

Running head: RELAXATION RESPONSE, RESTING, & ANXIETY

The Relaxation Response and Quiet Resting: Are They Comparably  
Efficacious in Reducing State and Trait Anxiety?

M.A. Thesis for Clinical Psychology

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Submitted as a Partial fulfilment of the Requirement for the  
Master of Arts Degree in Clinical Psychology at Lakehead University

Thunder Bay, Ontario

January 2000

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### Acknowledgements

I would like to thank my thesis advisor, Dr. Charles Netley, for his continual interest, support, and expert guidance during the two years it took to complete this study. His insight, encouragement, and knowledge were indispensable in this process. I would like to thank Dr. Josephine Tan for her useful comments and insights during the course of this project. I am indebted to all the subjects who volunteered to participate in this study. Finally, I would like to thank my wife, Sara, for having had patience and understanding during those long hours I spent researching, preparing, writing, and re-writing this manuscript over the past year.

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### Abstract

Anxiety is an essential but occasionally unpleasant emotional state or condition. At its extreme anxiety can be maladaptive particularly when its level is out of proportion to a threat, or when it occurs in the absence of threat. Investigators have conceptualized state anxiety as a transient emotional state, and trait anxiety as a relatively stable individual difference in anxiety-proneness. While research has suggested that meditation is effective in reducing physiological arousal as well as state and trait anxiety, some evidence suggests that resting may be the key component of meditation's effectiveness. The present study examined the effect of relaxation response meditation and a resting procedure on state and trait anxiety. Subjects were randomly assigned to one of three conditions: relaxation response meditation (RR), quiet resting control treatment (termed "periodic somatic inactivity" or PSI), or no-treatment waiting list control. It was hypothesized that, compared with subjects assigned to the waiting list, subjects assigned to the two treatment conditions would show significant and equal reductions in scores on state and trait anxiety. Results showed that after 6 weeks only PSI was effective in reducing state anxiety and that RR and PSI were not effective in reducing trait anxiety.

## The Relaxation Response and Quiet Resting: Are They Comparably Efficacious in Reducing State and Trait Anxiety?

Anxiety is an inescapable aspect of life and many individuals function under a continual cloud of anxiety created by life's stresses, upheavals, stages, and phases. Nevertheless, anxiety is an essential part of our internal signal system that alerts us to changes in our bodies and in the world around us. A degree of anxiety is experienced not only when things go wrong, but also when things are changed, unexpected, or novel (Shader & Greenblatt, 1994). However, anxiety can be an unpleasant emotional state or condition characterized by subjective feelings of tension, apprehension, nervousness, and worry, and by activation or arousal of the autonomic nervous system (Beck, Emery, & Greenberg, 1985; Spielberger, 1983). Numerous investigations of the effects of anxiety have indicated that it can reduce performance and contribute to ill health (Bandura, Cioffi, Taylor, & Brouillard, 1988; Baron, 1988; Lan & Gill, 1984; Wiedenfeld et al., 1990).

Individuals have much to be anxious about - health, social relationships, careers etc. - and being anxious about these aspects of life is normal, even adaptive. When a threat is external and real, anxiety and fear overlap considerably. In this context, anxiety can be seen as an exaggerated or excessive response to verifiable danger (Beck et al., 1985). It can also occur when an individual senses that his or her ability to take protective steps or effective action in the face of verifiable danger is blocked (Shader & Greenblatt, 1994). In these instances, anxiety is usually experienced as a dramatic, unpleasant emotional experience that often eclipses other components of an individual's response to a threat. Human beings are predisposed to experience anxiety in response to a threat and are strongly moved by the experience to take steps to reduce it and to prevent its recurrence (Beck et al., 1985).



Anxiety is generally considered a normal reaction if it is aroused by a realistic danger and if it dissipates when the danger is no longer present. If the degree of anxiety is greatly disproportionate to the risk and severity of possible danger, or if the anxiety continues in the absence of objective danger, then it is considered abnormal (Beck et al., 1985). In other words, anxiety is considered maladaptive when its level is out of proportion to a threat, or when it occurs in the absence of threat. Thus, the term “anxiety” is also used in reference to fearful emotional responses when the source of danger is largely unrecognizable, obscure, or unknown, or when the response is incongruous or inappropriate to objective reality.

### Psychiatric Aspects of Anxiety

Anxiety is pervasive in North American society and, at its extreme, it is manifested in psychiatric disorders. Anxiety disorders, either clinically syndromal or subsyndromal, are among the most common disorders seen in a primary care setting, and are among the most prevalent problems treated by mental health practitioners (Boulenger, Fournier, Rosales, & Lavallée, 1997; Kessler et al., 1994; Zajecka, 1997). Many studies suggest that anxiety and depression occur comorbidly (Abramson & Alloy, 1990; Angst, Merikangas, & Preisig, 1997; Boulenger & Lavallée, 1993; Boulenger et al., 1997; Fawcett, 1997; Stahl, 1993, 1997), and in clinical practice, patients frequently report anxiety as a problem that accompanies depression or as a problem that appears when the depression lifts (Beck, Rush, Shaw, & Emery, 1979). Although anxiety is a symptom in many psychiatric disorders, modern diagnostic systems specify that it occurs alone or is the primary symptom in anxiety disorders (Holmes, 1991; Merck Research Laboratories, 1992).

Symptoms of anxiety can be classified as affective, cognitive, somatic, and behavioral; however, according to the fourth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV; American Psychiatric Association [APA], 1994) the underlying commonality

among all the anxiety disorders is a period of intense fear and discomfort. Physiologically, the symptoms of anxiety are the direct manifestations of peripheral autonomic nervous system discharge often resulting from the arousal of frightening fantasies, impulses, and emotions (Kalat, 1997; Merck Research Laboratories, 1992; Sternberg & Gold, 1997). In the CNS, noradrenergic neurotransmitters play a prominent role in the production of anxiety as does the amino acid gamma amino butyric acid (GABA), and recent studies point to the locus coeruleus, with its widespread connecting neural pathways to the rest of the brain (Bloom, 1995; Lader, 1983; Merck Research Laboratories, 1992), and to the amygdala and hippocampus (Kalat, 1997; Kalin, 1997; Lader, 1983; LeDoux, 1997; Skolnick & Paul, 1983) as important mediating centres.

#### State and Trait Anxiety

Since the middle of this century, psychological research on anxiety has been simplified in two respects. First, conceptual advances have clarified anxiety as a theoretical construct; and second, a number of psychometric scales have been created for measuring anxiety (Spielberger, 1983). Until recent decades, maladaptive anxiety was primarily regarded as an expression of emotion (anxiety) that had burst out of control (Beck et al., 1985). It is reasonable to assume that the emphasis placed on the emotional components of anxiety came about because of the dramatic feelings that occur when an individual is anxious. Commenting about the preoccupation that researchers and clinicians have on the emotional component of anxiety, Beck et al. (1985) stated, "This emphasis on the feeling component has drawn the attention of psychiatrists and psychologists away from what may be central feature of anxiety disorders - namely, a person's preoccupation with danger and his responses to it" (p. 6).

Beginning in the 1950s and 1960s, methodological and theoretical advances in research on anxiety led to the psychometric conceptualization of anxiety as a transient emotional state (i.e.,

state anxiety), or as a stable individual difference in anxiety-proneness (i.e., trait anxiety). These concepts of state and trait anxiety were first introduced by Cattell (1966) and were elaborated by Spielberger (1972). Commenting on anxiety as a theoretical construct, Spielberger (1983) stated:

The term anxiety is currently used to refer to at least two related, yet logically quite different, constructs. Empirically, anxiety is perhaps most often used to describe an unpleasant emotional state or condition. Anxiety is also used to describe the relatively stable individual differences in anxiety-proneness as a personality trait. (p. 1)

From this standpoint emotional states exist “at a given moment in time and at a particular level of intensity”, and anxiety states are “characterized by subjective feelings of tension, apprehension, nervousness, and worry, and by activation or arousal of the autonomic nervous system” (Spielberger, 1983, p.1 ).

Spielberger (1983) further defined state anxiety as the emotional reaction or response evoked when a person perceives a particular situation as personally dangerous or frightening, despite the presence or absence of objective danger. Heightened autonomic nervous system activity is a component of the state anxiety response, together with unpleasant feelings and apprehensive thoughts. In contrast to the transitory nature of emotional states, personality traits can be conceptualized as “enduring differences among people in specifiable tendencies to perceive the world in a certain way and in dispositions to react or behave in a specified manner with predictable regularity” (Spielberger, 1983, p. 1). Trait anxiety may also reflect individual differences in the frequency and intensity with which anxiety states have been manifested in the past, and in the probability that state anxiety will be experienced in the future. The stronger the anxiety trait, the higher the probability that the individual will experience more intense elevations in state anxiety in a threatening situation (Spielberger, 1983).

### The Modification of Trait Anxiety

Since trait anxiety refers to differences among people in the tendency to perceive stressful situations as dangerous or threatening and to respond to such situations with elevations in the intensity of their state anxiety, a potentially effective means of reducing intense elevations in state anxiety would be to reduce the person's anxiety-proneness or trait anxiety. However, personality traits by definition are considered to be underlying, stable dispositions that account for consistencies in behaviour (Mischel, 1993). Hence, it is questionable whether they can be changed through any intervention. Theoretically, trait anxiety should be no easier to change than any other underlying disposition. However, evidence suggests that trait anxiety can be changed, at least temporarily, through meditation.

### Meditation

The term meditation refers to a variety of mental exercises that involve limiting thought and attention (Hjelle, 1974; Smith, 1975; West, 1979). These exercises vary widely but usually involve sitting still and counting breaths, attending to a repeated thought, and focusing awareness upon a single object, sound, concept, or experience (Benson, 1975, 1996; Hjelle, 1974; Smith, 1975; West, 1979). Pelletier (1992) stated, "When the incessant activity of the mind is stilled, the meditator experiences that aspect of his being which is prior to and distinct from attention itself" (p. 193). Before proceeding, it is important to dispel misconceptions that meditation is contemplation, rumination, or simply thinking about something. Nor should meditation be confused with prolonged, self-induced lethargy (Pelletier, 1992).

