PROGRESSIVE RELAXATION TRAINING: EFFECTS UPON INSOMNIA, PSYCHOSOMATIC COMPLAINTS, AND GENERAL ANXIETY IN A POPULATION OF UNIVERSITY STUDENTS

by

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Bachelor of Art in Psychology

California State College

at San Bernardino, 1972

A THESIS SUBMITTED IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE OF

MASTER OF ARTS

in the Faculty

of

Education

ACCEPTED
FACULTY OF GRADUATE STUDIES

[redacted]
DEAN

DATE 18 May 77

We accept this thesis as conforming
to the required standard

[redacted]

UNIVERSITY OF VICTORIA

April 1977

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ABSTRACT

Progressive Relaxation Training (PRT) was used as the theraputic agent to help university students who experienced moderate insomnia. It was hypothesized that PRT would provide subjects with skills to relax themselves and provide an attention focusing mechanism, thereby allowing sleep onset to occur more rapidly. A second hypothesis based on the work of Goldfried (1971), was that the Progressive Relaxation Training group would have a significant reduction in general anxiety, as well as a significant reduction in tension related psychosomatic complaints following training. Subjects were tested for anxiety as measured by the Interpersonal Anxiety Test, for psychosomatic complaints as measured by the Thatcher Psychosomatic Test, and for sleep problems as measured by the General Sleep Questionnaire. Sleep onset latency times and difficulty in going to sleep were recorded daily in a sleep log. Training consisted of five weekly one hour group sessions, in which subjects were instructed in PRT, and trained to recognize the feelings of relaxation. Subjects were instructed to practice the technique once daily, the last thing before trying to fall asleep.

Following training all instruments were readministered. Analysis of covariance revealed no reductions in general anxiety, but a significant reduction in psychosomatic complaints. Analysis of variance on the sleep onset and difficulty data failed to achieve significance. Explanations for the lack of significance are discussed.

Examiners:

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ACKNOWLEDGEMENT

I would like to express my thanks to my Supervisory Committee for helping me through the process of completing this thesis. I would like to express my special thanks to Rey Carr for providing assistance and support to me as Supervisor and friend throughout the period of time I have been working on this thesis. I would like also to acknowledge my gratefulness to Jerry Deffenbacher, who though absent in body from this campus, has given me great support, encouragement and critical review of my writing, helped me to get started on this study, and who instructed me in the progressive relaxation technique. I would also like to acknowledge my gratitude to Walter Muir for his help in the analysis and handling of the data for this study, even though he was not a member of my Committee. I would like to acknowledge my many thanks to Elsie Coon, Liliane Morgan, and Aileen Averill for their special co-operation and help in expediting the red tape I encountered in trying to run this study. Lastly, I would like to acknowledge my extreme appreciation to my wife, Barbara, for her patience and support of me through this sometimes frustrating and grueling process of acquisition and application of knowledge.

CHAPTER I

Sleep disturbance and insomnia are problems shared by a significant number of persons in our society. In the general population insomnia is a common complaint among individuals with no other psychiatric problems, and among persons with psychiatric problems insomnia is often one of diagnostic criteria for affective disorders, such as manic-depressive reactions and involutional psychotic reactions.

Purpose

The purpose of this study is to explore the effectiveness of a tension-release progressive relaxation technique in lowering sleep onset latency times in a population of university subjects with moderate insomnia.

Progressive relaxation has been hypothesized by Goldfried (1971) to provide clients with an active coping skill with which to lower experienced anxiety. In view of this, the second purpose of this study is to test for reduction in general anxiety levels and tension related problems other than insomnia following training.

The Problem Of Insomnia

Assessing the extent of insomnia in the general population is a difficult task. According to Rechtschaffen and Monroe (1969), some of the practical limitations are: no clear dividing line separating chronic pathological sleeplessness and occasional insomnia brought on by psychological or physiological stress; some people are hesitant to approach their physician with their complaint of insomnia, and conversely, some physicians are hesitant to accept insomnia as a problem that deserves serious consideration. Outstanding among the theoretical difficulties in assessing insomnia are the unknown physiological factors which may contribute to insomnia such as biochemical abnormalities. On the other hand, there is also the possibility that insomnia bears no relation at all to physical abnormality. Another theoretical problem in insomnia research is the possibility that reduced sleep time could be due to either a lessened need for sleep or from insufficient sleep. It seems that the center of the problem is that the precise function of sleep is unknown, and without knowing what the function is, it is impossible to know or measure when someone has had enough, or not enough. However, the fact remains that a good number of people

complain about regular difficulty in going to and remaining asleep. Attesting to this is the ever increasing use of large numbers of non-prescription and prescription sleeping drugs.

According to the Ventura County Star Free Press, in California, which was reporting on a Sleep Symposium held in New York in December 1976, well over 100 million dollars a year is spent on prescription sleeping pills alone. This is not counting the amount spent upon over-the-counter sleeping drugs. In a study of two Scottish cities which was cited by Rechtschaffen and Monroe (1968), 15 per cent of the men and 25 per cent of the women over the age of 45 years, regularly took prescribed sleeping drugs. In a university population, sleep disturbance may cause particular cyclical problems.

Studies carried out on the University of Iowa campus (Borkovec and Fowles, 1973; Steinmark and Borkovec, 1974) showed that between 18 per cent and 15 per cent of the students polled required an average of 30 minutes or more to fall asleep at night. These same students also viewed this difficulty in falling asleep as a problem and were willing to volunteer for treatment aimed at elimination of their insomnia. Karacan, Williams, Littell and Salis (1972) in an epidemiological study of mental and physical health

characteristics within the general population of the County of Gainsville, Florida, found somewhat similar figures. Thirty-five per cent of those answering with sleep problems had sleep difficulty at least sometimes. Eight per cent reported having difficulty with sleep often, and 5 per cent reported sleep difficulties all the time. By combining the last two groups who have sleep difficulties more or less chronically, approximately 13 per cent of the general population experienced sleep difficulties. Among the individuals who reported having sleep difficulties: 55 per cent had trouble staying asleep; 6 per cent had what they felt was insufficient sleep; 3 per cent reported awakening too early; and 1 per cent got too much sleep. Another 20 per cent reported having two or more of these disturbances.

Significance Of This Study

This study will add data and evidence about the tension release progressive relaxation model as an effective technique in helping clients with insomnia and sleep disturbance. Detailed session by session instructions will provide a format for counsellors to follow in training clients in this type of therapy. This study also adds to the small number of studies testing whether or not progressive relaxation provides

clients with an active coping skill to deal with experienced anxiety and tension related problems.

The subjects in the study will learn a skill to relax themselves which will enable them to go to sleep quicker and with less distress. This should allow them more time and energy to devote to school related endeavors and studying. It also provides them with a technique for lowering their experienced anxiety or tension, which can be used in situations other than trying to go to sleep.

