning theory model and the relaxation model (Ray et al., 1979).

Neal Miller is credited with much of the theoretical foundation for the learning theory model, which is often presented as a skills training analogue. This model suggests that trial-and-error learning, shaped by reinforcement, offers an understanding of how a person can learn to control his or her physiological functioning (Ray et al., 1979).

The relaxation or antistress model, which is more pertinent to the present study, suggests that stress increases psychosomatic problems and contributes to the creation of "stress related disorders" such as hypertension, headaches, and anxiety. The model argues that the normal physiological reaction to stress is an increase in sympathetic nervous system activation followed by a parasympathetic reaction after the stress has passed. Based on the research of Cannon (1914), Selye (1980), and others, it is suggested that a subgroup of individuals do not return to the normal level of

physiological relaxation as quickly as the rest of the population. The model suggests, therefore, that the treatment of choice for this subgroup is training in some procedure, such as biofeedback, that leads to relaxation (Ray et al., 1979).

While biofeedback has a widespread appeal to the American public, long-term patient compliance appears to be dependent on the purpose for which it is used. Stroebel (1979) reports the percentage of individuals continuing to practice three months after training for general relaxation purposes as follows: TM, 80 percent; Carrington's Clinically Standardized Meditation, 60 percent; Benson's Relaxation Response, 20 percent; combined electromyographic-thermal feedback for general relaxation, 10 percent. However, compliance is very high for electromyographic-thermal feedback when it is applied to specific psychosomatic problems in which symptom relief is self-reinforcing. Therefore, it would appear that the application of biofeedback alone to teach stress management and general relaxation is comparatively much less effective than passive meditation such as TM (Stroebel, 1979).

The Quieting Response

The Quieting Response is a self-regulation technique for the control of stress. It was developed in 1974 by Charles F. Stroebel as an outgrowth of his work using biofeedback to treat stress disorders. Initially, the six-second Quieting Reflex was designed to help adults, but in 1977 work began on an adaptation for children and young people ages nine and up.

The result in 1980, was the QR for Young People program, authored by Margaret Holland, with Charles and Elizabeth Stroebel (Stroebel, 1980).

It was Stroebel's concern over patients' lack of long term compliance with biofeedback training which led to the development of the Quieting Response. Because patients tend to become dependent on biofeedback instrumentation, a self-reinforcing technique was needed to ensure transfer of training outside of the initial learning setting. The outcome was Stroebel's "quick mental mini-tranquilizer" that is elicited automatically when encountering mental stress, and that precludes inappropriate activation of bodily distress (Stroebel, 1979).

Stroebel speaks of the healthy individual as exhibiting an effective capacity to cope with stressors. These individuals usually regain a relaxed state within a relatively short time after "emergency response" episodes. The ability to regain this relaxed state is assumed to be an inherent quieting response which allows the body to restore the energy reserves needed for subsequent arousal periods. Conversely, persons who are predisposed to stress illnesses usually recover a relaxed state much more slowly, if at all. Instead, they tend to maintain excessively high levels of muscle and hormonal activity. Most stress prone individuals gradually seem to learn to override the inherent relaxation mechanisms until eventually the arousal response become routinized. It then has all the characteristics of an

acquired, seemingly automatic behavior pattern which the person comes to regard as "normal" (Stroebe, 1979).

The Quieting Response is triggered by annoyances and/or alterations in the breathing rhythm. An individual, adult or child, receiving QR training is first taught awareness of the annoyances which produces the breathing alterations, and then progresses through training to produce the sensations of limpness, warmth, and heaviness. Finally, the Quieting Response is taught according to a learning curve concept in order to facilitate transfer of the relaxation skills into real life situations. The Quieting Response training program requires eight hours for adults, while the QR for Young People requires four to nine hours. Adults need to practice the six-second techniques 60 to 100 times a day for four to six months whenever an annoyance is encountered. At that time most adults can achieve a low arousal state of reduced skeletal and smooth muscle tension within several seconds, even with their eyes open and while carrying on fairly normal Type A behavior. Children need much less time for the response to become automatic (Stroebe, 1979, 1980; Holland, 1980).

That children between the ages of nine and fourteen learn automatic control and relaxation skills faster than adults has been noted by Pelletier (1977) and Stroebe (1979). Pelletier speculates that this may be due to children being more willing to experiment with methods of self-regulation, and being less programmed into old behavior

patterns. Younger children do not "know" that autonomic control is not possible. Also, children and young adults have not made an excessive level of neurophysiological arousal into a habitual life style, so that it is easier to elicit and reestablish the relaxation response which has been an natural part of their functioning since birth (Pelletier, 1977).

Relaxation, very broadly defined, seems to be the final common pathway to the clinical benefits to be derived from stress reduction (Blanchard & Epstein, 1978). The Quieting Response shares this common pathway with meditation, techniques such as TM, the Relaxation Response, Progressive Relaxation, and biofeedback. The Quieting Response, along with systems of deep relaxation, utilizes periods of increased parasympathetic activity to produce the desired effects. The physiological outcome has been variously called the "trophotropic response", "self-regulatory normalization", the "Relaxation Response", and most recently the "Quieting Response".

There are several methodological and theoretical differences between the Quieting Response and other systems of deep relaxation. The effects of QR, for instance, can be experienced with a six-second exercise, while other methods can require 15 minutes to several hours (Benson, 1975; Stroebel, 1979). Also, in contrast to other types of relaxation exercises which involve becoming inattentive to the learning or doing process, the QR can be done while carrying

on normal activities (Stroebe, 1979; Holland, 1980). In general, most meditative practices are somewhat less structured than the QR technique.

Related Research

As mentioned previously, only one study using the QR for Young People has been completed to date, although a large scale study in a Colorado Public School System is being completed this spring (Stroebe, 1982) and several other research projects are in progress (Holland, 1982). The study which has been completed investigated the effects of QR training on adolescent psychiatric patients' ability to cope with stress (Jackson, 1981). Jackson compared the effects of QR training with self-relaxation training and delayed treatment (control). The QR subjects showed a significant change in tension reduction, and a significant decrease in subjective stress as measured by the Spielberger State Anxiety Scale.

Since research on QR has not yet been accumulated, the remainder of this chapter will be devoted to studies of the effects of anxiety on reading achievement, and to studies which have used related relaxation techniques with reading achievement as at least one variable.

Anxiety and Reading Achievement

Junior high school students seem to have been largely ignored in reading studies which investigated the effects of

stress or anxiety on reading achievement. Many studies have been done using elementary children or college students, and a lesser number using high school students, but very few have used grades seven through nine. In a review of research done prior to 1971, for instance, Gaudry and Spielberger (1971) presented the results of 27 studies which had investigated the relationship between anxiety and academic achievement. Only one of the studies had been conducted with junior high students, and it was concerned with anxiety and method of achievement. Of pertinence to the present study, however, is Gaudry and Spielberger's conclusion that the most consistent general finding noted in their research review is that high anxiety is associated with relatively low performance at both the school and the university level. Also, the evidence they gathered suggested that negative correlations between anxiety and achievement tend to increase in magnitude as school children progress through the elementary grades. An assumption might then be made that if the relationship between academic achievement and anxiety becomes progressively stronger as the student goes through sixth grade, then that relationship will surely not weaken as the student encounters the stresses of junior high school.

The only other research located which specifically investigated the relationship between reading achievement and anxiety in junior high students was done in 1972 by Herman. Using eighth and ninth grade students in remedial

reading classes, Herman found that individual counseling with Goodstein's system of verbal desensitization significantly reduced anxiety scores on the Children's Manifest Anxiety Scale (CMAS), while also significantly improving vocabulary and total reading scores. Correlations were significant and positive for CMAS and for both vocabulary and total reading score.

In 1974, Merryman published a study of the effects of manifest anxiety on the reading achievement of 185 fifth grade students. His study is included as it is often cited in studies of learning disabled (LD) and hyperkinetic children, and does have pertinence to the present study. In brief, Merryman concluded that while moderate levels of anxiety seem to enhance performance on certain reading tasks such as reading rate, it can interfere with other reading tasks, particularly inferential and literal comprehension and vocabulary. These are three of the reading components which are important for success at the junior high level.

Relaxation Training and Reading Achievement

There is the same dearth of research at the junior high level on the effects of various methods of relaxation training and/or biofeedback on reading achievement. Most studies which investigated these variables were conducted with hyperactive, retarded, or learning disabled children at the elementary level, or with college students. Some of the findings, however, might be applicable to reading disabled

junior high students. The studies which will be reviewed will not include those which used college students, as it is believed that the characteristics and environments of a college population may be too different from a junior high population to be able to generalize findings.