Historically, the goal of meditation was to join in a direct experiential knowledge of an absolute commonly referred to as God, Being, Unity, Brahma, or "The One" (Muller, 1995; Wallace, 1970; West, 1979). "The sages, devoted to meditation and concentration, have seen the

power belonging to God himself, hidden in its own qualities (guna). He, being one, superintends all those causes, time, self, and the rest” (Muller, 1995, p. 549). Various cultures and religions have advocated meditation as a method of attaining this goal for at least 2500 years (Noss & Noss, 1994; Prabhavananda & Isherwood, 1969; West, 1979). Ancient religious writings also indicate that meditation was conceptualized as a method of enhancing peace and serenity in the practitioner’s mind (Muller, 1995; Noss & Noss, 1994).

In contrast to the traditional religious or spiritual conceptualization of meditation, modern incarnations of the technique have evolved (e.g., Benson, 1975) and are understood as experiential exercises involving an individual’s attention, without needing to involve his or her belief systems or other cognitive processes. Regardless of the individual’s belief system, concentration is essential in all systems of meditation. The meditator learns to fix his attention firmly upon a given task for increasingly protracted periods of time.

In the last four decades meditation has been enthusiastically received in the United States and Europe by large numbers of people who view it as a method for overcoming the stresses of modern life and as a way of getting in “touch” with one’s self (Delmonte, 1983; Pelletier, 1992; Smith, 1976; West, 1979). Introduced to the Western world in 1959 by Maharishi Mahesh Yogi, Transcendental Meditation (TM) has become one of the most familiar of the meditative techniques (Eppley, Abrams, & Shear, 1989; Smith, 1976; West, 1979, 1980). It has gained popularity presumably because of its proponents’ claims that the technique is a natural and effective cure for mental illness (Mahesh Yogi, 1968). Unfortunately, tremendous enthusiasm for TM may have led to questionable conclusions about the technique’s effectiveness. Thus, sensational research results reported by the proponents of TM failed to receive the necessary critical examination until many years after the technique had become popularized (West, 1979, 1980).

It is partly because of such sensationalized anecdotal claims that investigators have focused attention on meditation as a psychotherapeutic agent (Holmes, Solomon, Cappo, & Greenberg, 1983; Eppley et al., 1989; Hjelle, 1974; Pearl & Carlozzi, 1994; Smith, 1976; Pelletier, 1992; Weinstein & Smith, 1992). Indeed, meditation has been used in the treatment of excessive anxiety within psychiatric units in both Europe and North America since the late seventies (West, 1979). To the casual observer, it may seem implausible that a simple mental exercise like meditation could have a beneficial effect on serious, stress-induced problems; however, there is an enormous volume of empirical evidence arguing for and/or documenting the efficacy of meditation as a psychotherapeutic technique for reducing anxiety (Holmes et al., 1983; Eppley et al., 1989; Fling, Thomas, & Gallaher, 1981; Pearl & Carlozzi, 1994; Pelletier, 1992; Smith, 1976; Weinstein & Smith, 1992; West, 1979, 1980).

#### Psychophysiological Correlates of Meditation

Certainly there is no lack of literature concerning the effects of meditation. Over 400 articles and studies have documented the psychophysiological changes that occur during meditative practice (Pelletier, 1992). Early research was conducted primarily with Zen masters and Indian Yogis who demonstrated marked degrees of autonomic nervous system (ANS) control. More recently, research has been conducted with Western meditators who practice TM (Pelletier, 1992). Since the early seventies, research has accumulated indicating that meditation does have a quiescent effect on the physiological correlates of stress and anxiety (Beary, Benson, & Klemchuk, 1974; Benson, 1975; Wallace, 1970; Wallace & Benson, 1972; Wallace, Benson, & Wilson, 1971). Early investigations of the physiological responses of meditating subjects found that meditation was effective in producing reductions in oxygen consumption, heart-rate, and blood lactate concentration, and increases in skin resistance and slow alpha wave activity (Beary,

et al., 1974; Wallace, 1970; Wallace & Benson, 1972; Wallace et al., 1971). Thus, meditators showed lower levels of physiological arousal during meditation than before meditation. From these data the authors concluded that meditation was a “wakeful hypometabolic physiologic state” (Wallace et al., 1971) that differed from the sleep state based on EEG indices, and lowered indices of physiological arousal (Beary et al., 1974; Wallace, 1970; Wallace & Benson, 1972; Wallace et al., 1971).

In contrast, other investigations have found that meditating subjects frequently exhibit EEG recordings of stage 1, 2, 3, and 4 sleep and spend as much as 42.5% of the first 20 minutes of meditation in sleep stages 2, 3, and 4, known as slow-wave or delta rhythms, a sign of decreased cerebral arousal; moreover, after they have finished meditating the majority of subjects report being asleep periodically while engaged in meditation (Pagano, Rose, Stivers, & Warrenburg, 1976; Younger, Adriance, & Berger, 1975). Subsequent research has generally shown that the decreases in arousal observed in meditation are not significantly different from decreases in arousal observed in other relaxation procedures, such as progressive muscle relaxation and hypnosis (Boswell & Murray, 1979; Fling et al., 1981; Goleman & Schwartz, 1976; Morse, Martin, Furst, & Dubin, 1977; Treichel, Clinch, and Cran, 1976; West, 1979, 1980). Moreover, as meditative techniques are practiced within a complex framework of expectation, philosophical beliefs, and social influence “the research thus has not generated an adequate scientific understanding of the specific independent variables and causal relationships that account for meditative phenomena” (Woolfolk, 1975, p.1333). In an extensive review of the literature West (1979) stated:

The evidence suggests, therefore, that there are decreases in arousal during meditation which do not appear to be significantly different from decreases in

arousal observed during other relaxing activities. There is some slight evidence which suggests that regular meditation practice produces decreases in arousal and arousability outside of meditation itself. Studies of the effect of meditation on scores from personality questionnaires give some support for this suggestion. (p. 460)

### Meditation and Personality States and Traits

A casual reading of the literature on the effects of meditation on personality would lead one to the conclusion that the practice of meditation is associated with decreases in neuroticism, depression, anxiety, and irritability (Delmonte, 1985; Hjelle, 1974; Kabat-Zinn et al., 1992; Pelletier, 1992; Smith, 1976; Throll, 1981; West, 1979, 1980). However, it must be recognized that much of the research on meditation is plagued by methodological problems (Eppley et al., 1989) making conclusions tenuous at best. In most past studies, the responses of the meditators were not compared to the responses of subjects who were engaged in some other restful activity; therefore, it cannot be concluded that meditation resulted in a “unique” level of arousal or a level of arousal that was lower than what subjects could achieve through quiet resting. Many investigations failed to include controls (Beary et al., 1974; Throll, 1981; Wallace, 1970; Wallace & Benson, 1972; Wallace et al., 1971; Weinstein & Smith, 1992), had high attrition rates (Smith, 1976), neglected to collect baseline measures and, consequently, could only compare post manipulation scores (Pearl & Carlozzi, 1994). In an extensive review of the literature, Eppley et al. (1989) concluded that much of the research on relaxation procedures is rendered questionable by the lack of an adequate control group, small sample sizes, high subject attrition rates, and inconsistency in meditation techniques. Fortunately, some investigators have recognized these methodological flaws and have attempted to remedy them through more careful methodological



designs (Boswell & Murray, 1979; Fling et al., 1981; Goleman & Schwartz, 1976; Holmes et al., 1983; Smith, 1976).

### Meditation and State-Trait Anxiety

In studies of the effects of meditation on state and trait anxiety, some investigators have found that meditation does not seem to reduce trait anxiety any more than simply resting or engaging in other relaxation techniques. The evidence supports the idea that a nonspecific component of the techniques is responsible for the therapeutic effects. However, we must be cautious in interpreting the results due to the methodological flaws mentioned above.

Smith (1976) compared TM to a placebo technique he labelled “Periodic Somatic Inactivity” (PSI, which involved sitting quietly) to a mantra technique modelled on TM, and to a procedure of thinking as many positive thoughts as possible. He found that subjects who meditated and subjects who engaged in PSI had equal reductions in trait anxiety; moreover, meditators and quiet sitters had significant reductions in trait anxiety when compared to a waiting-list control group. Commenting on these findings, Smith (1976) stated:

TM is no more effective in reducing trait anxiety than a parallel control treatment consisting of sitting without meditation. A treatment using a TM-like exercise is no more effective than a parallel control treatment using an exercise designed to be the near antithesis of meditation. These findings support the conclusion that the crucial therapeutic component of TM is not the TM exercise. (p. 635)

Smith speculated that a “nonmeditative” component may be responsible for TM’s therapeutic effect. According to Smith, the main difference between the techniques of TM and PSI was that TM involved the sustained voluntary regulation of attention, whereas PSI did not. “That these

groups did not differ suggests that the sustained voluntary regulation of attention is not a crucial therapeutic component of TM' (Smith, 1976, pp. 635-636).

Smith's (1976) conclusions seem reasonable but are confounded by the fact that the attrition rate among both the TM and PSI subjects was high, 59% and 53% respectively, while the no-treatment control group had an attrition rate of 13%. Moreover, random assignment of subjects in this study was confounded by the fact that 20% fewer subjects agreed to be in the wait-list control group. Another difficulty in interpreting Smith's results arises from the fact that the TM group practiced more regularly than the PSI group, and Smith adjusted the scores to account for this. Doing this may appear reasonable, but it is possible that the TM subjects' tendency to practice more frequently was an effect of the treatment as well as a cause of it. In other words, subjects may be less likely to engage in regular practice of a technique that they sense is ineffective in contrast to a treatment that is perceived as highly effective. Finally, evidence suggests that the PSI technique may have been similar to traditional forms of Zen and Soto Zen meditation (Eppley et al., 1989; Pelletier, 1992) whose instructions are quite similar to PSI. In these forms of meditation, the meditator is trained to place himself in a state of undistracted receptivity to external and internal stimuli (Pelletier, 1992)

In a similar study, Boswell and Murray (1979) studied the effects of mantra meditation, an anti-meditation technique designed to elicit the opposite effect of meditation, progressive relaxation, and a no-treatment control on state and trait anxiety. Results were obtained after a 2-week practice period. Overall, they found that post-test trait anxiety was significantly lower across all four groups when compared to pre-test scores. However, the investigators found no significant differences between the groups in state or trait anxiety. These findings failed to support the hypothesis that meditation is an effective method of reducing anxiety.