This study provides a replication of other studies using PRT as an effective intervention with clients with sleep onset insomnia. If PRT is an effective technique therapist time would be reduced. Most importantly, an additional demonstration of the effectiveness of PRT may provide an alternative method of treatment for persons who are presently relying on sleep inducing drugs.

The Insomniac - A Description

Persons with insomnia or poor sleepers, differ from persons who have no trouble going to sleep on a number of physiological and psychological measures. Monroe (1967) conducted a study in a sleep laboratory to measure differences between good and poor sleepers. Good sleepers characteristically fell asleep in less than

10 minutes, never more than 15 minutes; as a rule they never woke up at night; as a rule they had no subjective difficulty in falling asleep. Poor sleepers in Monroe's (1967) study took approximately 60 minutes or more to fall asleep and always more than 30 minutes; woke up at least once during the night; experienced considerable subjective difficulty in falling asleep, independent of how long it takes to fall asleep. Poor sleepers spent 10 per cent less time in bed sleeping, than good sleepers.

Physiological measures taken for both groups showed that poor sleepers had significantly higher body temperatures than the good sleepers. Body movement activity was greater for poor sleepers. Poor sleepers had higher mean values during pre-sleep and during all stages of sleep on heart rates and pulse volumes.

Differences on the Minnesota Multiphasic Personality Inventory (MMPI) showed that poor sleepers had much higher group means in the direction of psychopathology for a number of MMPI scales, when compared to the good sleepers' means. Two other studies (Borkovec, Steinmark and Nau, 1973; Kales and Cary, 1971) using the MMPI found similar differences between good sleepers and poor sleepers.

A comparison between the poor sleepers and the good sleepers on the Cornell Medical Index revealed that the poor sleepers had more psychosomatic and emotional symptoms than the good sleepers. The mean scores for somatic symptoms were compared, revealing a difference that was highly significant ($p < .005$). Emotional symptoms were also compared, and the poor sleepers had significantly more symptoms ($p < .02$) than did the good sleepers. Nicassio and Bootzin (1974) also administered the Cornell Medical Index to their subjects, and found that 23 of 30 scored at 30 or above, which is considered characteristic of an abnormal population.

In review, poor sleepers take longer to go to sleep, sleep less, and awake more during the night than good sleepers. Poor sleepers have higher levels of most physiological measures during sleep than good sleepers, thus indicating that the poor sleepers' sleep appeared to be more 'awake like' than did the sleep of good sleepers. On both the MMPI and the Cornell Medical Index, the poor sleepers scored significantly higher toward the abnormal end of the scales than did the good sleepers. In other words, when poor sleepers retire to go to sleep, they tend to have higher levels of physiological arousal, as demonstrated by the Monroe study and they also tend to be anxious and have anxiety producing thoughts and

ruminations or intrusive cognitions (Geer and Katkin, 1966). These two factors, being physically aware and having intrusive cognitions, possibly interacting, produce behaviors which are incompatable with normal sleep onset, thus making it more difficult for an individual with insomnia to fall asleep.

Treatments For Insomnia - Chemotherapy

There are two general categories for treating insomnia: chemotherapy, and psychotherapy (behavior therapy in particular). By far the most common of the two treatments is chemotherapy. The client is usually provided with either sleep inducing drugs (for example, chloral hydrate) or some type of muscle relaxant or tranquilizer, or both. It is beyond the scope of this paper to explore fully the implications and characteristics of chemotherapy, however, several limitations of chemotherapy are apparent. Chemotherapy is at best a short term prospect. With continued long term use, which is required with insomnia, most sleep inducing drugs have a diminishing of effectiveness, thereby requiring larger doses to induce sleep. With increased dosage, and long term use, there is a very real possibility of drug dependency, and the complications thereof. Since chemotherapy is a passive approach to insomnia, the client who has a long

term problem of sleep disturbance has little choice other than either increasing dosage to get to sleep (thereby facing possible drug side effects and/or drug dependency), or living with their problem and not taking the drugs.

The side effects of commonly prescribed sleep inducing drugs have been described in a thorough review by Hartman and Cravens (1972). Included in these are alterations of sleep patterns and changes of time between sleep onset and occurrence of the sleep level associated with dreaming. In addition, with the withdrawal of most sleep inducing drugs, there is an alteration of sleep patterns which continues for up to 6 weeks after stopping drug intake. The effects of drug use on sleeping patterns and the effects of drug withdrawal upon sleep was also reviewed by Kales, Malmstrom, Scharf and Rubins (1969) with similar conclusions. In a study cited by Monroe (1967), Oswald, Berger, Jaramillo, Keddie, Olley and Plunkett (1963) found that the drug heptabarbitone, which is used to induce sleep, actually produced effects similar to the characteristics in Monroe's study.

In review, although chemotherapy is the most extensively used therapy for treating insomnia, many of the drugs used cause side effects which may be more

serious than the original problem. The limitations of chemotherapy are the clear possibility of drug addiction with long term use and increased dosage, and problems of actual changes in sleep patterns which continue even after withdrawal of the drug. Another limitation is that chemotherapy is a passive approach to insomnia treatment, providing the patient with no skill in dealing with his/her problem, and providing no hope of improvement in the future, other than continued long term drug use.

Treatment For Insomnia - Behavior Therapy

The other prevalent forms of therapy for insomnia have their origin in behavior therapy. Although the use of these types of therapies are not as extensive as chemotherapy, and the literature in the area is sparse, the published results are promising, especially for those studies which use progressive muscle relaxation. As an overview of the types of behavior therapy used, each of the methods will be examined briefly before exploring progressive relaxation training in more depth.

Systematic Desensitization

Systematic Desensitization used for insomnia treatment usually follows the format developed by Geer

and Katkin (1966), which does away with the traditional fear hierarchy of about 20 items and replaces it with one item. The clients are taught how to progressively relax all the major muscle groups in their bodies and then when deeply relaxed, the item is presented. Several studies which have used this technique successfully to produce significant drops in sleep latency onset times (Borkovec, Steinmark and Nau, 1973; Geer and Katkin, 1966; Gershman and Clouser, 1974; and Steinmark and Borkovec, 1974).

Autogenic Training

Autogenic training is another procedure used in treating insomnia. This procedure induces relaxation by having the client repeat to himself suggestions of warmth and heaviness in his muscle groups over and over again. Nicassio and Bootzin (1974), in a study using autogenic training, found that it significantly decreased sleep latency onset times. Another study, by Kahn, Baker and Weiss (1968), also used this technique, but generalization to other studies is difficult as they used only subjective reports of improvement as the measure of effectiveness.