Before 1975, most of the research in teaching children biofeedback skills, and most of the clinical reports describing biofeedback therapy typically involved only one or two subjects (Hunter, Russell, Russell, & Zimmerman, 1976). One exception was an early study by Linden (1973). Using 26 black and Puerto Rican third graders, Linden found that the practice of meditation reduced test anxiety but had no significant effect on reading achievement. The children in the sample were drawn from classes in which they were already relatively proficient in reading performance, and Linden suggests that more noticeable effects might have been found if a wider range of reading achievement distribution had been used. Linden observed that his subjects apparently learned to be alert to various subjective feeling states, and thereby to cope with some anxiety responses in testing situations by voluntarily changing their feeling state. This finding lends support to the QR training program, which also teaches the students to become aware of the physiological and feeling state changes accompanying tension, anger, or anxiety.

Hunter et al. (1976) were among the first researchers to investigate the possibility that learning disabled students might learn control of their own physiological

functioning through biofeedback. Although their study of fingertip temperature control in seven- to nine-year old children does not pertain to the present study per se, their speculation that the kind of self-control acquired through feedback might have positive effects on learning was a forerunner of studies to follow. Biofeedback was viewed as "reinforcing an internal steady state conducive to learning" (Hunter et al., 1976, p. 743).

Another study published in 1976 supported a growing cognizance among researchers that children can be taught to be aware of the cues which often accompany anxiety and tension states. Thirteen hyperactive six- to ten-year-old boys showed behavioral improvement by practicing relaxation exercises and relaxing during tapes of visual imagery "trips". According to the authors of the study, after the boys learned awareness of body cues, responses incompatible with anxiety were introduced, resulting in reciprocal inhibition. Although the authors of the study point out several inadequacies in the design, it still appears to represent a landmark in work in imagery and relaxation training with children (Lupin, Brand, Brand, & Duer, 1976).

By 1978 evidence was "accumulating that children, as well as adults, using biofeedback training can learn to significantly influence their behavior when they learn to control their own physiological functioning" (Russell & Carter, 1978, p. 23). Russell and Carter trained fifteen 10-year-old learning disabled students during the summer months

to reduce levels of electromyograph (EMG) activity in the forearms of their preferred writing hand. The students also practiced handwriting coordination exercises, and used pre-recorded cassette tapes at home to practice relaxation. Significant gains were shown on seven of the nine dependent measures, including reading scores. The results were assumed to be directly attributable to the treatment, EMG biofeedback and relaxation training, since no academic remediation other than handwriting was administered. The authors interpreted their results as indicating

. . . that as the children become more relaxed, they can learn more effectively. They may even have more effective access to previously learned information without the excessive interference generated by their fluctuating musculoskeletal and autonomic responses to their environment (Russell & Carter, 1978, p. 24).

The research just described was completed during the Summer of 1977 and was repeated by Russell and Carter between 1977 and 1978 with three different groups of children: two learning disabled and one educable mentally retarded. Pre and post measures remained consistent with the original research.

Also, in 1978, a study was conducted by C. Green to determine if a difference in muscular tension exists between proficient and nonproficient readers. One hundred thirty-two second through sixth graders read four three-minute selections orally and silently while being monitored by EMG. Green's conclusion was that poor readers are not under any more stress than good readers at the elementary level.

In 1979, a review of literature concerning progressive muscle relaxation and EMG skeletal muscle relaxation therapy for hyperkinesis and learning disabilities began to cast doubt on the advantages of using biofeedback over other relaxation techniques as a therapy for children (Bhatara, Arnold, Torance, & Gupta, 1979). The authors reviewed 16 studies done between 1975 and 1978, and concluded that there was insufficient evidence to support the clinical utility of EMG biofeedback in hyperkinesis. Furthermore, even if EMG biofeedback is useful, it may not surpass progressive muscle relaxation in the behavioral treatment of hyperactivity. The authors also suggest that muscle relaxation training may generalize to the classroom better. Their review of the literature concluded that the studies to 1978 are conflicting, contradictory, and flawed by too many methodological problems.

Two studies published in 1980 differed in their conclusions. Huff (1980) found no difference in reading achievement gains made by sixth and seventh grade students who received relaxation training, suggestion, hypnosis, or experimenter contact. However, a recent well-controlled German study by Frey (1980) involving 60 disabled readers in grades three through six, found that relaxation training significantly raised reading achievement and lowered anxiety. The students received five minutes of progressive muscle relaxation exercises similar to Jacobson's, and 10 minutes of autogenic training once a week for the entire

school year. The students were encouraged to practice the autogenics for two or three minutes twice a day on their own, and to develop their own individual autosuggestions. The training program developed by Frey is similar in many ways to the methodology and conceptual orientation of the QR for Young People training program.

Summary

In our predominately success oriented society, students are under considerable pressure from parents, teachers, and peers to make high grades in school so that success will be assured in later life. Students' grades in school are often based, in large part, on reading ability. When low reading students are faced with a reading task, it may be that they direct their energy toward resolving the conflict between wanting to please "important others" and the reality that failure is probable. In such a situation the students may be much more aware of their inward responses than they are of the external task stimulus. In this sense the reading task is threatening and anxiety provoking, and the students' performance levels are reduced because their energies are directed toward dealing with the anxiety rather than the task (Merryman, 1974).

If students could learn to relax by some method, then it seems possible that this relaxation could result in increased performance on academic tasks, and in increased calm in other stressful situations (Russell & Carter, 1978).

There are many ways to teach students to relax in the face of stress, among which is the relatively new QR for Young People training program (Holland, 1980). Since little research has been done on teaching low reading junior high school students to relax, it would seem useful to see if training with the QR Program would increase performance on reading tasks. Therefore, the research hypothesis for this study is:

Students receiving QR training will demonstrate a greater increase in reading comprehension scores than students receiving placebo training (drawing experience).

CHAPTER III

METHODS

Sample

The subjects for this study consisted of 32 students in grades seven through nine who were enrolled in remedial reading classes. The 22 boys and 10 girls ranged in age from 12 years, 7 months, to 15 years, 4 months, with a mean age of 13 years, 8 months. Seven of the 32 students were also in one to two hours of Learning Disability classes daily. One student attended a class for the Emotionally Disturbed one hour daily, and one student was in transition from an Educably Mentally Handicapped program to a Learning Disability program. Racial composition consisted of 29 white students and three American Indian students. The students were fully informed about the study, and volunteered to participate. Parent permission was also obtained for each student who participated.

All students in the study attended Central Junior High, which is one of two junior highs in the Sand Springs Public Schools, Sand Springs, Oklahoma. The total school population is approximately 6,000 with Central Junior High enrollment currently 670.

Remedial Reading Program Description

The method and time of entry into the school's remedial reading program varied, although the remedial reading teacher screened and approved all students for placement. Candidates for the program included: (a) students who scored more than two years below grade level on the previous year's SRA achievement scores, (b) students who were recommended by their teachers during the course of the year, (c) students who transferred into the district after school started and were behind in reading, and (d) continuing students from the previous year. After approval by the remedial reading teacher, students were assigned to available class periods by the school counselor.

Diagnostic reading tests were administered by the reading teacher at the time of entry into the remedial reading program. Most students were given the Individual Criterion Referenced Test, a Gates McGinnitie Reading Test, plus additional diagnostic reading tests on an individual basis. The reading levels of the students in the present study ranged from 2.2 to 7.2 as measured by the Gates McGinnitie Reading Test.

The 55-minute classes met daily during the school year, and were taught by a state certified remedial reading teacher. Students were assigned to class periods by grade level when possible. However, three of the five periods contained a mixture of grade levels.

Instruments

The Nelson Reading Skills Test

Test Description. The Reading Comprehension subtest of the Nelson Reading Skills Test (Hanna, Schell, & Schreiner, 1977) was used as a pre and post measure for this study. The Nelson Reading Skills Test (RST) was first published in 1931 under the name of the Nelson Silent Reading Test. It was revised and published as the Nelson Reading Test in 1962. The present edition, published in 1977, measures word meaning and reading comprehension for grades three through nine. Optional subtests are provided for measuring word parts or decoding skills for the lower level of the test, and reading rate at upper levels. Grade equivalents, percentile rank bands, percentile ranks, normal curve equivalents, and stanines are provided for each subtest. In addition, a Total Reading Score is provided.

The Nelson was selected for its format design and its emphasis on reading comprehension. The Reading Comprehension subtest, rather than both Reading Comprehension and Word Meaning, was used in an effort to reduce student resistance to "another test." Because of this particular group of students' low achievement levels, they received more than the usual amount of testing, and most were either openly negative or passively resigned to tests. Not only did they take the usual beginning and end of the year school achievement tests, but they also took several reading tests within

the reading class during the year. Those who were in special education classes took additional tests. By using only the Reading Comprehension subtest of the RST, testing time was reduced to 25 minutes, which it was hoped would result in greater student effort.

There are two alternate, equated forms of the RST called Forms 3 and 4. Each form consists of three overlapping levels, A, B, and C, which are contained in a single student test booklet. Level A covers grade three and half of grade four; Level B covers the second half of grade four and grades five and six; Level C covers grades seven, eight and nine.