Fling et al. (1981) compared two forms of meditation, sitting, and two wait list control groups. The investigators found that trait anxiety decreased significantly in the two meditation groups, the quiet sitting group, and one of the waiting list control groups, and that decreases in trait anxiety approached significance in the second waiting list control group. Thus, subjects placed in both of the waiting list groups experienced considerable trait anxiety reductions. This contrasts significantly with Smith's (1976) study in which the control group did not exhibit reductions in their trait anxiety levels. Fling et al. (1981) concluded that expectancies of the meditators in the Smith (1976) study were probably exaggerated because "they used TM, which asserts 'conclusive proof' for its claims" (p. 789). Fling et al. speculated that the subjects' expectancy of benefit was attenuated in their study (compared to Smith's study) and that this attenuation may have been the factor that resulted in reductions in trait anxiety that did not differ significantly from the control group. Alternatively, there may have not been any attenuation in the treatment groups' expectancy of benefit, only a reduction in the waiting-list control group's trait anxiety that approached the magnitude of reductions experienced by the treatment groups.

Pearl and Carlozzi (1994) also reported significant reductions in trait anxiety among meditators when compared to waiting-list controls. They concluded that meditation does decrease trait anxiety, and stated that "These data confirm the common finding that meditation decreases anxiety..." (Pearl & Carlozzi, 1994, p. 298). Unfortunately Pearl and Carlozzi's (1994) conclusion is rendered dubious by the fact that subjects in this study were not pretested for baseline measures of anxiety (the authors compared only post manipulation scores), and that a resting-only comparison group was not used.

Other research has suggested that individuals who engaged in either meditation or progressive relaxation had significant reductions in anxiety, with no differences between the two

groups in final trait anxiety levels. That is, subjects who engaged in meditation or progressive relaxation had equal reductions in trait anxiety (Weinstein & Smith, 1992). In contrast, Zuroff and Schwarz (1978) found significant reductions in trait anxiety among meditators when compared to individuals practicing muscle relaxation and to subjects in a control group. However, these investigators used the S-R Inventory of Anxiousness (Endler, Hunt, & Rosenstein, 1962) while other investigators have used the State-Trait Anxiety Inventory (STAI; Spielberger, 1983) to measure trait anxiety.

In a similar study, Throll (1981) also found that meditators exhibited significant decreases in state and trait anxiety when compared to subjects who engaged in progressive muscle relaxation. Throll (1981) suggested that the more pronounced decreases found for meditators could be explained primarily in terms of the greater amount of time that meditators practiced their technique (4 hours per week) compared to subjects in the progressive muscle relaxation group (30-40 minutes per week). Unfortunately, the investigator failed to include a wait-list control group in this study rendering the results difficult to interpret.

Overall, the results of most investigations have generally failed to reveal reliable physiological or psychological differences between meditating and resting subjects, and are representative of a growing body of research that does not support the notion that meditation reduces anxiety above and beyond the nonspecific factors involved in other interventions (Boswell & Murray, 1979). The foregoing review of the literature suggests that meditation may not be objectively or subjectively different from sleep or resting, because no reliable or consistent differences between meditating and resting subjects have been found, and no consistent, significant differences between meditating subjects and subjects engaged in other forms of relaxation have been identified. Therefore, it cannot be concluded that meditation results in a unique or lower

level of physiological arousal or state-trait anxiety than is found in relaxation or resting groups. These findings are consistent with research suggesting that rest or sleep is the therapeutic component of meditation (Smith, 1976; Kindlon, 1983). Based on the preceding discussion, it appears that the meditation exercise as an intact entity is not essential for meditation's therapeutic effect on anxiety, and that some component common to all relaxation procedures is responsible for this anxiety-reducing effect.

In sum, research has suggested that the use of meditation can lead to reductions in state and trait anxiety. Unfortunately, methodological flaws characterize many of the studies of meditation (Eppley et al., 1989), and it is unclear whether benefits are the result of the procedure per se, or from some common (i.e., nonspecific) thread that runs through all relaxation procedures. There is evidence that meditation is not qualitatively different from sleep or resting (Smith, 1976) and that the therapeutic benefit of the technique is due to this qualitative similarity (Kindlon, 1983). Many studies indicate that simply resting quietly or engaging in other relaxation procedures are equally effective in reducing state and trait anxiety (Kindlon, 1983; Smith, 1976; Weinstein & Smith, 1992).

### TM and The Relaxation Response

Much of the research carried out on meditation has concentrated on TM, mainly because of the availability of TM meditators and also because people who learn TM are taught in the same way (West, 1979). Unfortunately, during the process of learning TM individuals are subjected to a variety of demand characteristics, e.g., preconceptions and expectations (Eppley et al., 1989; West, 1979), making the interpretation of research results difficult. First, throughout the process of learning TM, the individual's expectation of benefits is exaggerated (see Smith, 1976; West, 1979). Second, considerable social pressures are placed upon the individual to experience and

report benefits (West, 1979). Third, payment of a large fee to the instructor most likely deters individuals from believing that they have gained nothing over the course of learning and using TM (West, 1979). Fourth, subjects have a predisposition to change anyway (hence a desire to change may lead one to learn TM), and there is the danger that he or she will view the experiment as an opportunity to prove that meditation works (West, 1979). Fifth, the demand characteristics of meditation experiments are often explicit; the aim of the experiment is obviously to discover the effects of meditation (West, 1979, 1980). Sixth, an effect attributable to the TM trainers may exist. For example, Eppley et al. (1989) found a significant correlation between effect size and the number of follow-up hours TM trainers provided.

In response to these problems psychiatrists and psychologists have developed “noncultic” techniques of meditation, which supposedly reduce placebo and expectancy effects (Benson, 1975; Lehrer, Schoickett, Carrington, & Woolfolk, 1980). It is unlikely that these problems can be overcome entirely; however, at least two possible advantages to using noncultic meditative techniques in research exist. First, they have been specifically developed to be easier for subjects to learn; second, the nonreligious overtones may make the techniques more acceptable to individuals with traditional western religious beliefs.

One noncultic alternative to TM that has become popular in the last two decades is Benson’s (1975) Relaxation Response. According to Benson (1975), the Relaxation Response is a physiologic response that is diametrically opposed to the fight-or-flight response, which is considered to be an innate autonomic response to stressful stimuli (Selye, 1956; Kalin, 1997). Benson (1975) stated that:

Each of us possesses a natural and innate protective mechanism against “overstress,” which allows us to turn off harmful bodily effects, to counter the effects of the fight-or

flight response. This response against “overstress” brings on bodily changes that decrease heart rate, lower metabolism, decrease the rate of breathing, and bring the body back into what is probably a healthier balance. This is the Relaxation Response. (p. 25-26)

Benson (1975) regarded the Relaxation Response not merely as a technique for eliciting relaxation but as an innate psychophysiological response that occurs during the practice of all relaxation procedures.

According to Benson (1975) there are four basic components common to meditative techniques that succeed in eliciting the Relaxation Response: (1) a quiet, calm environment with few distractions; (2) a constant mental device or stimulus (e.g., a sound, word, or phrase repeated silently or aloud, or fixed gazing on an object); (3) a passive attitude aimed at disregarding distracting thoughts; (4) a comfortable position to prevent any undue muscular tension. One of the greatest advantages of the Relaxation Response form of meditation is that it is simple and easy to learn and that it produces the same physiologic changes (i.e., heart-rate, blood pressure, EEG changes) noted during TM (Benson, 1975). The Relaxation Response technique has been used successfully as a method of mild anxiety reduction by the present author on a limited sample of clients on an individual basis.

A number of investigators (Fling, Thomas, & Gallaher, 1981; Holmes et al., 1983; Lehrer, Woolfolk, Rooney, McCann, & Carrington, 1983; Smith, 1976; Throll, 1981; Zuroff & Schwarz, 1978) have attempted to eliminate demand conditions in both TM and alternate meditation and/or relaxation treatments. Recall that Smith (1976) found that TM and PSI produced larger reductions in trait anxiety than a mantra technique modelled on TM, and to a procedure of thinking as many positive thoughts as possible. He concluded that the difference was probably due to expectations because TM and PSI had more elaborate rationales. Unfortunately Smith’s (1976)

study, though well designed, suffered from methodological problems discussed above, so its conclusions are difficult to interpret unambiguously.

This leads to another overlooked aspect of the effect of meditation on state and trait anxiety: the individual's expectancy of benefit. Few studies have evaluated the individual's subjective expectancies of benefit before engaging in a relaxation experiment and how these expectancies may predict outcomes (Eppley et al., 1989). Investigations in social psychology have shown that if the expectancy of benefit due to a procedure is high, then the probability that the procedure will produce a positive effect increases (Bandura, 1983; Prentice-Dunn & Jacobs, 1986). This may be explained by research showing that an individual's desirability of an outcome contributes to the individual's ability to perform a task well (Prentice-Dunn & Jacobs, 1986). In other words, behaviours perceived to be effective in obtaining a positive outcome are learned and performed more effectively and contribute to that positive outcome. Therefore, the higher the perceived level of benefit from the relaxation procedure (high expectancy of benefit), then the greater the likelihood that the person will engage in the requisite behaviour. This, in turn, leads to high self-efficacy and a greater likelihood that he or she will report a reduction in anxiety.

Investigations have shown that exposure to stressful stimuli with a concomitant ability to control them reduces the adverse effect of such stimuli (Wiedefeld et al., 1990); however, exposure to the same stressful stimuli without the ability to control them activates a variety of complicating physiological processes (Bandura et al., 1988; Wiedefeld et al., 1990). When individuals learn successful relaxation strategies, the successful outcome should elicit increased levels of perceived self-control and self-efficacy. Overall, individuals with higher self-efficacy expectancies have lower arousal levels and usually perform well, especially on complex or fear-inducing tasks (Bandura, 1983). Therefore, considering that state anxiety is characterized by



heightened autonomic nervous system activity, unpleasant feelings, and apprehensive thoughts, it is reasonable to assume that a highly efficacious person may be better able to willfully distract attention away from threatening physiological sensations and negative thoughts.