Progressive Relaxation Training - Overview

The most researched and used technique for treating insomnia is progressive relaxation training (PRT). This technique involves teaching clients to relax by progressively tensing and releasing the major muscle groups in the body and having the clients sensitize themselves to the feedback coming from these major muscle groups as they relax. Progressive relaxation training actively works on physiological arousal (Monroe, 1967) and intrusive cognitions (Geer and Katkin, 1966). These are the two most common factors, possibly interacting, which may contribute to sleep disturbance. In dealing with intrusive cognitions, and/or anxiety producing thoughts and ruminations, PRT provides clients with something upon which to focus their attention, for example, the feedback from the major muscle groups. Since this takes little thinking on the part of the client, it does not interfere with the normal sleep onset. Progressive relaxation training has also been shown significantly to lower physiological arousal. Paul (1969), in a study of the physiological effects of relaxation training, found that PRT and hypnotic suggestion significantly reduced heart rate, respiratory rate, and tonic muscle tension when compared with a

control group ($p < .01$). He also found that PRT was significantly more effective than hypnotic suggestion in reducing heart rate and tonic muscle tension, systems which are not under direct voluntary control. By reducing physiological arousal, PRT allows clients to slow down their bodies, thereby inducing a set of behaviors much more compatable with sleep onset.

In the field of sleep research, there is a major concern as to the effects of positive demand upon subjects' reports of improvement. Positive demand affects the subjects' reports by the subject having expectations that the treatment will help, regardless of the fact that the treatment may or may not help. The subject transmits these expectations to the measures which judge the effectiveness of the therapy. To help offset the positive demand characteristics, several approaches are used. A counterdemand period can be used for this purpose. It is a statement by the experimenter that the treatment will not have effect until a later time, for example, not until three weeks after the treatment begins. This allows the experimenter to measure the effectiveness of the treatment prior to the positive demand period. Another method of offsetting positive demand is by using self reports of measurable behavior, rather than reports of global improvement.

Subjects in the experiment can also be told at the beginning of the therapy that they will be the best judges of the effectivness of the therapy, and that whether or not the therapy is effective, valuable research data will still be collected. Most studies in the field of sleep research include some type of control for the effects of positive demand.

Progressive Relaxation Training - Treatment For Insomnia

The effectiveness of PRT in reducing sleep onset insomnia has been substantiated in several studies which will be reviewed in the following manner: first, studies containing subjects with moderate insomnia where training was in groups and a no-treatment control group was used will be examined since these studies most closely resemble the design of the present study; secondly, studies with all of the above elements except with a population of severe insomniacs will be examined, followed by a study with groups of severe insomniacs using a tape recorded automated approach. A study training moderate insomniacs in groups follows, which did not use a no-treatment control group, and the last study trained subjects with moderate insomnia individually rather than with a group approach.

Borkovec, Kaloupek and Slama (1975) designed a study to treat a group of moderate insomniacs who had an average sleep onset latency of approximately 30 minutes. The study lasted four weeks, the first three weeks being a counterdemand period (the counterdemand instructions were that the clients would not have any improvement until the fourth week, at which time dramatic improvement would be experienced), and the last week being the demand period. The counterdemand instructions were designed to allow an unbiased check upon drops in sleep onset latency, as the clients were not under pressure to report improvement, so any improvements would hypothetically be due to the effectiveness of the treatment procedure. At the end of the counterdemand period (Week Three) and prior to the demand period, a comparison of decreases in sleep latency showed the PRT group to have had a significant drop in sleep latency ($p < .025$) when compared with the relaxation without tension release group and the placebo and control groups. Following the fourth week (the positive demand period), all groups had significant drops in sleep latency, but only the PRT group had a significantly greater improvement than the no-treatment control group. In a five month follow up, only the PRT group had a significant decrease in sleep latency from Week Four to follow up ($p < .05$).

In another study of moderate insomnia, Steinmark and Borkovec (1974) found similar data, while controlling for demand. Subjects using PRT had significant decreases in sleep onset latency times ($p < .025$) when compared to the no-treatment control and placebo groups during the counterdemand period. During the demand period, the PRT group had a significantly greater improvement in lowering sleep onset latency when compared to the no-treatment control group ($p < .001$). In a five month follow up, the PRT group reported further reductions in sleep latency from the end of treatment ($p < .02$), while the placebo group, which had had some improvement during the demand period of the treatment, did not maintain these gains. As a whole the study was well designed, and executed, but the follow up data must be looked at cautiously, as it was obtained by one phone call to the subjects, and not by having the subjects record their sleep times over a period of time, which would be more reliable.

In a study treating subjects with severe insomnia (average sleep latency at baseline was 120 minutes), Nicassio and Bootzin (1974) used PRT as one of the treatments. This study demonstrates the effectiveness of controlling the subjectivity of subjects' reports although it did not specifically control for demand characteristics. To control for the subjectivity of the

subjects' reports of their sleep latency, the subjects mailed daily sleep questionnaire postcards to the experimenters. In addition to this, collaborative data were gathered from subjects' spouse/roommate who were asked to fill out the same types of daily sleep questionnaire for two days prior to post-test (n = 14 of a total of 30 subjects). These data revealed no significant difference from the subjects' own reports, indicating the accuracy of the subjects' own subjective data. Another method used to ascertain objective improvement in the subjects'sleep was the recording of the subjects' pupillography for a fifteen minute period at post-test. This measure was taken to determine if the subject got a 'good nights sleep' and is alert, by photographing the subject's pupils during a fifteen minute interval in a light tight room. If the subject is rested and alert, the pupils will maintain maximum dilation throughout the entire procedure; the less rested the subject is, the earlier his pupils begin to contract. Not all of the subjects had this measure taken (n = 19 of 30), so the results are not conclusive; but comparing the two treatments (PRT and autogenic) with the two controls (self-relax and no-treatment), significant differences were found ($p < .05$), with the treated subjects having less pupil contraction. A possible complication is the fact that this measure was

not given as a pre-test, so as to remove possible prior differences between groups.

Nicassio and Bootzin did not control for abrupt drug stoppage and possible side effects of this stoppage of sleep inducing drugs upon their subjects' sleep patterns. Since there were a sizeable number of subjects who were using chemotherapy (n = 16 of 30), and the subjects were asked to stop abruptly, with physician's permission (which many sleep researchers do not advise because of the side effects; see: Kales, Malmstrom, Scharf and Rubins, 1969), conclusions from the data need to be looked at cautiously.

The PRT group did have significantly lower sleep latency times when compared with the placebo and no-treatment control at post-test. They also took significantly less time to go to sleep at post-test than they had during the baseline period. The six-month follow up states that the treatment effects were continued from post-test, but here again the subjects were asked to discontinue taking sleeping drugs during the one week follow up period.

In review, the study controlled very well for subjectivity of the subjects' reports, a possible contaminator in sleep research, but, the execution of the study was not as careful as it could have been, since

the authors did not take note of the possible effects of abrupt drug stoppage.