The Reading Comprehension subtest measures understanding of what has been read silently. In this subtest, the student reads brief passages which are described by the RST authors as containing a variety of humanities, science, and social studies subject matter of kinds usually encountered in school reading. The passages are said to reflect situations which represent a cross section of the population the United States, including various social and ethnic groups. Both expository and narrative writing styles are utilized. Passage length increases in the more advanced levels. A variety of mental processes is called for in answering the multiple choice comprehension questions that follow each passage. Some questions require simple recognition of answers that are presented verbatim in the passages, while others require drawing inferences from what has been

read, or identifying cause and effect relationships (Hanna, Schell, & Schreiner, 1977).

Validity

No independent validity studies are available yet for the RST (Hatch, 1982). However, the RST Technical Manual (Hanna et al., 1977) presents an analysis of the data supplied by a small school district that participated in the 1976 spring standardization sample as evidence of criterion-related validity. The RST authors caution, however, that the school district's student scores were less variable than scores from across the nation; therefore the correlation coefficients which are presented are smaller than would be expected from a district in which student variability more nearly approximates that of the national sample. Correlations between RST scores and the district's end-of-year grades in reading, language, and spelling (in subjects for which grades were available) were computed across grades three through nine. The median correlations of the Reading Comprehension subtext with reading, language, and spelling were .55, .52, and .41 respectively. The absolute values of these correlation coefficients are said to provide evidence of the concurrent validity of the RST (Hanna et al., 1978).

Using Sax's (1974) definition of concurrent (criterion) validity as the correlation of a set of measurements with an external criterion measured concordantly, several questions might be raised concerning the evidence presented by the

RST's authors on criterion validity. No explanation is offered, for instance, about the method of grade conversion used to compute the correlation with RST scores. No comment was made as to how many, if any, students took out-of-level tests. It is also unclear whether the reading grades supplied by the school, particularly in the sixth, seventh, and eighth grade classes, were from actual reading classes or were composite grades from subjects requiring reading.

Construct Validity

Passage dependence data is supplied in the RST Technical Manual (Hanna et al., 1977) as evidence of construct validity. Passage dependence is defined as students not being able to answer reading comprehension questions with greater than chance-level success when these questions are administered without the passages upon which they are based. A mean passage dependence index was computed for the items for which data was available. The indices were computed using students in grades four through six with both forms of Levels A, B, and C. The mean values reported range from +.28 to +.49, with positive values representing desirable passage dependence.

A possible problem with the construct validity of the RST is the test's ability to discriminate between grade levels. Spache (1976b) suggests that at least 15-20 percent of the total test items should be used to measure each

year's growth. This is not possible with the RST, as the Reading Comprehension subtests of Levels A, B, and C each cover nine grade levels, with approximately 50 percent of the items included in the middle three grades. At Level B, for instance, the most difficult eight items (of a total of 33) cover six grade levels (from 5.8 to 11.7). Thus, the RST's ability to discriminate between grade levels, particularly in the upper quartile of each level, appears inadequate.

Content Validity

According to its authors, the content validity of the RST was designed "to reflect the life space" of the students who will take the test. To accomplish this end, emphasis was given to the interests, variety, and novelty of the test content. The test authors consulted teachers and librarians, and studied published research to generate the list of possible topics from which the final reading passages were selected. The writing styles represented in the passages were systematically varied, and attention was given to item difficulty, frequency of usage for stimulus and keyed words in the Word Meaning subtest, and readability of passages in the Reading Comprehension subtest.

Reliability

Split half reliability estimates were obtained for each of the three levels of the RST and the estimates were then

adjusted for full length by use of the Spearman-Brown formula. The raw score equivalent half reliability of the Reading Comprehension subtest for forms 3 and 4 of Level A ranged from .86 to .89; for Level B the reliability was .92 for both forms; and for Level G, the reliability ranged from .90 to .93. For a test which covers several grades, Spache (1976) recommends a reliability in the high .80s or above .90. The reliability quotients of the RST, therefore, appear to be adequate.

Test Selection

The RST appeared particularly appropriate for the present study for the following reasons:

1. The RST is organized to facilitate out-of-level testing of students in the same class. Students are given a Level A, B, or C answer sheet, depending on their reading level, but the same test booklet is used for all students. The same test directions are also given for Levels A, B, and C, thus minimizing possible embarrassment to the lower functioning students.
2. Test directions are read aloud to the students as they read the same directions silently, again avoiding possible discomfort to the student who might not be able to understand the directions.
3. The RST can be administered by a regular teacher; no psychometric training is required.
4. Although the RST is designed for grades three

through nine, additional samples of approximately 200 each in grades two and eleven were tested in the standardization group to provide data points to help in extrapolating grade equivalent scores beyond the range for which the RST was designed. This appeared to increase the likelihood of valid scores for the few students in the present study who were reading on a second grade level. In Level A there are 13 test questions before a Grade Equivalent score of 2.0 is reached.

Treatment

Quieting Reflex Training

The training program, QR for Young People, is divided into 10 lessons. Lessons can be completed in 20 minutes, or can be extended to 50 minutes by the teacher or therapist. The first lesson introduces the student to the scope and content of the program. Lessons two through seven utilize tapes, called training elements, to provide instruction; lessons eight through ten are designed to reinforce QR concepts, to complete QR activities and share projects, and to review and evaluate the QR training. The QR for Young People kit consists of the following materials: The Instructor's Manual, the QR Log (a diary-type booklet) to be used by the student, and four cassette tapes which contain the six training elements plus 25 brief reinforcement exercises.

The six training elements are described in the Instructor's Manual as follows:

TRAINING ELEMENT A -- The purpose of the first element is to introduce young people to QR, to teach them to recognize changes in breathing, and to teach them to imagine breathing through their feet in preparation for doing the six-second Quieting Reflex. Each succeeding element is designed to enhance the youngster's body awareness and ability to shift gears quickly and at will.

TRAINING ELEMENT B -- This element teaches the six-second QR, reinforces understanding of breathing as each person's central rhythm, and teaches youngsters to recognize and then reduce facial muscle tension.

TRAINING ELEMENT C -- This element reviews the QR and then teaches youngsters to be aware of the differences in their bodies when their muscles are tense and when their muscles are loose. Increased body awareness of tension will help youngsters recognize the changes that occur when they use QR.

TRAINING ELEMENT D -- This element reviews QR and then teaches young people to experience the warmth and heaviness associated with vasodilation. By learning the sensations of deep warmth, they can increase the warmth/heaviness experience when they do their six-second QR.

TRAINING ELEMENT E -- The purpose of this element is to review and reinforce the experiences of changing breathing, reducing muscle tension, and experiencing warmth and heaviness. The imagery used in the tape is intended to give youngsters new ways to assess these experiences.

TRAINING ELEMENT F -- This element introduces a four-step generalization sequence. This sequence (which takes less than five minutes) is a model for youngsters. The sequence has two purposes: (1) to enhance the effectiveness of the six-second QR; and (2) to cope with extremely upsetting situations where arousal has been greatly heightened and which thus require longer quieting in order to reverse the emergency arousal. This sequence can be thought of as a brief time-out that youngsters can use whenever they need to. After trying the taped generalization sequence, youngsters are invited to modify it in order to create their own special sequences which fit their particular physiological arousal patterns. They can use imagery from any of the previous training sequences, or create their own images as they individualize the training to their own needs (Holland, 1980, pp. 5-6).

The 25 reinforcement exercises take less than one minute each, and add variety to practicing the QR.

Exercises 1 through 6 particularly reinforce the breathing taught in Element A.

Exercise 7 reinforces awareness of facial tension which is taught in Element B.

Exercises 8 through 10 reinforce awareness of muscle tension throughout the body which is taught in Element C.

Exercises 11 through 13 reinforce the awareness of warmth and heaviness which is taught in Element D.

Exercises 14 through 18 reinforce the imagery introduced in Elements E and F.

Exercises 19 through 24 are movement exercises. These should be used whenever youngsters are highly excited or very active.

Exercise 25 is a specific exercise for use with youngsters who tighten their hands, clench their pencils and thus have difficulty with their handwriting (Holland, 1980, p. 6).

The Instructor's Manual also includes objectives, an explanation of the physiological principles, and a teaching sequence to accompany each lesson plan.

The authors of the QR for Young People program state that it has been designed and tested for ages nine and up in classrooms of all socioeconomic levels, and used by professionals in a wide variety of clinical applications (Holland, 1980; Stroebel, 1980).

Precautions and Limitations

The following precautions and limitations in using QR training were listed in the Instructor's Manual:

1. Strict supervision of a physician is necessary for

youths suffering from epilepsy or juvenile diabetes. An explanation of why this is necessary was not provided.

2. QR training should be utilized as a treatment program for stress related symptomology only with medical supervision. Stroebel (1980) suggests when that QR training is being used as an educational program, parents of students who are under active treatment for medical or psychological problems should advise the treating professional to expect a reduction in excessive stress response. In compliance with these precautions, the parents of each student who participated in QR training were asked on the Parent Permission Form if their child had epilepsy, diabetes, or was currently in counseling with an outside agency. No students had either epilepsy or diabetes. Two students were in counseling.