One of the most unambiguous tests of the effect of expectations on the relative benefit of relaxation techniques is to manipulate them experimentally while keeping other factors constant (Eppley et al., 1989). In studies where investigators have attempted this by presenting sophisticated rationales and impressive benefits of the relaxation techniques, no significant differences on state and/or trait anxiety have been found, even when the manipulation was verified as being successful (Eppley et al., 1989). These findings appear to conflict with the common belief that expectancies can produce large effects. In studies on trait anxiety, the measurements were obtained weeks or months after the initial expectancy manipulation, but evidence suggests that the effects of expectancy manipulations are not cumulative or long-lasting (Eppley et al., 1989), and that expectations with respect to meditation tend to decrease over time (Zuroff & Schwarz, 1978). The relationship between high expectancy of benefit and state-trait anxiety will be further examined in this study.

The effects of the frequency and duration of meditation practice sessions have been seldom evaluated in past studies. Fling et al. (1981) found that relaxation procedure practice time correlated significantly with trait anxiety reduction ( $r = .27, p < .05$ ). Similarly, Throll (1981) concluded that greater frequency of practice in meditators yielded greater overall reductions in trait anxiety when compared to subjects practicing progressive relaxation. In general, TM subjects do appear to practice more regularly (Eppley et al., 1989). Presumably frequent, regular practice of a relaxation procedure like meditation should yield greater reductions in anxiety than

infrequent, irregular practice. The relationship between frequency and duration of practice and state-trait anxiety will be further examined in this study.

Several conclusions can be drawn from the above discussion. First, much of the research on meditation is plagued by methodological problems and results have been tenuous at best. Second, despite the popularity of meditation, evidence suggests that meditation may be no more effective than other relaxation procedures or resting in reducing physiological arousal and state-trait anxiety. Some studies have shown that meditation seems to have a beneficial effect on physiological arousal and on state-trait anxiety. Nevertheless, it is unclear if this anxiolytic effect is due to some unique property of meditation or if this effect is due to a nonspecific component common to all relaxation procedures (i.e., resting). Third, studies of meditation on anxiety have neglected to measure subjects' expectation of benefit and how this expectation affects outcome measures. Fourth, frequency and duration of meditative practice have not been included as predictors of outcome measures.

### Present Study

The following research was conducted with the purpose of eliminating methodological problems that have plagued past research on meditation, and determining whether regular practice of either a quiet resting procedure or a simplified form of meditation would produce equal reductions in subjects' self-reported state and trait anxiety. The present study seeks to determine if (1) resting is the nonspecific component through which meditation exerts its therapeutic effect on state-trait anxiety, (2) subjects' expectancy of benefit can predict changes in state-trait anxiety, and (3) frequency and duration of practice can predict changes in state-trait anxiety.

The design involves comparisons among two relaxation procedures and a control group: (1) Benson's (1975) Relaxation Response (RR), (2) a procedure based on Smith's (1976) PSI

technique, and (3) a waiting list control group. Subjects in the two treatment groups were required to monitor their frequency of practice and subjective anxiety level prior to and following each session. It was hypothesized that: (a) RR and PSI would significantly reduce state and trait anxiety scores on the State Trait Anxiety Inventory (STAI; Spielberger, 1983) compared with waiting list controls; (b) high expectancy of benefit in both RR and PSI conditions would contribute to greater reductions in state and trait anxiety; (c) greater frequency per week of relaxation practice would be significantly correlated (negatively) with state and trait anxiety change scores; (d) greater amount of time per session that subjects spend engaged in either relaxation procedure would be significantly correlated (negatively) with state and trait anxiety change scores.

### Method

#### Subjects

Subjects were recruited by presenting details of the study to students enrolled in introductory psychology classes at Lakehead University (LU). The final sample was composed of 11 male and 15 female undergraduates, ranging in age from 19 - 41 years.

#### Procedure

The author met with each class, informing them that the study involved an investigation of the effects of relaxation techniques on anxiety and worry. Upon completion of the presentation, the author circulated a sign-up sheet and invited interested individuals to sign up for one of three information sessions scheduled for the following week. Three separate times were made available to accommodate all interested subjects. Forty-five individuals signed up for the information sessions. Confirmation of each subject's interest and willingness to participate was made by telephone the day before their scheduled sessions.

During the information sessions the author explained that the study involved three phases: Phase one required that subjects be (1) pretested for state and trait anxiety and personal information relevant to the study (e.g., experience with, and current use of, relaxation procedures; frequency of use, etc.); (2) given general instructions in one of two relaxation techniques or be placed on a waiting list; and (3) tested for their level of confidence that the technique would be beneficial in helping them reduce their stress level (expectancy of benefit). Phase two required the subjects to carry out the relaxation procedure at least once per day for three days a week over a six-week period. Subjects were informed that during the six-week period they would also be required to monitor their pre-relaxation and post-relaxation levels of subjective anxiety before and after each session, respectively. Phase three required the subjects to return for post-testing of state and trait anxiety. Subjects placed on the waiting list were given the opportunity to learn a relaxation technique after completion of the study. Finally, subjects were informed that participation in all three phases of the study would be mandatory for receipt of course credit. As an added incentive, the experimenter informed subjects that they would have a chance at a \$50.00 cash prize to be drawn upon completion of all three phases of the study.

Subjects who agreed to participate based on the procedure outlined above were randomly assigned by blocks to one of three groups: RR, PSI, or no-treatment control-group. Subjects were given a consent form to fill out before the beginning of the session (Appendix G). Upon its completion, the author gave individual instruction in the relaxation techniques to each subject according to their assignment. Once instructions were given, subjects were given the STAI and the questionnaire of demographics and the past and present use of a relaxation technique. Following the instruction period and assessment, each subject was given an envelope that contained a protocol for instructions in one of the relaxation techniques (Appendix H and

Appendix I), procedures of the study (Appendix J), and the RPL (Appendix C). Subjects assigned to the No-Treatment waiting-list control group were given instructions relevant to that condition (Appendix K). At the end of five weeks, the author contacted subjects by telephone to schedule them for one of the post-test assessment sessions. During these sessions the RPLs were collected and subjects were given the STAI again. Those who were placed in the waiting-list control group were given the opportunity to learn a relaxation technique. Subjects were reminded of the \$50.00 cash draw and were given a receipt for three course credits for participating in the three phases of the study.

### Measurement Instruments

Questionnaire of Subject Demographics (QSD). The QSD was used to obtain measures of subject demographics including age, sex, educational attainment, occupation, and academic interest (see Appendix A). A section was included that dealt with the subject's previous use of a relaxation procedure, the type of procedure used, whether the procedure was helpful, present use of the procedure, and frequency of use. The questionnaire also included a Confidence Rating Scale [CRS; adapted from Lust, Celuch, and Showers (1993)]. The CRS is a measure of an individual's expectancy of benefit. In other words, the CRS measures how confident a subject feels that a relaxation procedure will be helpful. It has anchor points of "0" and "10," describing states of no confidence and total confidence, respectively.

State Trait Anxiety Inventory (STAI Form Y-1 and Y-2; Spielberger, 1983). The STAI (see Appendix B) has been used extensively in research and clinical practice. It comprises separate self-report scales for measuring state and trait anxiety. The state anxiety scale consists of 20 statements that evaluate how respondents feel "right now, at this moment." Consistent with the definition of state anxiety given above, the scale evaluates feelings of apprehension, tension,

nervousness, and worry. The trait anxiety scale consists of 20 statements that assess how people generally feel. It has been used as a screening device for anxiety problems and for evaluating the immediate and long-term outcome of psychotherapy, counselling, behaviour modification, and drug treatment programs. This measure represented the index of self-reported anxiety.

Relaxation Practice Log (RPL; adapted from Sank & Shaffer, 1984). The RPL is a chart designed to allow subjects to monitor their daily progress while using either of the relaxation techniques (see Appendix C). It includes sections to monitor the amount of time in minutes per session that subjects practice the relaxation technique, whether they experienced any difficulties during the session, and a Subjective Units of Discomfort Scale.

Subjective Units of Discomfort Scale (SUDS; Wolpe & Lazarus, 1966). The SUDS is a measure of how calm or anxious an individual feels at any particular moment in time. It serves as a means of developing a common language with which to assist individuals in communicating about personal levels of tension. Subjects are asked to visualize an equal interval scale with 10 points. Like the CRS, this scale has anchor points of "0" and "10," describing states of total relaxation and total tension respectively (For some, the first point is equivalent to being sufficiently relaxed to fall asleep).

### Treatments

Relaxation Response (RR) Subjects assigned to the RR group were instructed by the author using the procedure outlined by Benson (1975). They were given a brief background detailing the hypothalamic pituitary adrenal (HPA) axis stress response and its effects on the body, the opposite and incompatible response elicited by the RR, and the procedure most conducive to eliciting the RR. This included instructions on posture, breathing, a mental device to focus on while breathing, and methods to deal with anxiety evoking thoughts (see Appendix D). Subjects

were instructed to practice the RR at least once a day for three days per week with sessions lasting 20 minutes, while rating their subjective arousal level before and after each session using the SUDS. They were also instructed to note any problems during their sessions and how long they engaged in the procedure in the space provided on the RPL.

Periodic Somatic Inactivity (PSI) Subjects assigned to the PSI group were instructed by the author using the procedure outline by Smith (1976). They were given a brief background detailing the hypothalamic pituitary adrenal (HPA) axis stress response and its effects on the body, the opposite, incompatible response elicited by PSI, and the procedure for engaging in PSI. This included instructions on posture, breathing, a mental device to focus on while breathing, and methods to deal with anxiety evoking thoughts (see Appendix E). Subjects were instructed to practice PSI at least once a day for three days per week with sessions lasting 20 minutes, while rating their subjective arousal level before and after each session using the SUDS. They were also instructed to note any problems during their sessions and how long they engaged in the procedure in the space provided on the RPL.

Waiting-List Group Participants in the waiting-list group were given a protocol that explained that they were placed on a wait-list for the duration of the six-week study. It also advised them that they would be contacted by telephone after five weeks had elapsed to schedule a session for additional testing (see Appendix F). Upon completion of post-test measures, individuals in this group were informed of the nature of the study and were given the option of learning either of the relaxation procedures.