Gershman and Clouser (1974) in a study using a severe insomniac population (average sleep latency was 65 minutes), demonstrated the effectiveness of the automated approach in teaching PRT. After four weeks of training, the PRT group had a significant decrease in sleep latency ($p < .005$) as compared to their pre-test estimate of sleep latency. In comparison the two no-treatment control groups had no improvement. The authors were aware of the effects of positive demand upon improvements in sleep latency. To help control for this, the authors actively tried to counteract the demand effects by telling the subjects the nature of the study and the treatments. They also stated that there was no reason to believe that either treatment would be better than the other, or that either would be certain to eliminate insomnia. The subjects were told they would be the best judges of effectiveness, and that any changes, either way, would be helpful in future research. The authors also cite a study by Nicolis and Silvestri (1967) which found that as the severity of insomnia increases, the effectiveness of the placebo treatment decreases. Since Gershman and Clouser's study was with a severe population of insomniacs, the possibility of demand altering the

outcome data should be minimized. In a one year from post-test follow up study, the PRT group had a continued drop in sleep latency (37 minutes at post-test, to 15 minutes at follow up) which appears to be a significant drop, but the authors did not include any statistical analysis.

In a two group study (treatment/placebo) done by Haynes, Woodward, Moran and Alexander (1974), PRT was also found effectively to reduce sleep onset latency times when compared with the placebo group. This study was well designed and shorter in duration than most, using three weeks of treatment. The PRT group had a significant drop in sleep latency from baseline to post-test, and also demonstrated greater improvement in decreasing latency than the placebo group ($p < .07$). The authors were aware of demand characteristics and to help offset them, they included the placebo group. They also relied upon self report measures of behavior (e.g. time to fall asleep) rather than self reports of behavioral change (e.g. global improvement), thereby decreasing the impact of the demand characteristics on self report measures. The authors point out the efficiency of this procedure in regard to therapist time per client, which was less than thirty minutes per client. No follow up study was included, so no data on continued treatment effects were available.

Generalization Of Treatment Effect

Goldfried (1971) hypothesizes that relaxation training can be employed to teach the client an active coping skill, which can then be used whenever the client experiences anxiety. Hence, a client who is taught PRT for a specific target anxiety, should have a reduction in that target anxiety, but should also, according to Goldfried, have a considerable reduction in general or non-targeted anxieties as well. Thus, while clients are learning to apply relaxation specifically for the reduction of sleep onset anxieties and physical tensions, they may also be learning a more general anxiety-or-tension-reducing strategy. If this hypothesis is valid, clients learning a self management form of progressive relaxation training might also show a reduction in general anxieties and tension related problems other than insomnia. Support for this hypothesis exists, but generally the relaxation procedures used are slightly different from the ones used in this study. An overview of these procedural differences is provided by Deffenbacher and Snyder (1976). In view of these procedural differences, comparisons to this study will be difficult to judge. Studies using PRT for treating insomnia have not tested for reductions in general anxiety, but Gershman and Clouser (1974) observed that following the twelve month

follow up study, a number of the clients reported using the PRT technique in stressful situations, without receiving any instructions to do so. These authors also reported a significant pre-post test change in the direction of stability for the PRT group on the Neuroticism-Stability Dimension of the Eysenck Personality Inventory.

However, studies examining PRT and target anxieties other than insomnia have tested for general reaction effects. Sherman and Plummer (1973), in a well controlled study of the effectiveness of PRT, found that a population of normal students who were taught PRT over a five week period had significant drops in pre-post test scores on two general anxiety measures, including the IPAT anxiety scale. All the subjects were issued the IPAT and the other anxiety measures (the Fear survey, and the Willoughby Neuroticism Schedule) as part of a personality course in which they were involved. Thus, they were blind to the fact that it had any relationship to the training they received, and lessening the possibility of demand interaction on their scores.

Using tension headaches as their target anxiety, Cox, Freundlich, and Meyer (1975) found that PRT significantly reduced non medically caused headaches. The study also found that the subjects using PRT had

significant psychosomatic complaint reduction at post-test ($p < .001$) when compared with the placebo group, and also significant reduction from post-test to a four month follow up study ($p < .05$).

In attempting to reduce test anxiety, Chang-Liang and Denny (1976) used PRT and also tested for reductions in general anxiety. The results of the study indicate a significant decrease in general anxiety (for IPAT scores, $p < .01$).

Finally, Deffenbacher and Snyder (1976) studying test anxiety also found significant reductions in general anxiety (IPAT reductions, $p < .001$) at post-test.

In review, several studies have found reductions in general anxiety following progressive relaxation training. While specific applications of technique in PRT may vary, the reductions in general anxiety and in psychosomatic complaints lend support to Goldfried's hypothesis that PRT teaches subjects a skill which enables them actively to cope with anxiety.

Because generalization of treatment effects has not been explored using insomnia as the target anxiety, this study will address itself to the relationship between progressive relaxation training and a reduction in sleep disturbance. This study will also explore the relationships between progressive relaxation training and non targeted anxieties.

Specifically, it is hypothesized that 1) subjects in the training group will experience a decrease in sleep onset latency time, as measured in minutes to go to sleep, whereas the subjects in the control group will not; and 2) subjects in the training group will demonstrate a decrease in their general anxiety levels (as measured by the IPAT) and a decrease in psychosomatic or tension related problems (as measured by the TPT) other than insomnia, following training; whereas subjects in the control group will not.

CHAPTER II

Method

Subjects

Subjects were 32 volunteer undergraduate University of Victoria students who, after hearing an introductory talk by the author, marked on questionnaires handed out to the entire class, that they took at least 30 minutes per night on the average to go to sleep. All subjects were called by the experimenter; the procedure was described to them; if they were still interested, an appointment was made for pre-testing. Subjects were randomly assigned to one of two groups, a treatment group (n = 15) and a no-treatment control group (N = 17). At the pre-testing, all subjects were told they had been assigned randomly into one of two groups. Group One would receive training immediately, and Group Two would receive training next term. In the interim, Group Two would mail weekly logs of their sleep onset times to the experimenter. All subjects read and signed informal contracts (see Appendices A and B) The control group (Group Two) was provided with a packet containing six, one week sleep logs (see Appendix C)

six, one week sleep logs in postcard form, pre-stamped, pre-numbered, and pre-addressed to the experimenter, and an instruction sheet explaining the use of the forms. The control group also received instructions from the experimenter as to what to do with the forms and were told that the experimenter would call them two times during the next six weeks. Three control group subjects dropped out, one quit school, and two were dropped due to not showing up for testing. Four treatment subjects dropped out, three because of time conflicts, and one because sleep latency times went up during the second week of treatment and she felt it was not helping.

Instruments

Sleep onset latency of 30 minutes or more was used as the criterion for acceptance into training. This was measured via a questionnaire issued to classes given the introductory talk by the experimenter. All subjects were issued a general sleep questionnaire (see Appendix D) to assess sleep patterns and to screen for drug use. No subjects currently using prescription drugs to induce sleep were accepted into the study. To measure non targeted anxiety the Interpersonal Anxiety Test (IPAT; Cattell and Scheier, 1961) was issued.