Drawing Experience

Drawing experience was the placebo treatment for the control group in the present study. The students in this group used the "Time to Draw" cards (Webb, 1974), which is a series of 26 cards, each with a letter of the alphabet and sequential steps to make a cartoon character from the letter. (A sample drawing from one of the cards can be found on page 97 of the Appendix.) Periodically throughout the treatment period, the students in the drawing group were given the option of filling in and coloring cartoons from the teacher's regular materials.

Research Design

This investigation studied the effects of QR training on the reading comprehension scores of 32 junior high school students of both sexes who were attending remedial reading classes. Alternate forms of the Reading Comprehension subtest of the Nelson Reading Skills Test (RST) were administered in pre- and posttesting sessions to measure the effect, if any, of QR training on reading comprehension raw scores.

The research design for this study was a pretest-posttest control group design. This design was chosen as particularly appropriate for research in a single school setting since possible interaction effects of school and treatment are minimized as threats to external validity (Campbell & Stanley, 1963). The design is also advantageous in that it controls for threats to internal validity (Huck, Cormier, & Bounds, 1974).

History, however, may be a threat to internal validity in this study. The pretest-posttest control group design calls for simultaneity of experimental and control sessions, or randomization of experimental occasions (Campbell & Stanley, 1963). Neither was possible in the present study; therefore the intrasession history of the individual students could be considered an uncontrolled extraneous variable.

Three threats to external validity may be considered additional limitations in the study (Campbell & Stanley, 1963). First, an interaction between the RST pretest and the

treatment may have occurred through student awareness that they were to be assigned to either a QR or drawing group before they took the RST pretest. The possible effects of this knowledge are discussed in Chapter V. Second, although interaction effects of school and treatment are minimized by the pretest-posttest control group design, possible interaction effects may exist between student and teacher selection and treatment. The teacher and the students were volunteers for the study, and the effects of "volunteerism" on the treatment results are not known.

The third threat to external validity may exist through a reactive arrangement effect which parallels the possible pretest-treatment interaction, i.e., student awareness that they were participating in a research study, plus the somewhat artificial setting created by the QR and drawing experiences. Although both treatments were administered by the regular teacher in an effort to minimize the effect, the periods of QR training and drawing were unusual enough events in the classroom to have had an additive effect on treatment results through novelty (Campbell & Stanley, 1963).

This study used a matching procedure in selection of experimental and control subjects. Matching was done as an adjunct to the simple random sample, a permissible procedure when correction for initial mean differences in the two groups does not have to be made (Campbell & Stanley, 1963). In the present study, the initial mean differences in Gates McGinnitie Reading scores and ages of the subjects (two of

the matching variables) were small. There was a .2 mean grade level difference and a 2 month mean age difference between the experimental and control groups (grade $t = .47$, $p < .05$; age $t = .02$, $p < .05$).

The experimental group in this study received QR training, while the matched controls received placebo training (drawing experience). The independent variables were treatment (QR training vs. drawing experience) and time (pre- and posttesting). The dependent variable for the study was reading comprehension raw scores. To aid in generalization to other classroom situations, the QR training was done in the classroom by the remedial reading teacher (Campbell & Stanley, 1963).

Student Selection

The 32 students in the sample each attended one period daily for remedial reading. The students had been assigned to one of five class periods by administrative procedure and available space at the time of enrollment. The basis for assignment to class period was not relevant to the present study; therefore was not considered a biasing variable.

Since it was considered desirable to have uninterrupted, same-grade periods for QR training, the choice of class periods was limited. Only three of the five daily periods contained students of the same grade level, and one of these three was a split lunch period. The two periods which did meet the uninterrupted, same-grade criteria were therefore

chosen, and the remaining periods were used for selection of students to receive drawing experience.

The total enrollment in the remedial reading program was 43. Three students did not receive permission to participate in the research study. Of the 40 remaining students, 32 received treatment (QR training or drawing experience), leaving eight students who could not be matched because of scheduling problems. Table I shows the distribution of the 32 students assigned to the two groups by class period.

TABLE I
NUMBER OF STUDENTS RECEIVING
QR OR DRAWING EXPERIENCE
BY CLASS PERIOD

Condition	Period					Total
	1	2	3	4	5	
QR Training	0	9	7	0	0	16
Drawing	3	0	0	8	5	16
Total	3	9	7	8	5	32

Matching Procedure

The subjects in the QR and drawing groups were matched on three variables related to reading achievement or reading performance: gender, age, and current reading level. Students were also matched on grade whenever possible. No attempt was made to match the students on an ethnological basis, nor was attendance in a special education class considered as a matching variable.

Gender was considered first, as research has consistently found sex differences which would preclude matching a boy and a girl. Girls, for instance, are more fluent and read better during the school years, while boys tend to score better on tests involving visual-spatial skills. Sex differences have also been consistently found in brain lateralization, a finding which may be partially responsible for girls' earlier development of reading and language (Smart, 1977). Boys and girls score differently both on various subtests of standard achievement measures throughout school (Sax, 1980), and on achievement motivation (boys being thought to be motivated to do well just for the sake of being excellent, and girls to win social approval) (Smart, 1977). Additionally, a much smaller proportion of girls develop reading disabilities, the ratio being approximately one girl to five boys (Harris & Sipay, 1976).

Age was the second matching variable, as age can function as a common denominator for a variety of factors which influence growth in reading, such as the cognitive,

physical, and affective changes of the adolescent period (Harris & Sipay, 1976; Smart, 1977). The ages of the students in the present study ranged from 12 years, 7 months to 15 years, 4 months, a three year time period which encompasses four of six distinct and definable stages of adolescence (Nixon, 1973). Age, therefore was considered a necessary variable to be controlled through matching in order to minimize the possible effects of widely varying maturity among the students.

The third variable on which subjects were matched was total reading scores (grade equivalents) from Gates McGinnitie reading tests which had been administered earlier in the year. Subjects were matched on this variable in an attempt to avoid a regression to the mean effect, a phenomenon in which low scoring students tend to score higher and high scoring students tend to score lower on test-retest (Spache, 1976a). The matching design is presented in Table VI in the Appendix.

Procedure Format

The QR training consisted of 10 days of QR lessons and 10 days of reinforcement exercises which covered a four-week period. The two QR classes received approximately three and one-half hours of QR training lessons using the QR tapes, class discussions, and filling out the QR Logs. An additional 36 minutes were devoted to reinforcement exercises. Total training time during the treatment period was

approximately four hours. Longer training periods had been originally planned, but the discussion period following each exercise was shorter than anticipated, due apparently to the teacher's difficulty generating conversation about the tapes, and in encouraging the students to talk about their experiences.

QR training lessons and reinforcement exercises were conducted by the teacher in the remedial reading classroom at the first of each period. The seventh grade class had QR lessons and reinforcement exercises at 9:30 A.M., and the eighth grade class at 10:30 every school day. With the exception of the first week, the ten QR lessons were given on Mondays and Thursdays, with reinforcement exercises on Tuesdays, Wednesdays, and Fridays. One disruption in the schedule occurred on the eleventh day of training when the seventh grade class had to attend an assembly. Their lesson was postponed until the following day. Following completion of the daily QR training, the remaining time in each 55 minute period was spent in reading instruction. The treatment schedule is presented in Table II.

Students in the drawing groups had reading instruction for the same amount of time each day as the QR groups. Drawing activities were scheduled for the corresponding time period in which the QR student received either a QR training lesson or reinforcement exercises.

Standard instructions and program format from the QR Instructor's Manual were followed closely. The training

TABLE II
TREATMENT SCHEDULE FOR QR TRAINING

Week	Treatment Day	Day of Week	Lesson	*Training Element	Reinforcement Exercise
1	1	T	I		
	2	F	II	A	
	3	M	III	B	1
	4	T			2,3
	5	W			4,5,6
	6	T	IV	C	7
	7	F			8,9,10
2	8	M	V	D	11
	9	T			12,13,1
	10	W			14,15,2
	11	T	VI	E	16
	12	F			17,3,4
3	13	M	VII	F	18
	14	T			25,5,Choice
	15	W			6,Choice
	16	T	VIII		Choice
	17	F			25,Choice
4	18	M	IX		Choice
	19	T			Choice
	20	W	X		

*The cassette tapes which contain six of the ten QR lessons are called Training Elements in the "QR for Young People" program.

tapes rather than live presentation were used to insure standard presentation.

Four days prior to beginning QR training, all students participating in the study took the Reading Comprehension subtest of the RST, Form 3. The three students who were absent were tested by the author when they returned to school. At the end of the four-week treatment period, all participating students took the alternate form of the RST, Form 4. The procedural steps for carrying out the present study are presented in the following section.