## Results

Eight RR, eight PSI, and seven control subjects reported for post testing. This represents an attrition rate of 11% for RR, 11% for PSI, and 12.5% for no-treatment controls. Demographic makeup of subjects is presented in Table 1. Pretest and post-test means and standard deviations of state and trait anxiety for RR, PSI, and no treatment groups are presented in Table 2.

Results of evaluation of the assumptions of normality of sampling distributions, linearity, and homogeneity of variance were satisfactory. One way Analyses of Covariance (ANCOVAs) were performed on all post-test outcome measures using the respective pretest scores as covariates. Significant effects were followed up with post-hoc Tukey tests to determine significant pairwise mean differences. Analyses were performed by SPSS version 8.0 for Windows 95.

### State Anxiety

An ANCOVA comparing post-test state anxiety scores for RR, PSI, and No-Treatment revealed significant between groups differences on state anxiety,  $F(2, 19) = 4.62, p < .05$ . This analysis is presented in Table 3. Means involved in the analysis are presented in table 4. Post-hoc Tukey's HSD tests ( $p < .05$ ) indicated that there was a significant difference between the PSI group ( $M = 30.75, SD = 6.16$ ) and the No-Treatment Group ( $M = 37.00, SD = 4.28$ ). The mean difference between the RR group and the No-Treatment Control Group was not significant, nor was the mean difference between the RR and PSI groups. The strength of association between the main effect and the DV scores was computed. According to Howell (1997) a relatively unbiased estimate of the magnitude of experimental effect is omega-squared. The magnitude of experimental effect using this statistic yielded  $\omega^2 = .28$ . Thus, 28% of the variance in the adjusted post-test state anxiety scores was associated with treatment.



Table 1

Demographic Makeup of Subjects by Group

		Treatment Group		
		RR	PSI	Control
Gender	female	6	4	3
	male	2	4	4
Age in Years	<u>M</u>	21.13	19.88	22.14
	<u>SD</u>	3.76	1.13	4.67
Education Level in Years	<u>M</u>	14.63	14.00	15.00
	<u>SD</u>	1.19	1.21	1.53
Previously Used Relaxation?	Yes	3	2	3
	No	5	6	4
Relaxation Type	Meditation	2	1	1
	Other	1	1	2
	None	5	6	4

Table 2

Pre-Test and Post-Test Means and Standard Deviations of STAI State and Trait AnxietyScores for RR, PSI, and No Treatment Groups

		Treatment Group		
		RR	PSI	No Treatment
Pre-Test State Anxiety	<u>M</u>	37.44	32.78	38.50
	<u>SD</u>	6.31	6.10	13.72
Post-Test State Anxiety	<u>M</u>	34.38	30.75	37.00
	<u>SD</u>	5.18	6.16	4.28
Pre-Test Trait Anxiety	<u>M</u>	37.22	35.11	39.13
	<u>SD</u>	4.89	9.48	9.75
Post-Test Trait Anxiety	<u>M</u>	37.62	33.63	36.14
	<u>SD</u>	5.37	9.77	8.97

Note. RR = Relaxation Response; PSI = Periodic Somatic Inactivity

Table 3

Univariate Analyses of Covariance Comparing Post-Test State Anxiety Scores for RR, PSI, and No-Treatment Groups

Source	<u>df</u>	<u>F</u>
Pre-Test State Anxiety	1	36.73***
Treatment Group	2	4.62*
Within-Group error	19	

\*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$

Table 4

Regressed Change Means and Standard Deviations of STAI State and Trait Anxiety Scores for RR, PSI, and No Treatment Groups

		Treatment Group		
		RR	PSI	No Treatment
State Anxiety	<u>M</u>	-.82	-1.80	2.96
	<u>SD</u>	1.97	2.07	4.75
TraitAnxiety	<u>M</u>	.91	-.20	-.87
	<u>SD</u>	1.31	2.88	5.56

### Trait Anxiety

This analysis indicated no significant between-group differences on post-test trait anxiety. The means involved in this analysis are presented in Table 4.

### CRS

To test whether expectancy of benefit was associated with greater decreases in post-relaxation state and trait anxiety, two separate ANCOVAs comparing post-test state and trait anxiety scores for RR and PSI with their respective pre-test scores and CRS scores as covariates were performed. These analyses indicated no significant between-group differences on state or trait anxiety.

### SUDS

SUDS scores were obtained from the two treatment groups to determine the relative benefit of the relaxation procedures on self-reported arousal levels prior-to and after engaging in either of the techniques. It should be noted that these data cannot be interpreted in the traditional sense because there was no control group included in the acquisition of SUDS scores. SUDS scores were obtained only from subjects in the treatment groups. No formal hypotheses were made regarding the pattern of findings, but it was expected that, as with state and trait anxiety, there would be no significant group differences in SUDS scores.

An ANCOVA comparing post-relaxation SUDS scores for RR and PSI with pre-relaxation SUDS used as a covariate revealed significant between group differences,  $F(1, 105) = 14.74, p < .01$ . Means and standard deviations used in this analysis are presented in Table 5. Mean SUDS scores of the RR group decreased significantly more than that of the PSI group over the course of the study. More specifically, the RR group showed greater decreases in SUDS scores ( $\underline{M} = -1.35, \underline{SD} = 1.49$ ) from the beginning of practice sessions to the end,

Table 5

Regressed Change Means and Standard Deviations of SUDS for RR and PSI Groups

	Treatment Group					
	RR			PSI		
	<u>M</u>	<u>SD</u>	<u>n</u>	<u>M</u>	<u>SD</u>	<u>n</u>
SUDS	-1.35	1.49	8	.27	1.72	8

Note. RR = Relaxation Response; PSI = Periodic Somatic Inactivity; SUDS = Subjective Units of Discomfort Scale.

while the PSI group showed smaller decreases in SUDS scores ( $\underline{M} = .27$ ,  $\underline{SD} = 1.72$ ).

To determine whether practice of the relaxation techniques over the six week period was associated with decreases in subjective arousal (i.e., SUDS), a 6 (weeks) x 2 (RR, PSI) ANCOVA for repeated measures was conducted on the post-relaxation SUDS scores with the pre-relaxation SUDS scores used as a covariate. This analysis revealed no significant main effect or interaction. It appears that there was no practice effect of the relaxation procedures.

### Reported Difficulties

Subjects in the RR group reported experiencing difficulties while using the technique 33.3% of the time, while subjects in the PSI group reported experiencing difficulties 48.9% of the time. A Mann-Whitney Test revealed that there were no significant differences between the groups in reported difficulties. Means and standard deviations data are presented in Table 6. To test whether there was a significant difference in SUDS scores between subjects who reported difficulties using the relaxation techniques to those who reported no difficulties, a 2 (Subjects Reporting Difficulties, Subjects Reporting no Difficulties) x 2 (RR, PSI) ANCOVA on post-test SUDS scores with pretest SUDS scores as a covariate was performed. Means and standard deviations used in this analysis are presented in Table 7. This analysis revealed a significant main effect of Treatment Group,  $\underline{F}(1, 103) = 9.52$ ,  $\underline{p} < .01$ . Subjects in the RR group reported significant reductions in SUDS scores ( $\underline{M} = -1.36$ ,  $\underline{SD} = 1.49$ ) when compared to subjects in the PSI group ( $\underline{M} = 0.27$ ,  $\underline{SD} = 1.72$ ). There was also a main effect of difficulties,  $\underline{F}(1, 103) = 4.27$ ,  $\underline{p} = .041$ . Subjects who reported having no difficulties with the relaxation procedures had greater reductions in their SUDS scores ( $\underline{M} = -0.10$ ,  $\underline{SD} = 2.10$ ) when compared to subjects who reported having difficulties ( $\underline{M} = 0.12$ ,  $\underline{SD} = 1.35$ ). This analysis also revealed a significant interaction between difficulties and treatment groups,  $\underline{F}(1, 103) = 7.81$ ,  $\underline{p} < .01$ . Subjects in the

Table 6

Means and Standard Deviations for Mean Reported Difficulties Per Session and Duration of Relaxation Sessions by Treatment Group

Treatment Group		Mean Reported Difficulties	Duration of Sessions (Minutes)
RR	<u>M</u>	1.33	10.06
	<u>SD</u>	0.49	4.40
PSI	<u>M</u>	1.50	18.47
	<u>SD</u>	0.50	3.75

Note. RR = Relaxation Response; PSI = Periodic Somatic Inactivity



Table 7

Regressed Change Means and Standard Deviations of SUDS for RR and PSI Groups byReported Difficulties

Treatment Group	Reported Difficulties		SUDS
RR	No	<u>M</u>	-2.03
		<u>SD</u>	1.23
	Yes	<u>M</u>	-0.01
		<u>SD</u>	0.94
	Total	<u>M</u>	-1.36
		<u>SD</u>	1.49
PSI	No	<u>M</u>	0.40
		<u>SD</u>	1.98
	Yes	<u>M</u>	0.13
		<u>SD</u>	1.40
	Total	<u>M</u>	0.27
		<u>SD</u>	1.72

Note. RR = Relaxation Response; PSI = Periodic Somatic Inactivity; SUDS = Subjective Units of Discomfort Scale.

RR group who reported no difficulties had greater reductions in SUDS scores ( $\underline{M} = -2.03$ ,  $\underline{SD} = 1.23$ ) when compared to subjects in the RR group who reported difficulties ( $\underline{M} = -0.01$ ,  $\underline{SD} = 0.94$ ), subjects in the PSI group who reported no difficulties ( $\underline{M} = 0.40$ ,  $\underline{SD} = 1.98$ ), and subjects in the PSI group who reported difficulties ( $\underline{M} = 0.13$ ,  $\underline{SD} = 1.40$ ).

### Duration of Practice Sessions

A oneway ANOVA revealed no significant difference between the groups in terms of weekly frequency of practice. An ANOVA revealed that the mean duration of relaxation sessions differed significantly between the two treatment groups,  $\underline{F} (1, 14) = 16.78$ ,  $\underline{p} < .01$ . The PSI group spent more time per session relaxing ( $\underline{M} = 17.34$ ,  $\underline{SD} = 2.32$ ), compared to the RR group ( $\underline{M} = 12.30$ ,  $\underline{SD} = 2.59$ ).