Numerous studies have been conducted upon the IPAT Anxiety Scale to determine the scales reliability and validity in measurement of anxiety. The IPAT Anxiety Scale Manual (Cattell and Scheier, 1963) summarizes much of the research conducted upon the instrument. The correlation between the different factors of the total scale, i.e., construct or internal validity, is +.85. Evaluation of anxiety in the same client by different psychiatrists reveals a correlation between clinical consensus, i.e., external concrete validity, and the IPAT Anxiety Scale of +.30 to +.40. Reliability for the scale as measured by a test-retest over a one week interval revealed a correlation of +.93; a test retest over a two week interval revealed a correlation of +.87. Psycho-physiological symptoms were measured by the Thatcher Psychosomatic Test (see Appendix E). General sleep questionnaires (see Appendix D) were issued as a measure of overall sleep disturbance. A summary of reliability and validity information for the Thatcher Psychosomatic Test and the General Sleep Questionnaire can be found in Appendix I. Sleep onset latency and difficulty in falling asleep were measured by sleep logs which were filled out daily by both groups.

Procedure

The instruments were administered on two occasions. The first administration was prior to start of treatment.

The second administration was one week following the end of the five week training period. The pre-tests were administered to all subjects by the experimenter; the post-tests were administered to the control group by the experimenter, and because of time conflicts, a person assisting the experimenter administered the post-tests to the treatment group. All subjects filled out the sleep log on a daily basis, starting on the first week of the training period. The controls transcribed the data from the daily sleep log onto a weekly postcard which they mailed to the experimenter. Logs for the treatment group were collected at each training session and new logs were issued.

Training

The training lasted for five weeks. Each weekly session was an hour in length. All subjects received the same number of training sessions. For session by session instructions and training procedures see Appendix G.

CHAPTER III

Results

Analysis of the results from the instruments testing the hypothesis that subjects would experience decreases in sleep problems revealed decreases on all sleep problem measurements, but none reached significance. The hypothesis predicting a decrease in general anxiety and tension related problems received partial support. Data analysis revealed a significant reduction in psychosomatic complaints, but no change was observed in general anxiety levels.

The hypothesis predicting a decrease in sleep problems was tested in the following manner. Data reduction of the minutes-to-go-to-sleep, and difficulty-in-going-to-sleep measures were formed by combining each subject's nightly scores into a weekly mean on each measure. These mean scores, within groups, were combined to provide a group weekly mean. A one way repeated measures analysis of variance was then performed on the minutes-to-go-to-sleep and on the difficulty-in-going-to-sleep measures over the five week training period. On the minutes-to-go-to-sleep measure, F (9,40) = 2.43, $p < .07$, (see

Table 1) and the difficulty-in-going-to-sleep measure, F (9,40) = 1.7, $p < .17$ see (Table 2), reductions were observed, but neither reached significance. The third instrument measuring sleep problems was the General Sleep Questionnaire. A score for this questionnaire was determined by combining the numerical values of the answers into one overall score per individual per testing. As recommended by Cronbach and Furby (1970) analysis of change over the treatment interval was made by analysis of covariance with pretreatment scores as the covariate on post-treatment scores. This analysis was chosen because it would provide an equivalence between groups on the pre-test scores, so as to reveal a more accurate measurement of change when analyzing post-test scores. The analysis revealed a reduction in general sleep problems but this did not reach significance F (1, 21) = 3.69, $p < .07$,(see Table 3.)

The Thatcher Psychosomatic Test and the IPAT were the two instruments used to test for generalization of treatment. Data reduction for the Thatcher Psychsomatic Test involved multiplying the numerical value for severity times the numerical value for frequency for each condition. The scores for each condition were then summed to provide a total score. Analysis of covariance was performed on the TPT, with the pre-treatment score the covariate

Table I

REPEATED MEASURE ANALYSIS OF VARIANCE ON MINUTES TO SLEEP OVER THE FIVE WEEK TRAINING PERIOD

Source of Variation	df	SS	MS	F	P
Treatment	4	964.59	241.15	2.43	0.065
Error	36	3573.00	099.25		
Total	40				

Table 2

REPEATED MEASURE ANALYSIS OF VARIANCE ON DIFFICULTY TO SLEEP OVER THE FIVE WEEK TRAINING PERIOD

Source of Variation	df	SS	MS	F	P
Treatment	4	5.40	1.35	1.70	0.17
Error	36	28.67	0.879		
Total	40				

Table 3

ANALYSIS OF COVARIANCE COMPARING TREATMENT GROUP AND CONTROL GROUP RESPONSES ON THE GENERAL SLEEP QUESTIONNAIRE WITH PRE-TEST SCORES AS THE COVARIATE ON THE POST-TEST SCORE

		Residuals			
Sources of Variation	df	SS	MS	F	P
Treatment	1	220.53	220.53	3.69	0.068
Error	21	1255.50	59.79		
Total	22				

of the post-treatment scores. The analysis revealed a significant improvement for the treatment group F (1, 21) = 5.20, p < .03,(see Table 4.) An analysis of covariance was performed on the IPAT. The pre-treatment scores for the IPAT were the covariate on the post-treatment scores; this analysis revealed very little change in the treatment group's score following training F (1, 21) = 0.1, p < .74,(see Table 5.)

Table 4

ANALYSIS OF COVARIANCE COMPARING TREATMENT GROUP AND CONTROL GROUP RESPONSES ON THE THATCHER PSYCHOSOMATIC TEST, WITH PRE-TEST SCORES AS THE COVARIATE ON THE POST-TEST SCORES

		Residuals			
Sources of Variation	df	SS	MS	F	P
Treatment	1	2668.39	2668.39	5.2	0.03
Error	21	10772.45	512.87		
Total	22				

Table 5

ANALYSIS OF COVARIANCE COMPARING TREATMENT GROUP AND CONTROL GROUP RESPONSES ON IPAT, WITH PRE-TEST SCORES AS THE COVARIATE ON THE POST-TEST SCORES

		Residuals			
Sources of Variation	df	SS	MS	F	P
Treatment	1	4.36	4.36	0.11	0.74
Error	21	809.66	38.56		
Total	22				

CHAPTER IV

Discussion

On all measures related to sleep problems, such as onset latency times (see Figure 1), difficulty in going to sleep (see Figure 2) and the general sleep questionnaire, a reduction in sleep problems was observed. This reduction was in the expected direction but was not significant. On the measure of general anxiety no trends were noted, whereas on the psychosomatic measure a significant reduction in complaints was observed. The hypothesis relating to a reduction in general anxiety and tension related problems was thus partially supported in that a reduction in psychologically related tension problems was observed, but the hypothesis also received no support for the expected reduction in general anxiety.