Procedural Steps

The procedural steps for this study began approximately two months before the start of the project. The participation of the remedial reading teacher was secured first, and then approval was obtained from the school principal, the Director of Special Services, and the Superintendent. Materials for the project were ordered next, including the QR program, appropriate forms and levels of the RST, and the "Time to Draw" cards. Skating tickets to be given to the students for returning their permission forms were obtained from the local skating rink.

Reading scores were gathered from the files of the remedial reading teacher along with descriptive data from the school's files for assignment of students to treatment groups. Included was data on age, race, gender, grade, and Gates McGinnitie scores.

Forms and instructions were constructed next, including: (a) informed consent forms, (b) an explanation of the project to read by the teacher before the consent forms were given to the students to take home, (c) a teacher log to record daily activities, (d) a student evaluation form to be used on completion of the project, (e) a large "DO NOT DISTURB" sign for the teacher's door when QR training was being conducted, and (f) daily "cue cards" for the teacher which outlined the QR lessons and the steps to be followed each day.

Following arrival of the materials for the project, a QR Log was constructed for the sixteen students in the QR group. (Previous permission had been given by Dr. Holland to copy the materials which come with the QR Training program.) The Instructor's Manual was also copied for the teacher to study. The "Time to Draw" cards for the students receiving drawing experience were filed in alphabetized folders and boxed for easy accessibility. The appropriate level of the RST for each student (from Gates McGinnitie scores), and identifying information was filled in on each answer sheet. The answer sheets were assembled by class period for ease of administration by the teacher.

Teacher training began two weeks before the study started, and totaled 15 hours. Arrangements were made through the school counselor for two volunteer students, with parent permission, to act as subjects. The teacher, the author, and the two students practiced one lesson and

two to three reinforcement exercises each day during the 10 day period.

Also two weeks before the beginning of the study, a copy of the informed consent form was sent to the school Principal and the Superintendent for approval. One week before study began, the teacher read an explanation of the study to each of her classes and gave the informed consent forms to the students to take home. The students were told that if they brought their forms back signed the following day, they would receive a free skating ticket. The teacher emphasized that each student would receive a ticket regardless of whether or not they participated in the study--that the ticket was only for returning a signed form. Forty of the 43 forms were returned. The author made home visits on the three unreturned forms. As recommended in the QR manual, the parents of two students who were in counseling were contacted.

When all consent forms were received, final matching of students was made. Two days before QR training began, all materials were delivered to the teacher. The following day all participating students took the Reading Comprehension subtest of the RST, Form 3. (The three students who were absent were tested by the author.) After the reading tests were collected, a list of student assignments to the QR, and Drawing groups was given to the teacher. The students in each class were told to which group they had been assigned on the day QR and drawing experience began.

On Mondays and Thursdays the two classes of QR students followed the 10 QR lessons as programmed in the Instructor's Manual. On the remaining days of each week they did two reinforcement exercises at the beginning of the period, and one reinforcement exercise toward the end of the period. The exercises were scheduled so that they reinforced the previous lesson. Exercises 1 through 6 were repeated, as suggested in the Instructor's Manual, during the second and third week of the program. During the latter part of week three and all of week four, the students chose their favorite reinforcement exercises. Exercises 19 through 24 were omitted, as these are optional movement exercises designed for use when students are highly excited or very active.

The students in the control group were introduced to the "Time to Draw" cards on the first day of the study, and were told that they would be drawing for varying amounts of time each day for the following four weeks. A brief explanation was given of eye-hand coordination. The students were also told that the drawing practice was to see if daily eye-hand exercises would improve their reading.

At least one visit a day was made to the classroom to lend support to the teacher and to discuss progress. On the 20th day of the QR program, materials for posttesting were delivered to the teacher. On the day following posttesting, a visit to each class was made to thank the students for their participation in the study, and to solicit the opinions and ideas of the students in the two classes which

received QR training. The students were also briefly interviewed individually by the author. "Certificates of Completion" were presented by the teacher to each participating student in the five class periods. This was done as a token of appreciation, and with the hope that the students might have a favorable view of research as adults.

Hypotheses

To carry out the purpose of this investigation the following null hypotheses were tested:

- H₁: There will be no significant difference between the pre- and posttest means of reading comprehension scores for the group which received QR training and for the group which received drawing experience.
- H₂: There will be no significant difference between means on reading comprehension for pre- and posttest scores.
- H₃: There will be no significant interaction between time (pre and post) and treatment (QR training and drawing experience) on reading comprehension scores.

These hypotheses were tested at or beyond the .05 level of confidence.

Data Analysis

A two-way mixed model analysis of variance was the statistical techniques used to analyze the data (treatment by time). There were two levels of the treatment factor (QR training and drawing experience) and two levels of the time factor (pre- and posttest scores). Analysis of variance was chosen because it is not only sensitive to possible

differences between the two groups being compared, but also to the possible existence of an interaction between the two independent variables (Huck, Cormier, & Bounds, 1974). The minimum requirement for significance was set at an experimenter's error of $p < .05$.

Three conditions must be fulfilled to apply analysis of variance procedures to a set of data: (1) the scores must be from a genuine interval scale, (2) the scores must be normally distributed in the population, and (3) the variance in the treatment conditions or groups must be homogeneous (Linton & Gallo, 1975). In the present study, the first condition was met through use of raw scores from the RST. The second condition was met during the norming of the RST. The third condition was satisfied through matching procedures, with subsequent non-significant t tests for the matching variables of age and Gates McGinnitie scores.

The assumptions underlying analysis of variance techniques include the above conditions plus the additional assumption that the sample was drawn at random from the population under consideration (Linton & Gallo, 1975). This assumption could not be fully met in the present study due to the existence of only one remedial reading class. The assumption was partially met through previous assignment of students to class periods by procedures unrelated to the present study and believed not to constitute a biasing influence.

CHAPTER IV

RESULTS

Formal Results

The results of the present study are presented in this chapter in terms of an analysis of the data. The study sought to examine the effect of QR training on the reading comprehension scores of junior high school low readers. The research question to be answered was whether students who received QR training would show a greater increase in reading comprehension scores than students who received placebo training (drawing experience).

The independent variables for the study were treatment (QR training vs. placebo training) and time (pre and post), with the dependent variables consisting of raw scores from the Reading Comprehension subtest of the Nelson Reading Skills Test. The means and standard deviations of the pre- and posttest raw scores for the QR and drawing groups are found in Table III.

Three hypotheses were formulated to answer the main research question. Hypothesis One posed the question: Will the means of the reading comprehension scores be different for the group of students who received QR training and the group of students who had drawing experience? The second

hypothesis addressed whether a significant difference would exist between the reading comprehension means of pre and posttest scores. And third, would there be a significant interaction between time (pre and post) and treatment (QR training vs drawing experience)? A two-way analysis of variance with repeated measures over time was the selected statistical model used to test the three hypotheses. Table IV summarizes the information obtained from the analysis of variance procedure.

TABLE III
MEANS AND STANDARD DEVIATION FOR READING
COMPREHENSION RAW SCORES

Treatment	Time		Combined Mean
	Pretest	Posttest	
QR Group			
N	16	16	
Mean	7.50	21.94	14.72
Standard Deviations	2.19	8.40	
Drawing Group			
N	16	16	
Mean	8.56	24.25	16.41
Standard Deviations	2.09	5.47	
Combined Mean	8.03	23.09	

TABLE IV
 SUMMARY TABLE FOR THE ANALYSIS OF VARIANCE
 PRE- AND POSTTEST READING
 COMPREHENSION SCORES

Source	SS	df	MS	F	*
<u>Between Subjects</u>					
Treatment	45.56	1	45.56	1.44	NS
Error	947.19	30	31.57		
<u>Within Subjects</u>					
Pre-Post	3630.06	1	3630.06	155.87	S
Treatment X Time	6.25	1	6.25	0.27	NS
Error	698.69	30	23.29		

*S = Significant beyond the .05 level of confidence;
 NS = Not significant at the .05 level of confidence.

Examination of the ANOVA table shows that the means of the reading comprehension scores were not significantly different for the group of students who received QR training and the group of students who had drawing experience. Thus, Hypothesis One cannot be rejected. Hypothesis Two, however, can be rejected, as both groups made significant gains in reading comprehension scores between pre- and posttesting.

Hypothesis Three stated that there would be no interaction between treatment and time. This hypothesis cannot be rejected, as no significant effects were shown on pre- and posttest reading comprehension scores for either of

the treatment groups. The research question, therefore, must be answered negatively. Students who received QR training did not show a greater increase in reading comprehension scores than students who received placebo training (drawing experience).

Additional Informal Analysis

The students in the QR group rated themselves on a "Calm Upset Scale" in their QR Log at periodic intervals during the training period. The descriptive data gathered from their ratings are presented here as basis for discussion in Chapter V.