To test whether greater duration of practice was associated with greater decreases in post-relaxation SUDS, an ANCOVA comparing post-relaxation SUDS scores for RR and PSI with pre-relaxation SUDS and duration of practice as covariates was performed. This analysis revealed significant between group differences,  $\underline{F} (1, 105) = 9.00$ ,  $\underline{p} < .01$ .

### Correlational Analysis

Table 8 presents correlations between state anxiety change scores, trait anxiety change scores, CRS scores, previous use of relaxation techniques, pre-test state and trait anxiety, duration of relaxation sessions, and weekly frequency of sessions for all subjects. The relationship between CRS scores and state anxiety change scores was not significant, nor was the relationship between CRS scores and trait anxiety change scores. CRS scores were significantly correlated with pretest state anxiety scores ( $\underline{r} = -.40$ ,  $\underline{p} < .05$ ), and the latter, in turn, were significantly correlated with state anxiety change scores ( $\underline{r} = -.50$ ,  $\underline{p} < .05$ ). A multiple regression analysis was

Table 8

Intercorrelations Between Pre-Test State and Trait Anxiety Scores, State and Trait Anxiety Change Scores, CRS scores, Previous Use of a Relaxation Procedure, Weekly Frequency of Sessions, and Duration of Sessions (N =23)

Variable	1	2	3	4	5	6	7
1. Pre-Test SA Scores							
2. Pre-Test TA Scores	.82**						
3. SA Change Scores	-.48*	-.32					
4. TA Change Scores	-.22	-.25	.32				
5. CRS Scores	-.19	-.36	-.11	-.18			
6. PURP	.01	.03	.55**	.23	.13		
7. Frequency	-.03	-.11	-.58**	.19	-.02	-.09	
8. Duration	.00	-.04	-.53**	.09	-.09	-.02	.92**

Note. SA= State Anxiety; TA= Trait Anxiety; CRS = Confidence Rating Scale; PURP = Previous Use of a Relaxation Procedure.

\*  $p < .05$ . \*\*  $p < .01$ .

performed to partial out the contribution of CRS Scores after controlling for pretest state anxiety. This analysis revealed that CRS scores did not predict a significant amount of the variance in state-anxiety change scores when pretest state anxiety scores were held constant.

Weekly frequency of relaxation practice was significantly correlated with state anxiety change scores ( $r = -.58, p < .01$ ). Duration in minutes spent engaged in the relaxation procedure was significantly correlated with state anxiety change scores ( $r = -.53, p < .05$ ).

Previous use of a relaxation procedure was significantly correlated with state anxiety change scores ( $r = -.55, p < .01$ ). A subject's previous experience with a relaxation procedure is often an exclusionary criterion in relaxation studies; however, because of the small sample size, subjects reporting previous, but not concurrent, use of a relaxation procedure were not excluded. In order to evaluate the contribution of this variable to state anxiety change, a stepwise regression analysis was performed using state anxiety change scores as the criterion variable. The rationale for this analysis was twofold: (1) to evaluate the relative contribution of research variables to state anxiety change scores and (2) to avoid misleading conclusions from interpreting, as unique variance, the correlations of these variables with state-anxiety change scores. This analysis was intended to evaluate what, if any, additional variance over and above CRS scores, frequency of relaxation sessions, and duration of sessions that previous experience with a relaxation technique accounted for in state-anxiety change scores. The analysis proceeded as follows: (1) the previous experience with a relaxation technique variable was forced in on the first step, (2) the remaining three variables were also forced in stepwise with the order determined by the highest F-to-enter value at that step, and (3) no variable was removed from the analysis once entered, i.e., forward stepwise procedure. Table 9 displays  $\Delta R^2$ , Adjusted  $\Delta R^2$ , and  $\Delta R^2$  Change after entry of all four IVs. At step 1, with previous use of a relaxation procedure in the equation,

Table 9

Stepwise Regression of State Anxiety Change Scores on Previous Use of Relaxation, CRS Scores, Frequency of Sessions, and Duration of Sessions (N = 22)

Step	Variable	<u>pr</u>	<u>R</u> <sup>2</sup>	Adjusted <u>R</u> <sup>2</sup>	<u>R</u> <sup>2</sup> Change
1.	Previous Use of Relaxation	.48*	.23	.20	.23*
2.	CRS Scores	-.11	.26	.18	.03
3.	Frequency of Sessions	-.51**	.51	.43	.25**
4.	Duration of Sessions	-.45*	.51	.40	.00

Note. pr = Partial Correlation; CRS = Confidence Rating Scale

\*  $p < .05$ , \*\* $p < .01$

$R^2$  Change = .23,  $F(1, 20) = 6.07$ ,  $p < .05$ . At step 2, addition of CRS scores to the equation did not reliably improve the prediction of state anxiety change scores. At step 3, with weekly frequency of practice added to the prediction of previous use of a relaxation procedure and CRS scores,  $R^2$  Change = .25,  $F(1, 18) = 9.11$ ,  $p < .01$ . Addition of weekly frequency of practice to the equation with previous use and CRS scores resulted in a significant increment in  $R^2$ . At step 4, duration of practice did not reliably improve the prediction of state anxiety change scores.

An identical stepwise procedure was performed on trait anxiety change scores. Table 10 displays  $p$ ,  $R^2$ , Adjusted  $R^2$ , and  $R^2$  Change after entry of all four IVs. None of the variables predicted a significant amount of the variance in trait anxiety change scores. In short, it appears that previous use of a relaxation procedure, CRS scores, weekly frequency of practice, and duration of practice do not predict trait anxiety change scores.

### Discussion

The present study failed to support the hypothesis that subjects who engage in either RR meditation or a parallel control treatment termed PSI would show equal reductions in state and trait anxiety. There were no significant differences between the PSI and RR groups on post-test state anxiety, and only subjects in the PSI group showed significant reductions in state anxiety compared to controls at post-test. No group showed significant changes from pre to post-test trait anxiety. These findings do not support the hypothesis that both the PSI and RR groups would show equal reductions in state and trait anxiety compared to controls. Past research has indicated that the meditation exercise as an intact entity is not essential for meditation's therapeutic effect, and that some component common to all relaxation procedures is responsible for this effect. Taken together the findings from the present study do not support the hypothesis that resting is the component through which meditative techniques exert their therapeutic effect on state and

Table 10

Stepwise Regression of Trait Anxiety Change Scores on Previous Use of Relaxation, CRS Scores, Frequency of Sessions, and Duration of Sessions (N = 22)

Step	Variable	<u>pr</u>	<u>R</u> <sup>2</sup>	Adjusted <u>R</u> <sup>2</sup>	<u>R</u> <sup>2</sup> Change
1.	Previous Use of Relaxation	.25	.06	.02	.06
2.	CRS Scores	-.18	.11	.01	.05
3.	Frequency of Sessions	.19	.15	.00	.04
4.	Duration of Sessions	.09	.20	.00	.05

Note. pr = Partial Correlation; CRS = Confidence Rating Scale

trait anxiety.

No support was found for the hypothesis that high expectancy of benefit would contribute to greater reductions in state and trait anxiety. This is in contrast to previous research that shows a strong predictive effect of expectancies on arousal levels (i.e., Bandura, 1983, 1989 etc.). The same pattern was found for trait anxiety change scores. Frequency of practice was significantly correlated with state anxiety change scores ( $r = -.58$ ), as was duration of practice ( $r = -.53$ ). As hypothesized, frequency of practice added significantly to the prediction of state anxiety change scores with previous use of relaxation and CRS scores in the equation, but duration of practice did not reliably add to the prediction of state anxiety changes.

In contrast to the findings for state anxiety, subjects in the RR group showed greater overall reductions in SUDS scores compared to the PSI group. It was expected that the two treatment groups would not differ in SUDS scores, but the RR group reported greater reductions in SUDS from the beginning of relaxation sessions to the end. Clearly, RR meditation had a greater effect on SUDS scores when compared to PSI. A stepwise regression analysis on residualized SUDS change scores of reported difficulties and treatment group revealed that reported difficulties did not reliably add to the prediction of SUDS change scores. Therefore, it can be concluded that RR meditation is significantly more effective at reducing SUDS scores than PSI. It is unclear why the two treatments did not differ on state anxiety scores, but differed on SUDS scores. Perhaps, the SUDS taps into a different psychological construct than the state section of the STAI. The author is unaware of any relaxation studies that used the SUDS scale as an outcome measure, or of any studies that have researched its psychometric properties. Considering that variations of the SUDS are used by clinicians to monitor their clients' subjective states prior-to and after relaxation practice, further research is needed to evaluate its psychometric



properties. Finally, frequency of practice was associated with equal reductions in SUDS scores for both groups, with greater weekly frequency leading to greater reductions in SUDS.

Although the RR and PSI groups did not differ significantly from one another on post-test state anxiety, the finding that the PSI group showed greater reductions in state anxiety compared to controls could be due to the fact that PSI is a slightly more powerful technique than RR meditation. PSI is similar in many respects to traditional forms of Zen and Soto Zen meditation (Eppley et al., 1989; Pelletier, 1992). In these forms of meditation, the meditator is trained to place himself in a state of undistracted receptivity to external and internal stimuli (Pelletier, 1992). PSI's similarity to this form of meditation may have resulted in the greater reductions in state anxiety relative to the control group. Nevertheless, it is important to note that the difference between RR meditation and the control group approached significance ( $p = .07$ ) and may have reached significance given a larger sample size.

It is possible that RR meditation was not amenable to the sample of subjects used in this study, which led to the lower overall benefit compared to PSI. Many of the subjects were undergraduates who were living communally in the campus residence and it is possible that this living arrangement was not conducive to the quiet environment that is necessary to elicit the relaxation response. In contrast, PSI may have been more effective in terms of overall benefit in such an environment. Comments on the RPLs indicated that many of the subjects in both groups were disturbed by their roommates or other students in residence while they tried to engage in the relaxation techniques. Although subjects in the RR group reported difficulties 33.3% of the time, compared to subjects in the PSI group who reported difficulties 48.9% of the time, it is possible that the difficulties that the RR group experienced had a greater effect on post-test state anxiety.