On all measures of sleep problems (Hypothesis 1), a decrease in sleep problems was noted, although none of the indices reached significance. The decrease in the minutes-to-go-to-sleep index in the present study is similar in direction to most studies using PRT, although in the present study this decrease did not reach significance. Borkovec, Kaloupek and Slama (1975),

Figure 1

Sleep Onset Latency Times For Treatment And Control Groups During The Five Week Training Period

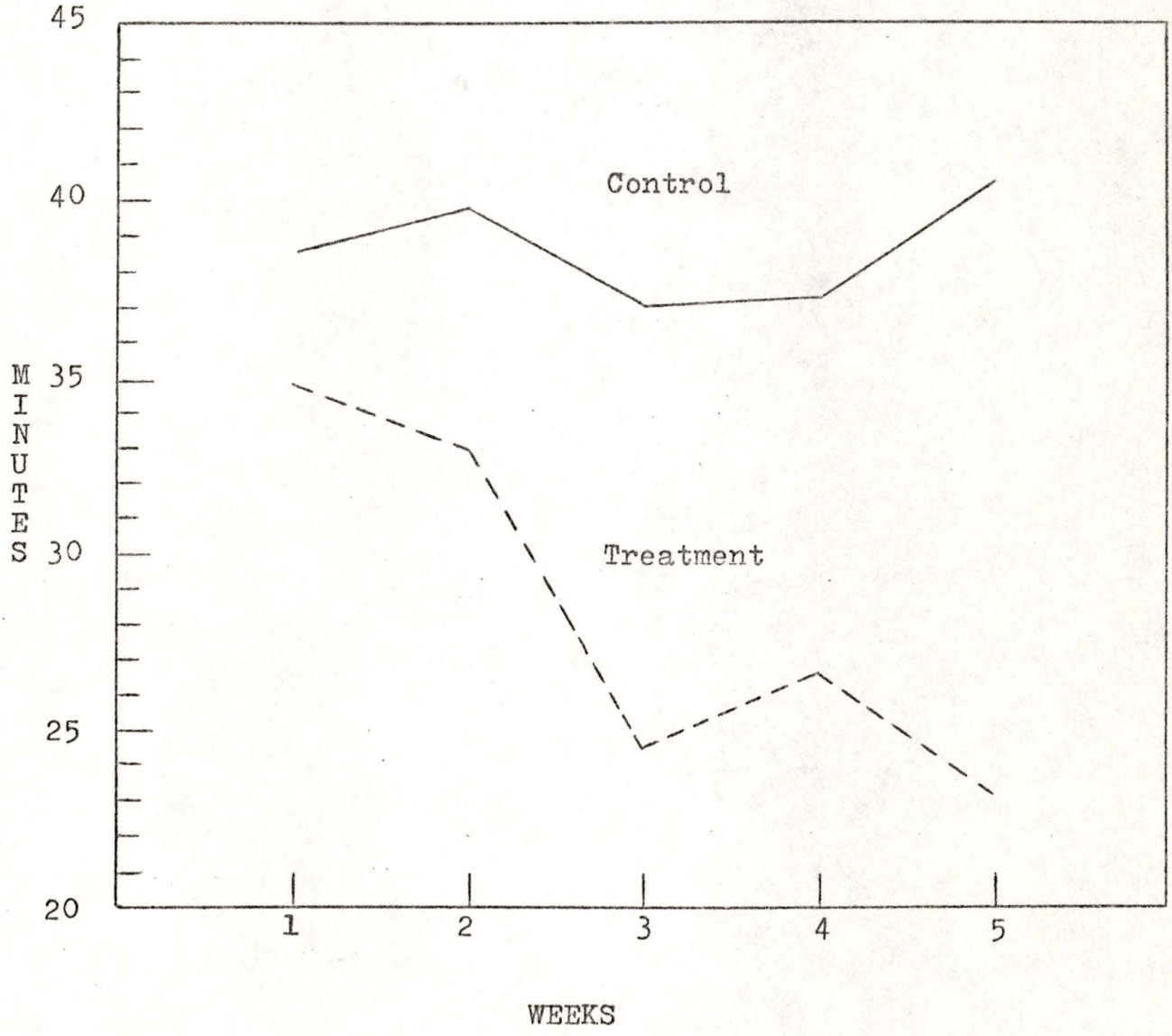
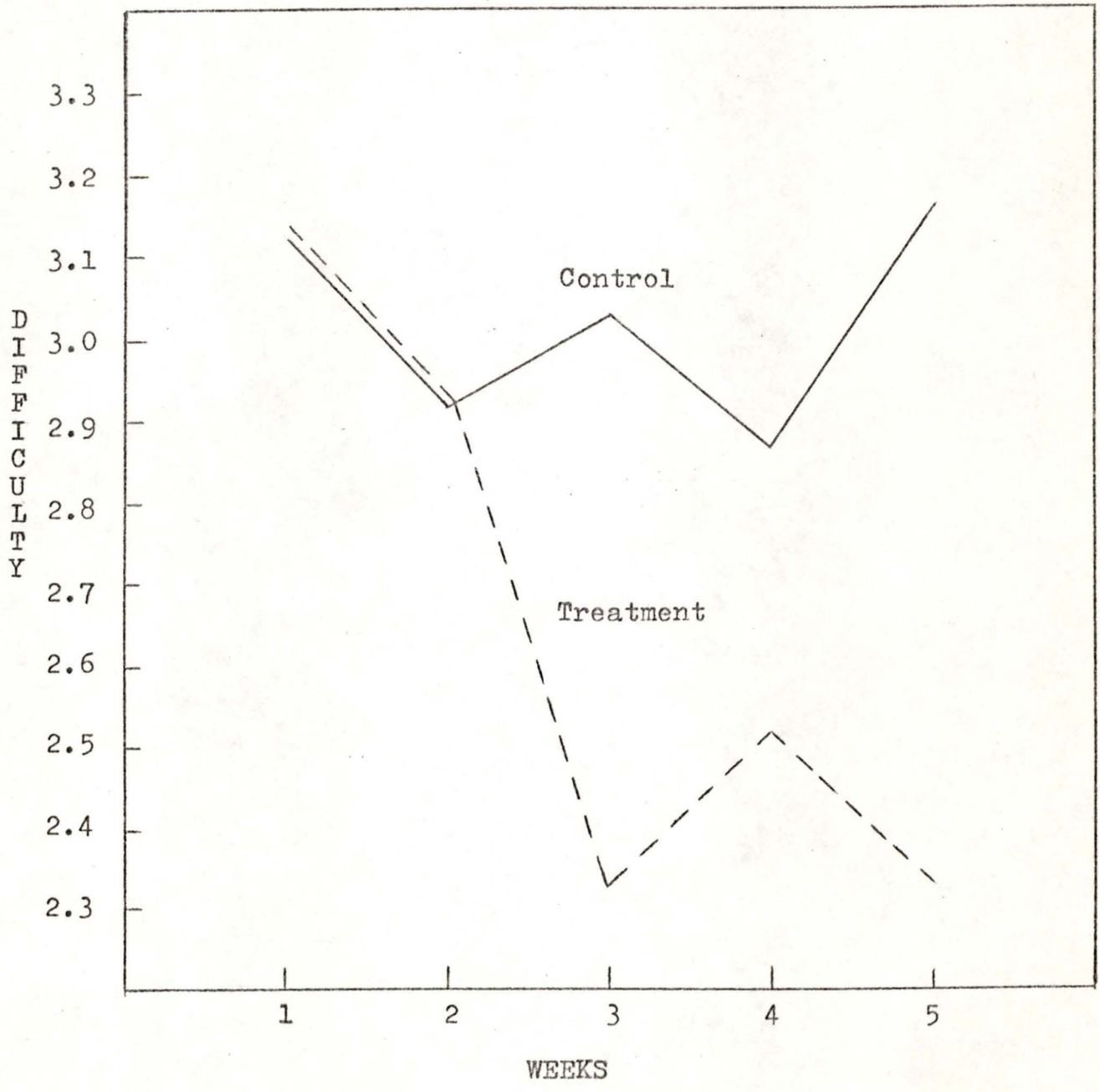