On the first day of the training period, the students were asked to rate how they felt on a scale of 1 (calm) to 7 (upset) while at home, at school, while playing their favorite sport, and while studying. The results, which are presented graphically in Figure 1, indicate that the students tended to feel more upset, tense, and anxious while at school and when studying than they did when they were at home or playing their favorite sport. The means and standard deviations for these four situations are presented in Table V.

Using the same Calm Upset Scale format, the students also rated how they felt before and after listening to each of the first five QR training tapes. The data gathered is presented graphically in Figure 2. The results, presented in Table VI, showed a significant decrease in tension level after listening to four of the five tapes. These results are discussed further in the next chapter.

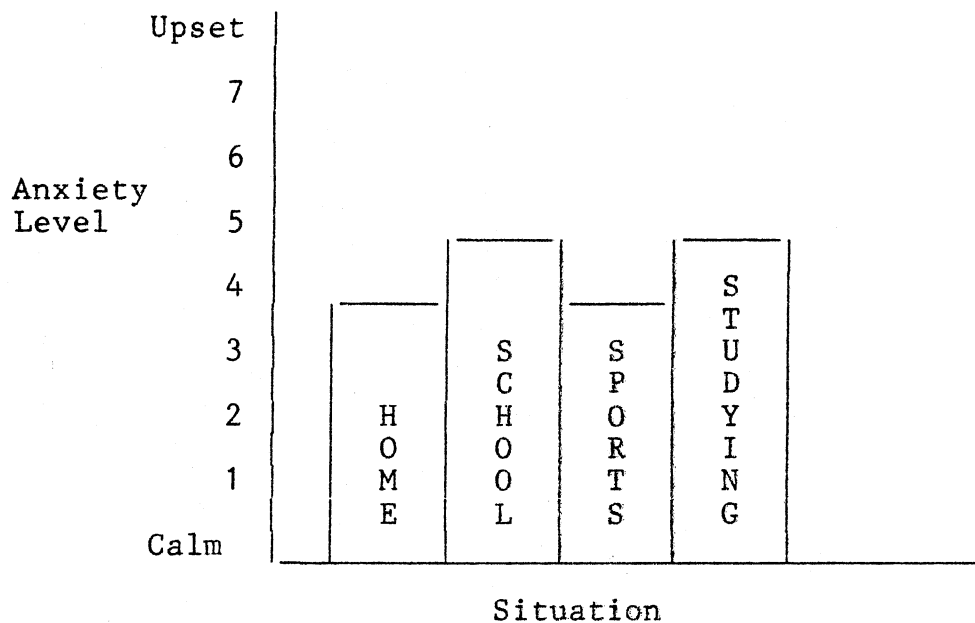


Figure 1. Mean Scores on Calm-Upset Scale

TABLE V
MEANS AND STANDARD DEVIATIONS FOR SITUATIONAL
CALM-UPSET SCALE

Situation	Mean	Standard Deviation
Home	4.0	1.32
School	4.5	1.32
Playing Favorite Sport	4.63	2.03
Studying	3.75	1.61

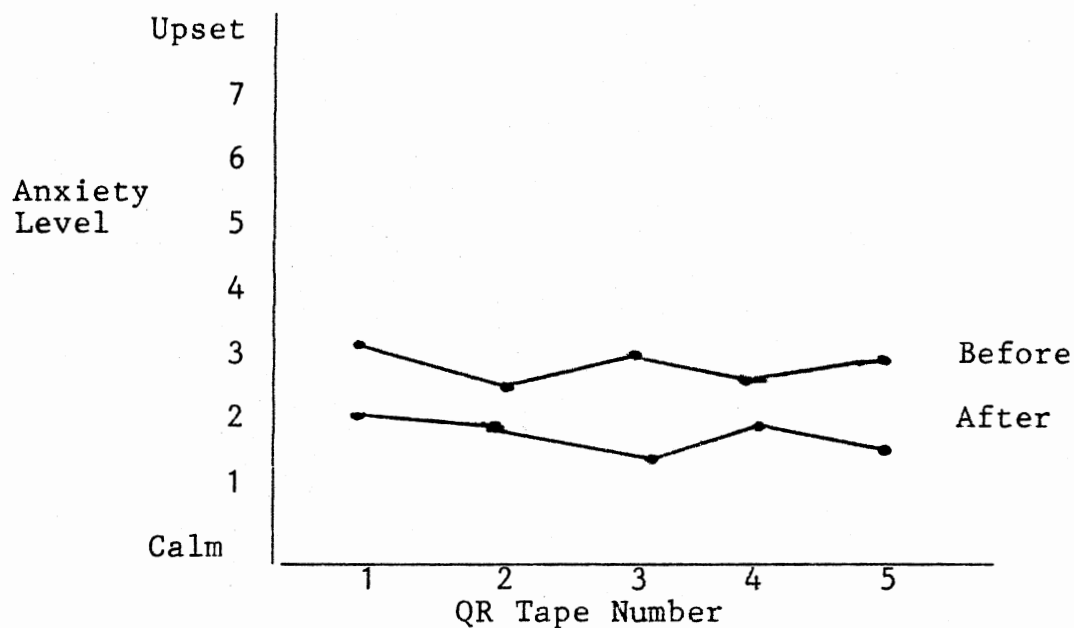


Figure 2. Mean Calm-Upset Scores Before and After Listening to QR Tapes

TABLE VI

MEANS, STANDARD DEVIATIONS, AND T TESTS FOR CALM-UPSET SCORES BEFORE AND AFTER LISTENING TO QR TAPES

Tape Number	N	Before		After		t	*
		\bar{X}	SD	\bar{X}	SD		
1	11	3.09	1.14	2.55	1.75	1.20	NS
2	15	2.67	1.05	2.07	1.33	3.50	S
3	15	2.80	1.08	1.80	.86	4.1	S
4	11	2.64	1.03	2.00	1.26	3.13	S
5	14	2.71	1.33	1.71	.91	2.8	S

N = Number of students present.

*NS = Not significant at the .05 level of confidence;

S = Significant at the .05 level of confidence.

CHAPTER V

SUMMARY, CONCLUSIONS, AND DISCUSSION

Summary

The purpose of this study was to determine whether learning a six second relaxation technique called a Quieting Response (QR) would increase the reading comprehension scores of junior high school students enrolled in a remedial reading program. Sixteen students in a suburban northeastern Oklahoma public school system spent four weeks learning the six second technique. Another 16 students who served as matched controls, received four weeks of placebo training through drawing cartoons.

A Pretest-Posttest Control Group design was utilized for the study (Campbell & Stanley, 1963). The independent variables were treatment (QR training vs. drawing experience) and time (pre- and posttesting). The dependent variable was reading comprehension scores on the Nelson Reading Skills Test (RST). The training program, QR for Young People (Holland, 1980) was used with the experimental group, and Time to Draw cards (Webb, 1974) were used with the control group. Both groups were pre-and posttested with the Reading Comprehension subtest of the Nelson Reading Skills Test

(Hanna et al., 1978). Analysis of variance procedures were used to analyze the data.

Conclusions and Discussion

Hypothesis One of the present study addressed the question of whether a difference would exist between the means on reading comprehension scores of students who received QR training and students who received drawing experience. Analysis of the data showed no significant difference between the two groups. Although the study, as designed, showed that QR training did not increase reading comprehension scores more than drawing experience, the results could be considered inconclusive because of a ceiling effect of the posttest measure. The results could be considered inconclusive due to a lack of student effort on the pretest measure and a ceiling effect on the posttest measure.

The effective range of a reading test can be considered the point between which students can score 40 percent to that point where they score 85 percent correct. A student who completes more than 85 percent of the test items on a reading test correctly has probably not been evaluated accurately, i.e., the test has been too easy (Spache, 1976b). In the present study, 50 percent of the students in the QR group and 37 percent of the students in the drawing group scored 85 percent or higher correct on the posttest. These results suggest two possibilities. First, the actual treatment effects of both the QR and drawing groups could be

obscured due to the low ceilings of levels of A, B, and C of the Nelson Reading skills test (RST). Second, the numerically higher percent of the QR students who scored 85 percent or more correct suggest that QR training indeed might have been the more effective of the two treatments.

Previous studies have shown a negative relationship between anxiety and academic achievement and/or reading achievement (Gaudry & Spielberger, 1971; Herman, 1972; Menyman, 1974). Research has also suggested that students can be taught to become aware of the subjective feeling states or physiological cues which often accompany anxiety and tension states, and thereby learn to cope with stressful situations through learning to change their feeling states (Linden, 1973) or physiological functioning (Hunter et al., 1976). The present researcher had hoped to lend support both to the above studies and to those which found that relaxation training improved reading scores, but several methodology flaws may have confounded the results (Russell & Carter, 1978; Frey, 1980). In addition to possible ceiling effects of the RST, other factors included: a lack of specific instructions to the students to use QRs when reading, interruptions during QR training, and the presence of three particularly disruptive students in the QR treatment group.