It is also possible that the duration of sessions may have had some effect on the outcome. Subjects in the PSI group may have exhibited greater reductions in state anxiety compared to controls, because these subjects spent more time practicing than subjects in the RR group. The fact that PSI subjects practiced for longer periods of time may account for the greater number of problems reported by this group. In contrast, RR subjects may have reported fewer problems because they did not spend as much time practicing.

Although Benson has provided evidence that RR is as effective as other forms of meditation (i.e., TM), it is a fact that RR was not as effective in this study. Previous studies used TM or other traditional forms of meditation in their designs and researchers often employed subjects who were experienced meditators, thereby “loading the deck.” It is possible that inexperience on the part of the RR meditators may have reduced its effectiveness. The present study found evidence that previous use of a relaxation technique contributed to the variance in state anxiety change scores. Subjects reported the use of a variety of techniques, but differences in experience and consistency of practice of those techniques was not ascertained. An improvement in the present study would be to include a group employing TM and eliminate those subjects who had experience with any of the techniques used in the study.

In the introduction it was pointed out that it is difficult to draw firm conclusions from previous research concerning the differential effects of meditation versus resting on state-trait anxiety because of methodological problems. The present study sought to eliminate these methodological flaws but was successful only in having a slightly lower attrition rate than many of the previous studies. Unfortunately, the sample size was small and like other studies of this sort replication with a larger sample size would assist in making clearer interpretations of the data. Considering that a sizeable proportion of subjects reported previous experience with a relaxation

procedure, it might be worthwhile in future research to screen subjects for prior experience with relaxation techniques and separate them into experienced and inexperienced groups. Another weakness of the present study was the fact that the sample consisted of undergraduate students who were not experiencing clinically significant levels of anxiety, and whose primary motivation may have been to gain course credit in their introductory psychology courses. A definite improvement would be to select subjects who are experiencing clinically significant levels of anxiety; moreover, if such a group were selected, then it would be helpful to include other self-report measures of anxiety and psychometric instruments that assess subjects' mood and level of perceived stress. Additionally, it may be helpful to include electrophysiological indices of anxiety (e.g., pulse, blood pressure, GSR, etc.) as outcome measures. Another improvement of the present study would be use a resting procedure that is not similar to traditional forms of meditation. As noted above, PSI is similar to traditional forms of meditation and may not have been the best choice in determining whether resting is the common element through which RR meditation reduces anxiety.

In conclusion, research has suggested that the use of relaxation can be an effective form of self-awareness, giving individuals a sense of mastery over their symptoms of anxiety, and often leading to reductions in the severity of those symptoms. Methodological flaws characterize many of the studies of meditation, and it is unclear whether benefits are the result of the procedure per se, or from some common thread that runs through all relaxation procedures. There is evidence that meditation is not qualitatively different from sleep or resting and that the therapeutic benefit of the technique is due to this qualitative similarity. Past investigations indicate that simply resting quietly or engaging in other relaxation procedures are equally effective in reducing state and trait anxiety. This is not to say that meditation cannot reduce state or trait anxiety. Research has clearly

demonstrated that meditation is often associated with reductions in these constructs, but there is no evidence that the reduction associated with meditation is greater than the reduction that is associated with resting. Although there is ample evidence that trait anxiety can be lowered, at least temporarily through meditation, and that resting can produce reductions in trait anxiety equal to meditation, this study can offer no such evidence. This study could be seen as the first step toward creating an effective experiment that more clearly tests whether resting is the common element through which RR meditation reduces trait anxiety.

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**Appendix A**

**Questionnaire of Subject Demographics**

**Carefully fill in all the information on this questionnaire**

Name (please print) \_\_\_\_\_ Age \_\_\_\_\_ Sex \_\_\_\_\_

Telephone number \_\_\_\_\_ email \_\_\_\_\_

Highest education level attained (e.g., one year of university = 14 years) \_\_\_\_\_

Occupation \_\_\_\_\_ Date \_\_\_\_\_ Marital Status \_\_\_\_\_

What is your major academic field of interest at LU? \_\_\_\_\_

This study involves learning and using a relaxation procedure. Have you ever used a relaxation procedure to help you relax and reduce stress? Yes No

If Yes, which relaxation procedure did you use? \_\_\_\_\_

Did you find it helpful? Yes No Are you still using it? Yes No How often? \_\_\_\_\_

Please rate how confident you are that the relaxation procedures described in this study will help you to relax and reduce stress. Circle a number from 0 to 10 that best represents your confidence level.

No Confidence Total Confidence  
0 1 2 3 4 5 6 7 8 9 10

On the next page is a questionnaire that assesses anxiety levels. Please turn the page, read the directions, and fill out the questionnaire. Once you have completed the questionnaire take all the documents up to the researcher. The researcher will then give you an envelope containing instructions regarding the study, which you are to open once you have returned home.

**Appendix B**

**State Trait Anxiety Inventory**

**SELF-EVALUATION QUESTIONNAIRE**

Developed by Charles D. Spielberger  
 in collaboration with  
 R. L. Gorsuch, R. Lushene, P. R. Vagg, and G. A. Jacobs  
 STAI Form Y-1

Name \_\_\_\_\_ Date \_\_\_\_\_ S \_\_\_\_\_  
 Age \_\_\_\_\_ Sex: M \_\_\_\_\_ F \_\_\_\_\_ T \_\_\_\_\_

**DIRECTIONS:** A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you feel *right now*, that is, *at this moment*. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe your present feelings best.

VERY MUCH SO  
 MODERATELY SO  
 SOMEWHAT  
 NOT AT ALL

- |  |   |   |   |   |
|--|---|---|---|---|
| 1. I feel calm .....                                       | ① | ② | ③ | ④ |
| 2. I feel secure .....                                     | ① | ② | ③ | ④ |
| 3. I am tense .....  | ① | ② | ③ | ④ |
| 4. I feel strained .....                                   | ① | ② | ③ | ④ |
| 5. I feel at ease .....                                    | ① | ② | ③ | ④ |
| 6. I feel upset .....                                      | ① | ② | ③ | ④ |
| 7. I am presently worrying over possible misfortunes ..... | ① | ② | ③ | ④ |
| 8. I feel satisfied .....                                  | ① | ② | ③ | ④ |
| 9. I feel frightened .....                                 | ① | ② | ③ | ④ |
| 10. I feel comfortable .....                               | ① | ② | ③ | ④ |
| 11. I feel self-confident .....                            | ① | ② | ③ | ④ |
| 12. I feel nervous .....                                   | ① | ② | ③ | ④ |
| 13. I am jittery .....                                     | ① | ② | ③ | ④ |
| 14. I feel indecisive .....                                | ① | ② | ③ | ④ |
| 15. I am relaxed .....                                     | ① | ② | ③ | ④ |
| 16. I feel content .....                                   | ① | ② | ③ | ④ |
| 17. I am worried .....                                     | ① | ② | ③ | ④ |
| 18. I feel confused .....                                  | ① | ② | ③ | ④ |
| 19. I feel steady .....                                    | ① | ② | ③ | ④ |
| 20. I feel pleasant .....                                  | ① | ② | ③ | ④ |

**SELF-EVALUATION QUESTIONNAIRE**

STAI Form Y-2

Name \_\_\_\_\_ Date \_\_\_\_\_

**DIRECTIONS:** A number of statements which people have used to describe themselves are given below. Read each statement and then blacken in the appropriate circle to the right of the statement to indicate how you *generally* feel. There are no right or wrong answers. Do not spend too much time on any one statement but give the answer which seems to describe how you generally feel.

ALMOST NEVER  
SOMETIMES  
OFTEN  
ALMOST ALWAYS

- 21. I feel pleasant ..... ① ② ③ ④
- 22. I feel nervous and restless ..... ① ② ③ ④
- 23. I feel satisfied with myself ..... ① ② ③ ④
- 24. I wish I could be as happy as others seem to be ..... ① ② ③ ④
- 25. I feel like a failure ..... ① ② ③ ④
- 26. I feel rested ..... ① ② ③ ④
- 27. I am "calm, cool, and collected" ..... ① ② ③ ④
- 28. I feel that difficulties are piling up so that I cannot overcome them ..... ① ② ③ ④
- 29. I worry too much over something that really doesn't matter ..... ① ② ③ ④
- 30. I am happy ..... ① ② ③ ④
- 31. I have disturbing thoughts ..... ① ② ③ ④
- 32. I lack self-confidence ..... ① ② ③ ④
- 33. I feel secure ..... ① ② ③ ④
- 34. I make decisions easily ..... ① ② ③ ④
- 35. I feel inadequate ..... ① ② ③ ④
- 36. I am content ..... ① ② ③ ④
- 37. Some unimportant thought runs through my mind and bothers me ..... ① ② ③ ④
- 38. I take disappointments so keenly that I can't put them out of my mind ..... ① ② ③ ④
- 39. I am a steady person ..... ① ② ③ ④
- 40. I get in a state of tension or turmoil as I think over my recent concerns and interests ..... ① ② ③ ④

---



**Appendix C**

**Relaxation Practice Log (RPL) and SUDS**

<b>RELAXATION PRACTICE CHART</b>				
Directions: For each WEEK of your relaxation training program, note which DAYS you practiced (at least three) and any REPORTED DIFFICULTIES during the sessions. Note how many MINUTES you practiced, and in the last two columns write in your RELAXATION RATINGS. Remember, 0 means total relaxation and 10 means no relaxation.				
NAME:				
AGE:			<b>RELAXATION RATINGS</b>	
DATE:			0 = Completely Calm and Relaxed	
			10 = Completely Anxious and Tense	
Week of Feb. 1 to 6		<b>MINUTES</b>		
<b>DAY Practiced</b>	<b>REPORTED DIFICULTIES</b>	<b>PRACTICED</b>	<b>BEFORE</b>	<b>AFTER</b>
1:				
2:				
3:				
Week of Feb. 7 to 13				
<b>DAY Practiced</b>				
1:				
2:				
3:				

Week of Feb. 14 to 20	DAY Practiced	REPORTED DIFICULTIES	MINUTES	RELAXATION RATINGS	
			PRACTICED	BEFORE	AFTER
	1:				
	2:				
	3:				
Week of Feb. 21 to 27	DAY Practiced				
	1:				
	2:				
	3:				
Week of Feb. 28 to Mar. 6	DAY Practiced				
	1:				
	2:				
	3:				
Week of Mar. 7 to 14	DAY Practiced				
	1:				
	2:				
	3:				

## Appendix D

### Relaxation Response Procedure

Instructions for the experimenter: three periods (...) Indicates a pause; a comma (,) indicates a natural mid-sentence pause; read the script in a slow, even, and relaxed manner. Instructions in *italics* are for the experimenter only and should not be read aloud.