Figure 2

Difficulty In Going To Sleep For Treatment And Control Groups During The Five Week Training Period



Steinmark and Borkovec (1974), Borkovec and Fowles (1973), and Haynes, Woodward, Moran and Alexander (1974), all had significant decreases in sleep onset latency times, using similar PRT procedures. As in the Monroe (1967) study, the subjects in the present study did experience considerable subjective difficulty in going to sleep. The trend was toward a decrease in difficulty, but this trend did not reach significance. Two studies, Borkovec, Kaloupek and Slama (1975), and Steinmark and Borkovec (1974), did find significant reductions on this index, but one other similar study, Borkovec and Fowles (1973) did not find a significant reduction.

There are several possible explanations for these measures not reaching significance. The treatment group was relatively small, so it is possible an adequate sample was not attained. Confounding the results is the fact that as the treatment was ending, exams were approaching, (within two weeks) with the possible effect of raising student anxiety and making going to sleep harder. The control group's difficulty and sleep onset latency times increased during the last week of training, possibly attesting to this fact.

Another possible explanation is that during Week Four, two subjects in the treatment group reported spuriously high sleep latency and difficulty in going to sleep, i.e., higher than their baseline week.

One of the subjects reported she was ill and coughing kept her awake. The other subject had a crisis in her personal life, which made it more difficult to go to sleep. These two subjects' high scores were enough to alter the entire group's mean upward, and thereby possibly affecting the probability. Two data reruns were conducted on the time and difficulty indices, one with the two subjects removed: minutes, F (4, 28) = 4.84, $p < .004$, and difficulty F (4, 28) = 3.53, $p < .02$. The second run was with both subjects Week Four scores changed to be the average of their Week Three and Week Five scores: minutes, F (4, 36) = 5.05, $p < .003$, and difficulty F (4, 36) = 3.62 < .01. Either of these statistical manipulations does alter the probability figures thus possibly suggesting that these two subjects' Week Four scores altered the entire group's mean so that the analysis did not reach significance. Also both manipulations change the Week Four means for difficulty and times downward, which makes Week Four the lowest weekly mean, i.e., Week Five being slightly higher, or more similar to the pattern of the control group's means which went up during Week Five (see Figures 1 and 2).

On the measures of general anxiety and psychosomatic complaints, there is support for the hypothesis in that there was a reduction of psychologically related tension problems, but not for the part of the hypothesis stating that there would be a reduction in general anxiety.

The present study focused primarily upon treatment of physical somatic symptoms of tension, which would account for the psychosomatic symptom reduction. Cox, Freundlich and Meyers (1975) also found significant reductions in psychosomatic complaints following PRT training for subjects with tension headaches. There are several possible explanations for the lack of reduction in the general anxiety domain. First, of course, is that PRT has no effect upon general anxiety, which counters Goldfried's (1969) hypothesis, and as well the results of Sherman and Plummer (1973), Chang-Liang and Denny (1976) and Deffenbacher and Snyder (1976). It seems evident from the present study that instructions to subjects about possible use of PRT outside therapy for other anxieties were not sufficient to produce a significant reduction in general anxiety. Chang-Liang and Denny (1976) also found no reduction in general anxiety in their relaxation only group, but their group was not instructed to use the technique outside of therapy. From the present study and from Chang-Liang and Denny (1976), it may follow that in order to induce a significant reduction in general anxiety some procedural alteration in the PRT training is needed. In two studies, Deffenbacher and Snyder (1976), Chang-Liang and Denny (1976), containing groups which used a modified

PRT procedure which included training as to when to apply the PRT, and in vivo practice sessions, a significant decrease in general anxiety was noted. This procedural alteration may train subjects in how and when to apply PRT, which may be training the subjects how to cope more effectively with general anxiety. Further study is needed to explore this phenomenon. To test if PRT is an element in an active coping process rather than the agent in this process as Goldfried (1971) suggests, a three group study would need to be run. Included in such a study would be: a PRT group, a PRT group with active in vivo and application training, and a control group. Using a pre-post test design, with the IPAT as one of the measures, and an anxiety related target behavior, this phenomenon could receive fuller attention.

As a result of this study the subjects have, as a group, considerably lowered the amount of time it takes for them to fall asleep, as well as the subjective difficulty in falling asleep. Several of the subjects, following training, remarked to the experimenter that they had learned something of value that they could use when they needed to. This study did not attempt to assess the plausibility of the treatment to the subjects or global improvement, but the remarks these subjects made do lend

some support to the notion that the subjects learned a skill, and that this skill is useful to them. Two studies, Nicassio and Bootzin (1974) and Kahn, Baker, and Weiss (1968), did measure treatment plausibility and global improvement, and found that most of their subjects found value in the treatment, but no statistical analysis was conducted. This skill, PRT, is now a part of their repertoire, and can be used whenever they experience difficulty in going to sleep. Potentially, this will allow them to be less concerned about their sleep patterns and to have less anxiety about their not getting to sleep. PRT will allow the subjects to avoid being exposed to the cyclical problems normally experienced by students with insomnia, for example, worrying about getting enough sleep prior to exams, which leads to a greater difficulty in going to sleep, which in turn increases their anxiety about getting enough sleep. It also seems unlikely that the students would have a need for sleep medications, and the potential ill effects of the chemotherapy.