The QR training program is not specific to particular situations such as reading or math. It is possible that the QR format was followed too strictly in the present study, for in retrospect, it would seem that more emphasis should

have been placed on awareness of tension and/or anxiety when facing difficult reading assignments. The students could then have been encouraged to use their QR training before and during reading. The awareness of body cues and a heightened sense of self control as described by Linden (1973), Hunter et al. (1976), and Jackson (1980) appeared to develop during the QR training period. Informal analysis of the data (Figure 2, p. 73), a student survey, and individual interviews with the students following completion of the study indicated that the students were using QRs effectively in various home and social situations, but not when reading or doing classwork. Specific instructions to the students to use QRs whenever facing difficult reading assignments might have been helpful.

Another factor which may have influenced the outcome of the study was the occurrence of several interruptions during QR training sessions. Despite a large sign on the door of the classroom requesting no entrance, student aides persisted in coming in to collect roll checks and deliver messages. This proved distracting to both the teacher and the students.

The third factor which may have biased the results is reflected in the larger standard deviation of the QR group as shown in Table III, page 69. This wider variability of the QR group is believed to have been due to the negative attitude of two boys in the QR treatment group toward the QR training program, and the apparent inability of a third

student from the Emotionally Disturbed class to control his talking-out. While the other students in the QR groups apparently were fairly successful in ignoring the three boys, it is not known how much of a disruptive effect their comments and antics had.

Hypothesis Two of the study was concerned with the difference between means on reading comprehension scores for pre- and posttest scores. A significant difference was found at the .05 level of confidence, with posttest scores being significantly higher. Again it must be suggested that this difference may be spurious, as it is believed that the students put forth only token effort on the pretest measure. One of the matching variables for the study was pre-existing total reading scores on the Gates McGinnitie Reading Test. The mean grade equivalent score for the QR students on the Gates was 4.7, with 4.9 as the mean of the drawing group. By contrast, the mean reading comprehension grade equivalent score on the RST pretest was 1.4 for the QR group, and 2.2 for the drawing group. Granted that total reading scores on the Gates McGinnitie cannot be considered equivalent to reading comprehension scores on the RST, still the differences would seem far too large to be attributed to differences between the tests. Also, the fact that the students in both groups gained approximately three years in reading comprehension scores within a period of four weeks again strongly suggests an almost total lack of motivation at the time of pretest.

One can only speculate about these widely divergent scores. What has happened when two matched groups of students in different class periods score far below what might be expected on a pretest measure and then encounter ceiling effects on the posttest measure? The teacher as a biasing influence seems doubtful, as these results were consistent across the QR and drawing groups. One explanation might be that the students intentionally scored poorly on the pretest out of a fear of failure on the reading tasks ahead. Another explanation, since this was a fairly test-wise group of students, is that they planned to please the teacher and the researcher by performing poorly on the pretest and thereby insuring large gains in reading scores on the posttest.

A third explanation might be that the students initially did not perceive the study as pertinent or relevant to their needs, but then were gradually affected by Hawthorne and placebo effects. The Hawthorne effect is an awareness on the part of the subject that he or she is receiving special treatment (Cook, 1962). A placebo effect is a special form of the Hawthorne effect, and can be described as the apparent effectiveness of an instructional approach resulting from the faith of both the subject and the experimenter in the efficacy of the method (McDonald, 1964). Placebo treatment is used to control the biasing forces of the Hawthorne effect (Cook, 1962). The students in the study had been given a description of the two groups

(QR and drawing) before the pretest, but were not told of their assignment to a particular group until after the pretest. Possibly, the knowledge of membership in a group became the foundation for Hawthorne and placebo effects, which when coupled with the treatment, caused the treatment effects to appear equal. This knowledge of group membership is similar to the testing-treatment interaction and reactive arrangement effect discussed by Campbell and Stanley (1963).

One other factor which may have contributed to the disparate scores was the author's almost daily visit to the classroom. Although the author had minimal contact with the students until after the treatment period ended, perhaps the interest of an outsider in the reading classes somehow added motivation during the treatment period.

Null Hypothesis Three could not be rejected. There was no significant interaction between time (pre and post) and treatment (QP training and drawing experience).

Informal Data Discussion

Informal analysis of the data obtained from the rating scales which the students filled out in their QR Logs lent support to research which has suggested a strong relationship between low reading ability and greater tension or anxiety in academic activities (Gaudry & Spielberger, 1971, Herman, 1972; Merryman, 1974; Holland, 1980). This relationship is shown graphically in Figure 2 (p. 73). That the students were also able to lower their self-perceived

tension levels while listening to each QR tape is shown in Figure 2 (p. 73). The students' comments during a post-study class discussion and during individual interviews indicated that they used a variety of body cues to alert themselves to tension and anxiety outside of the remedial reading class, such as, "My muscles feel tense," "I start biting my nails," "My reading speeds up and I stop understanding what I'm reading." Their self-ratings and comments suggested that QR training did improve awareness of body tensions.

In addition to informal discussion and interviews, the students were asked to fill out a short questionnaire on the day after the posttest. Their responses are summarized in Table VII, p. 82.

Student responses to the questions on the questionnaire which could be answered "yes" or "no" were more consistent with their responses during discussions than were responses to questions requiring differentiation of "never," "sometimes," and "often." It is not known whether this could have been due to student difficulty with time concepts, a tendency to respond with what the students thought was expected in a discussion situation, or to other factors such as the author's failure to ask the right questions.

With two exceptions, the students were very positive about QR training, and thought that the program should be repeated next year. Several of the students suggested that QRs should be taught in every class. Some of their reasons are listed below.

TABLE VII
STUDENT QUESTIONNAIRE RESPONSES

	Never	Sometimes	Often
How often did you use QR at home?	36*	43	21
How often did you use QR in other classes?	36	50	14
How often did you use QR's when you were mad?	43	29	29
		<u>Yes</u>	<u>No</u>
Do you think you will use QRs in the future when you are angry, upset, or tense?		86	14
Do you think the QR program would help students in reading classes next year?		93	7
Have you done a QR since yesterday?		36	64
Do you feel you learned something helpful?		79	21

*Percent of students responding in each category.

N=14 (Two students were absent)

"It works! I'd recommend it for everybody. Some people think it's stupid, but they don't know until they try."

"It worked. It would be good for the kids. Someone might get hurt - people get in fights."

"They (the other students) can get their work done better. I really don't like to do it but it helps."

"It would be helpful. It would fix them (the other students) where they would do their work - where they wouldn't get upset and would settle down and try."

"It helps people talk about their feelings. It calms them down when they're mad."

"There's been a bunch of fights this year, maybe it could help those people from getting in fights. It helped me out a lot."

"A lot of kids around here can't control their temper - it would help them."

"It's better than getting mad and hitting somebody. Besides, it's fun to learn."

"It helps people slow down and relax - helps them go through the day better."

Although 50 percent of the students reported using QRs in the classroom "sometimes" on the questionnaire, none of the students spontaneously mentioned, during discussions, having used a QR on an assignment or while reading. Instead, the majority mentioned emergency situations or anger reactions. A few students mentioned using a QR to relax. If the purpose of QR training is to be increasing

reading skills, the students' responses indicate the need for more specific instructions than the present study provided. Listed below are some of the students' answers to the question, "When have you used a QR?" ". . . when I get mad or framed for something I didn't do." ". . . I used to get mad at my neighbor a lot and now I just walk away." "I used it last night when my brother fell off his bicycle and got hurt." "At home Mom started griping at me and everything so I done it." ". . . when my brother kept dropping my headgear and I had to keep going back and pick it up." (riding motorcycles) ". . . when I sliced my finger open." ". . . when I got hit with a clod of dirt - I didn't hit my brother." ". . . when I messed up my timing." (sports) ". . . when I flipped my dune buggy." ". . . when my teacher yelled at me. It was hard but I did it (a QR)." ". . . when somebody kicked the ball out of line and accused me of missing it. I did a QR and went right on." ". . . when my dog got a rabbit." "I use it when I get mad or am under a lot of pressure." "I usually use it when I go to bed or want to sit down and relax." "Whenever I'm tired or upset or want to feel good." "When I get mad at Mom when she tells me to do something or I can't ride my bike."

Other favorable aspects of the QR programs which the students spontaneously discussed with the author included the fact that only six seconds were required, it was easy to learn, and, "You don't have to let people know you're doing it." Several students also mentioned future health benefits,

such as preventing high blood pressure. None of the students, however, mentioned the possibility of using a QR before and during reading.

The remedial reading teacher reported that she personally felt calmer during the training period, but she was unsure about her students. Their behavior seemed to remain fairly typical of the end of the year. She reported some "silly" behavior during the training sessions such as heavy breathing (usually instigated by one of three students), but few derogatory remarks. In general, she liked the program and felt that the students had responded positively.