**Script** (Based on Benson, 1975, pp. 162-163):

Ideally, before you begin, you should choose a quiet, calm environment with as few distractions as possible. Please get into a comfortable position where you feel supported and can relax... This is important so that there is no undue muscular tension in your body. Sit quietly and close your eyes... Deeply relax all your muscles, beginning at your feet and progressing up to your face... Keep them relaxed. Breathe through your nose... (*Do this with subject*). Become aware of your breathing... As you breathe out, say the word, "ONE," silently to yourself... Breathe IN...OUT, "ONE"... IN...OUT, "ONE"; (*Do this with subject*). Breathe easily and naturally (*Practice this for 10 minutes*). Do not worry about whether you are successful in achieving a deep level of relaxation. Maintain a passive attitude and permit relaxation to occur at its own pace. When distracting thought occur, try to ignore them by not dwelling upon them and returning to repeating "ONE." Now, sit quietly with your eyes closed until I tell you to open them (*Allow subject to sit for 2 minutes*). Now open your eyes and sit quietly (*Allow subject to sit for another minute*).

## Appendix E

### Periodic Somatic Inactivity Procedure

Instructions for the experimenter: three periods (...) Indicates a pause; a comma (,) indicates a natural mid-sentence pause; read the script in a slow, even, and relaxed manner. Instructions in *italics* are for the experimenter only and should not be read aloud.

**Script** [Based on Smith (1976)]:

Sit up straight in your chair... Place your feet flat on the floor... Place your arms in a position that is comfortable for you. Now, close your eyes and relax for the next 10 minutes... Remain physically inactive for this period of time; that is, sit still and avoid unnecessary movements. Let your mind do whatever it wants. Whatever you do mentally will have little or no impact on the effectiveness of this technique. The important thing is to remain physically inactive. Do not worry about whether you are successful in achieving a deep level of relaxation... You may engage in an occasional action such as shifting your position or making yourself more comfortable, and you may scratch (*Allow subject to practice this for 10 minutes*). Now, sit quietly with your eyes closed until I tell you to open them (*Allow subject to sit for 2 minutes*). Now open your eyes and sit quietly (*Allow subject to sit for another minute*). Breathe deeply a few times. (based on Smith, 1976).

## **Appendix F**

### **Waiting List Instructions**

Thank you for participating in this study. You have been placed on a waiting list over the next six weeks after which you will be invited to learn a relaxation procedure that is designed to reduce stress and help you to relax. Being able to relax is something modern people take for granted. Our daily lives seem to be teeming with activity and stimulation and often we feel “stressed-out.” However, it is important for our physical and psychological well being to be able to control our anxiety levels and maintain an optimal level of relaxation. This study has been designed to help you to do that.

You have been scheduled to return for more testing after six weeks has elapsed. At that time you will be given more details about the study and you will be offered to learn the relaxation procedure. It is very important that you return for this session.

If you have any questions regarding these instructions or if you encounter any difficulties when you engage in the relaxation procedure, then please feel free to contact Roy Thompson at 683-3392 between 10:00am and 6:30pm.

## Appendix G

### INFORMED CONSENT FORM

1. I, \_\_\_\_\_, the undersigned, hereby consent to participate as a subject in this research project entitled “Meditation, Rest, and Anxiety” conducted at Lakehead University. This project compares the effects of relaxation procedures on anxiety. Roy Thompson, the research investigator, has explained to me the procedures in the research project. The project has 3 phases.
2. Phase 1: This is an assessment phase that will last approximately one hour. I will be given a questionnaire that assesses my behavior and anxiety levels, and I will be given an envelope containing written instructions of the study. I am to open and read these instructions once I have returned home.
3. Phase 2: This is the main part of the study that will last 6 weeks. During this phase I will follow the relaxation procedure instructions given to me in phase 1.
4. Phase 3: This is a follow-up assessment phase that will last approximately one hour. Once phase 2 is over, I will return to the university for testing and will be given the same questionnaire that assesses my behavior and anxiety levels. I will be given details about the study and will be allowed to ask questions. I will receive 3 bonus points at this time for participation in all three phases of this study.

5. My consent is given of my own free choice without undue inducement or any element of force, fraud, deceit, duress, or any form of constraint or coercion. I understand that I am free to withdraw my consent at any time without prejudice to me. I acknowledge that no guarantee or assurance has been given by anyone as to the results to be obtained. I further understand that all results obtained from this research will be kept confidential and remain in storage at Lakehead University for 7 years. An impartial reference code will be used for all data files, figures and sign-up sheets. These codes also will be incorporated into any published works that come from this research effort.
  
6. I understand that there is no physical or psychological harm associated with this research project. If I should find the research procedures to be *uncomfortable* or *unpleasant*, I am free to withdraw from the project at any time I wish without penalty. I also understand that I can choose an alternative (e.g., writing a research essay) to participating in any research project to obtain extra course credit.
  
7. If I wish to have a summary of the results, I can request a copy from the investigator.

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Signature of participant

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Date

## Appendix H

### Relaxation Response Instructions

1. To gain the most from this procedure, it is suggested that you practice three times per week at least 20 minutes per day.
2. Before you begin each session, please fill in the appropriate information on your relaxation practice chart. Remember to rate how relaxed you feel prior to beginning the procedure, any problems that you encounter, and how many minutes you engaged in relaxation. Once you have finished your session, remember to fill in your relaxation rating. Once the study is over, please remember to return the relaxation practice chart to the researcher.
3.
  - A. Sit quietly in a comfortable position
  - B. Close your eyes
  - C. Deeply relax all your muscles, beginning at your feet and progressing up to your face. Keep them relaxed.
  - D. Breathe through your nose. Become aware of your breathing. As you breathe out, say the word, "ONE," silently to yourself. For example, breathe IN... OUT, "ONE"; IN... OUT, "ONE"; etc. Breathe easily and naturally.
  - E. Continue for 20 minutes. You may open your eyes to check the time, but do not use an alarm. When you finish, sit quietly for several minutes, at first with your eyes closed and later with your eyes opened. Do not stand up for a few minutes.
  - F. Note on your relaxation practice form your level of relaxation.
  - G. Do not worry about whether you are successful in achieving a deep level of relaxation. Maintain a passive attitude and permit relaxation to occur at its own pace. When distracting thoughts occur, try to ignore them by not dwelling upon



them and return to repeating “ONE.” With practice the response should come with little effort. Practice the technique once daily, but not within two hours after any meal, since the digestive processes seem to interfere with the elicitation of the relaxation response.

## Appendix I

### Periodic Somatic Inactivity Instructions

1. To gain the most from this procedure, it is suggested that you practice three times per week at least 20 minutes per day.
2. Before you begin each session, please fill in the appropriate information on your relaxation practice chart. Remember to rate how relaxed you feel prior to beginning the procedure, any problems that you encounter, and how many minutes you engaged in relaxation. Once you have finished your session, remember to fill in your relaxation rating. Once the study is over, please remember to return the relaxation practice chart to the researcher.
3.
  - A. Sit up straight in your chair. Place your feet flat on the floor. Place your arms in a position that is comfortable for you.
  - B. Now, simply close your eyes and sit for the next 20 minutes. Remain physically inactive for this period of time; that is, sit still and avoid unnecessary movements.
  - C. Let your mind do whatever it wants. Whatever you do mentally will have little or no impact on the effectiveness of this technique. The important thing is to remain physically inactive.
  - D. Do not talk, walk around, or change chairs. You may engage in an occasional action such as shifting your position or making yourself more comfortable. And you may scratch.
  - E. At the end of the session, open your eyes, breathe deeply a few times, and continue with your everyday activities
  - F. Note on your relaxation practice form your level of relaxation.

- G. Do not worry about whether you are successful in achieving a deep level of relaxation. Maintain a passive attitude and permit relaxation to occur at its own pace. Practice the technique once daily, but not within two hours after any meal, since the digestive processes seem to interfere the elicitation of relaxation.

## **Appendix J**

### **Relaxation Study Main Instructions**

Thank you for participating in this study. You have been selected to engage in a relaxation procedure that is designed to reduce stress and help you to relax. Being able to relax is something modern people take for granted. Our daily lives seem to be teeming with activity and stimulation and often we feel “stressed-out.” However, it is important for our physical and psychological well being to be able to control our anxiety levels and maintain an optimal level of relaxation. This study has been designed to help you to do that.

Over the next six weeks it is important that you maintain a fairly rigid schedule with regards to this study. It is for your maximum benefit that you engage in all the instructions exactly as they are given. This relaxation procedure works best if you practice it three times per week for at least 20 minutes each time. If you miss one session then schedule it for the next day. The key is that you practice it three times each week.

You will note on that there is a relaxation practice chart included in this package. It is important that you fill this chart out each time you engage in the relaxation procedure. Moreover, once you have completed the study, it is important that you bring this chart with you when you return to the university for final testing by the researcher.

If you have any questions regarding these instructions or if you encounter any difficulties when you engage in the relaxation procedure, then please feel free to contact Roy Thompson at 683-3392 between 10:00am and 6:30pm.

## **Appendix K**

### **No-Treatment Control Group Instructions**

Thank you for participating in this study. You have been placed on a waiting list over the next six weeks after which you will be invited to learn a relaxation procedure that is designed to reduce stress and help you to relax. Being able to relax is something modern people take for granted. Our daily lives seem to be teeming with activity and stimulation and often we feel “stressed-out.” However, it is important for our physical and psychological well being to be able to control our anxiety levels and maintain an optimal level of relaxation. This study has been designed to help you to do that.

You have been scheduled to return for more testing after six weeks has elapsed. At that time you will be given more details about the study and you will be offered to learn the relaxation procedure. It is very important that you return for this session.

If you have any questions regarding these instructions or if you encounter any difficulties when you engage in the relaxation procedure, then please feel free to contact Roy Thompson at 683-3392 between 10:00am and 6:30pm.