Suggestions for Further Studies

The present study has not provided strong support for the position that QR training can increase the reading comprehension scores of low reading junior high school students. The research results can be considered inconclusive, however, due to limitations of the study such as a lack of student effort on the pretest, and a ceiling effect on the posttest. Despite the present statistical results, the researcher suspects that QR training can be effective with this particular group of students. The students' informal responses indicated interest and a realization that QRs could be helpful to them. The following recommendations and suggestions are offered for future studies in this area:

1. Care should be taken in future research to employ a pre- and posttest reading instrument

with enough test items at the upper limit of the appropriate levels to insure against a ceiling effect.

2. A change in the research design is suggested in future studies which might want to replicate this study. Use of random selection and assignment to QR, drawing, and no-treatment groups would eliminate problems encountered in matching, and would allow broader generalization.
3. A study of this type might be better undertaken earlier in the year, possibly in October, and continued at least until mid-March. This time period would avoid most of schools' group testing, and the pre- and posttesting in remedial reading rooms. The extended training might also yield more reliable results, and would take little more of the teacher's time (Spache, 1976b). After the initial two or four week training period, possibly all that would be needed would be a daily reminder to the students to do a QR before and during reading assignments.
4. If the primary purpose of using QR training is to increase reading skills, then more emphasis should be placed on when to do a QR during reading. For instance, the students might be instructed to do a QR when they first touch a

textbook, another when they find the assigned pages, and still another when they encounter a difficult word. They could also be given more specific instructions on how to monitor their body tension cues while reading.

5. Careful arrangements need to be made through the school's office to guard against interruptions during the QR training period. The present study depended on a DO NOT DISTURB sign on the door, which proved inadequate. Possibly all school staff and student aides could be apprised of the specific times during which they are not to enter the room.
6. Advance plans need to be made for disruptive students. Individual training might be provided, if possible, or those particular students might be assigned to a study hall during the initial training period.
7. The possible effect of an administrative representative visiting the classroom might be a planned variable in future studies to see if the interest of an "outsider" would create motivation.
8. If at all possible, enough remedial classes should be included in the study to allow for random sampling procedures.

9. Future research might investigate several variations of the present study. QR training might be taught at the beginning of the year in a study skills class. Also, QR training could be limited to teachers only, with the teachers subsequently incorporating QRs into their instructional program.
10. Provisions need to be made in future research designs for the students who attend both special education classes and remedial reading. Possibly they could be matched if a matching design is used, or equal numbers could be present in all groups if a matching design is not used. Ethnic groups should also be addressed in the same manner.
11. The reactions of the group of students who received drawing experience appears to be a particularly fruitful area for future research. The teacher reported almost panic reactions during the first few days of the project, with the students protesting vehemently that they could not draw. Many students evidenced obvious frustration and self-criticism. Some insisted, "This is no good," and tore up their papers, while others made only a token effort and then just sat for

the remainder of the period. They had to be reassured repeatedly that their drawings were not going to be graded, and that turning in their drawings was totally voluntary. Their discomfort gradually lessened, and after about a week some of the students began showing interest. A few even asked for more drawing time. Future studies might address such questions as: Was the student's initial panic reaction due to visual-motor impairment? Difficulty changing from routine activities? Fear of failure? Would other students in junior high have this reaction, or it is limited to students in remedial reading classes? Did the gains in reading comprehension scores of the present students who received drawing experience emanate from a gain in self-confidence through drawing?

Concluding Statement

Since remedial reading at the secondary level has generally yielded disappointing results, authorities in the reading field are beginning to focus their attention on the correlates of reading rather than relying solely on standard remedial reading practices (Spache, 1976a). The self concept and personal adjustment of low readers is one of the areas which is receiving attention. It is the researcher's

opinion that QR training holds good potential for helping the secondary students who dread coming to school because they cannot read the textbooks.

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APPENDIX

TABLE VIII
 MATCHING DESIGN: EXPERIMENTAL GROUP
 (QR) WITH CONTROL GROUP (DRAWING)

Pairs	Subject	Gender	Age	Score	Grade
Pair 1	E1	M	14-3	5.2	7
	C1	M	13-11	5.4	7
Pair 2	E2	M	13-4	2.7	7
	C2	M	13-1	3.3	7
Pair 3	E3	M	13-2	5.7	7
	C3	M	12-11	5.1	7
Pair 4	E4	M	13-7	3.3	7
	C4	M	13-11	3.1	7
Pair 5	E5	M	13-6	3.3	7
	C5	M	13-8	5.1	7
Pair 6	E6	F	12-7	5.7	7
	C6	F	12-8	3.3	7
Pair 7	E7	F	13-6	4.4	7
	C7	F	13-7	4.1	8
Pair 8	E8	F	14-4	4.2	7
	C8	F	14-2	4.8	8
Pair 9	E9	F	12-9	6.2	7
	C9	F	13-2	4.7	7
Pair 10	E10	M	13-8	6.9	8
	C10	M	13-5	7.2	8
Pair 11	E11	M	14-1	4.3	8
	C11	M	14-11	7.1	9
Pair 12	E12	M	13-7	7.6	8
	C12	M	13-3	5.6	7
Pair 13	E13	M	14-5	2.2	8
	C13	M	14-9	5.7	8
Pair 14	E14	M	14-7	3.0	8
	C14	M	15-4	4.7	9
Pair 15	E15	M	13-10	4.6	8
	C15	M	14-3	4.9	9
Pair 16	E16	F	13-10	5.9	8
	C16	F	13-10	3.7	8

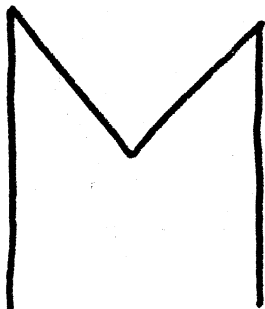
Age is expressed as years and months.

Score is total reading score, expressed as a grade equivalent, on the Gates McGinnitie Reading Test.

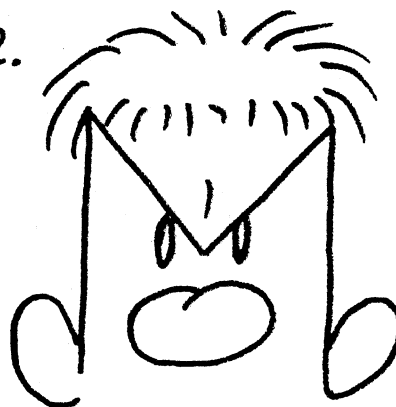
TABLE IX
AGE AND SCORE DIFFERENCES BY GROUP

Grade	Group	\bar{X} Age	Age Range	\bar{X} Age Diff.	\bar{X} Score	Score Range	X Score Diff.
7	Exp.	13.5	12-7 - 14-4	2.7 mos.	4.5	2.7 to 6.2	.9
	Cont.	13.5	12-8 - 14-2		4.3	3.1 to 5.4	
8	Exp.	14.0	13-7 - 14-7	3.7 mos.	4.9	2.2 to 7.6	1.8
	Cont.	14.2	13-3 - 15-4		5.5	3.7 to 7.4	

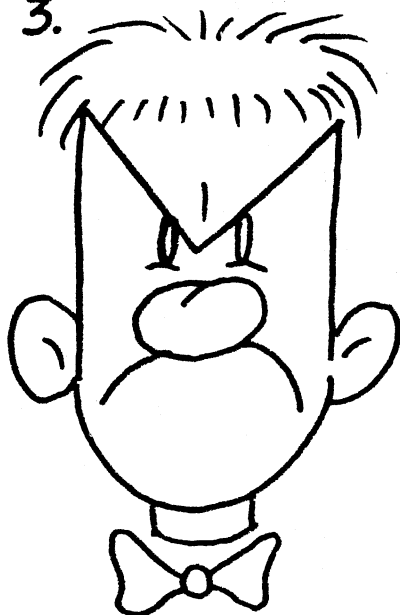
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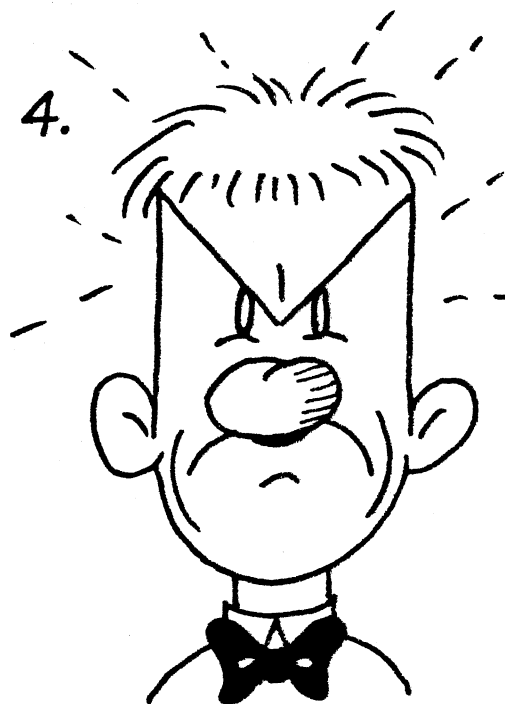
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3.



4.



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