The PRT procedure is economical in therapist time. The therapist spent under two hours per client for the entire five week program. Since the program can be taught fairly easily to other therapists, a large number of potential instructors are readily available. The use

of PRT as an active process to lower sleep onset latency times in subjects who experience this type of insomnia seems to be a valid hypothesis. A follow up study is at present being conducted, but will not be included in this study. The follow up consists of re-testing all subjects in both groups with the IPAT, the General Sleep Questionnaire, and the Thatcher Psychosomatic Test, as well as having all subjects complete sleep logs for a one week period. The follow up is being done prior to training the control group, so as to provide additional contrasts between groups. In addition, a post test will be conducted upon the control group, following training, so as to compare treatment effectiveness between groups. An analysis will be done on this additional data, and will be submitted for publication. A test-retest reliability study is also being conducted upon the Thatcher Psychosomatic Test and the General Sleep Questionnaire; this data will also be contained in the journal article, (see also Appendix I).

Suggestions For Improvement Of The Present Study

The addition of a two to three week baseline period prior to the start of training would allow the subjects time to become accustomed to observing their sleep onset times, and to become used to recording these times. An increase in the number of subjects in each group would

be a more representative sample of the entire population of persons with this type of insomnia. The inclusion of automation of the relaxation instructions, on cassette, would allow clients to take the cassettes home, as well as allow the therapist to circulate in the room during therapy sessions to check with clients individually to see how the relaxation exercises were progressing. The inclusion of a stimulus control element into the program would allow the subjects to structure sleep patterns and behaviors more efficiently. The use of instruments which have had validity and reliability studies conducted upon them would allow easier generalization of the results to other studies.

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APPENDIX A

INFORMAL CONTRACT FOR SLEEP STUDY FOR TREATMENT GROUP

Informal Contract For Sleep Study

I,_____ do agree to do the following things:

1. To fill out three sets of questionaires.
2. To come to all group meetings, or notify Stan Thatcher if I can not.
3. Keep a record of my sleep onset each day.
4. Keep a record of my daily relaxation practice.
5. To not discuss the details of the procedure with others.

In return for these commitments, I will receive the following:

1. Training in a relaxation technique which may lower my sleep onset time.
2. A complete discussion of the study, after it completion, if I desire it.
3. The opportunity to be involved in a research programme.

The design of this study requires that two groups of people be compaired to test the effectiveness of the relaxation technique. Both groups will receive training, but one will be trained before the other. The selection of people into these two groups will be done completely by random, with each person having an equal chance of being in either group.

Please keep this contract, as it will serve as a reminder of things to be done, and it also has information about getting in touch with Stan Thatcher.

Signed:_____ Date:_____

Signed:_____ Dat.:_____

Stan Thatcher: Mail box in Mac 241

Phone number: 479- 9252 (before 9 pm, please)

APPENDIX B

INFORMAL CONTRACT FOR SLEEP STUDY FOR CONTROL GROUP

Informal Contract for Sleep Study

I, _____ do agree to do the following things:

1. To fill out four sets of questionnaires.
2. To keep a record of my sleep onset each day.
3. To weekly mail a card with a record of my sleep onset and difficulty.
4. To notify Stan Thatcher if I decide to quit participating.
5. To come to all meetings when they occur.

In return for these commitments, I will receive the following:

1. Training in a relaxation technique which may lower my sleep onset time.
2. A complete discussion of the study, after its completion, if I desire it.
3. The opportunity to be involved in a research program.

The design of this study requires that two groups of people be compared to test the effectiveness of the relaxation technique. Both groups will receive training, but one will be trained before the other. The selection of people into these two groups will be done completely by random, with each person having an equal chance of being in either group.

Please keep this contract, as it will serve as a reminder of things to be done, and it also has information about getting in touch with Stan Thatcher.

_____ _____

Signed Date

_____ _____

Signed Date

Stan Thatcher: Mail box in Mac. 241
Phone number: 479-9252 (before 9 p.m. please)

APPENDIX C

SLEEP LOG

SLEEP LOG

Name:_____ Week of:_____ to:_____

	Minutes to go to sleep	Degree of Difficulty								
		no difficulty		some difficulty		moderate difficulty		a good deal of difficulty		extreme difficulty
Monday		0	1	2	3	4	5	6	7	8
Tuesday		0	1	2	3	4	5	6	7	8
Wednesday		0	1	2	3	4	5	6	7	8
Thursday		0	1	2	3	4	5	6	7	8
Friday		0	1	2	3	4	5	6	7	8
Saturday		0	1	2	3	4	5	6	7	8
Sunday		0	1	2	3	4	5	6	7	8

Please place your name and the weeks date at the top. Write in the approximate number of minutes it took you to fall asleep each night, and circle how much difficulty you had in going to sleep. Try to complete this form each morning; if you do forget, try to remember as closely as you can. Do not leave any days blank.

APPENDIX D

GENERAL SLEEP QUESTIONNAIRE

Please answer the remaining questions in terms of your average or typical experience with your sleep situation during the past month.

1. How many nights per week do you experience sleeping difficulties? _____ nights per week.
2. How long does it take you to fall asleep after retiring? _____ minutes
3. How many nights per week do you awaken during the night? _____ nights per week
4. How many times per night do you wake up? _____ times per night
5. When you do awaken during the night, what percent of the time do you have difficulty falling back to sleep? _____% of the time
6. How often during the week do you awaken and are unable to fall back to sleep at all? _____ times per week
7. How much difficulty do you have falling to sleep?

0	1	2	3	4	5	6	7	8
no difficulty		some difficulty		moderate difficulty		a good deal of difficulty		extreme difficulty

8. How rested do you feel in the morning?

0	1	2	3	4	5	6	7	8
very rested		somewhat rested		moderately rested		not very rested		no feeling of being rested

9. How much enjoyment do you get from sleeping?

0	1	2	3	4	5	6	7	8
very much enjoyment		much enjoyment		moderate enjoyment		a little enjoyment		no enjoyment whatsoever

10. How often do you feel tired during the day because of poor sleep from the preceding night? _____ days per week.
11. Does your sleeping difficulty cause other disruptions in your daily living? _____ Specify:

12. Are you currently taking any drugs for the difficulty? _____ Specify type of drug and dosage.

APPENDIX E

THATCHER PSYCHOSOMATIC TEST

Name:_____ Date:_____

Please rate each of these conditions for frequency of and severity of occurence. Frequency refers to the total amount of time you experienced a condition; severity refers to the average amount of pain or distress of the condition when it did occur.

FREQUENCY

1. Did not occur
2. Lasted less than 3 hours
3. Lasted 3-7 hours
4. Lasted an entire day
5. Lasted several days

AVERAGE SEVERITY

1. Not noticeable
2. Slightly bothersome
3. Moderately bothersome
4. Severely bothersome
5. Very severely bothersome

FREQUENCY	Condition	SEVERITY
_____	headaches	_____
_____	backaches	_____
_____	cramps	_____
_____	nausea	_____
_____	loss of appetite	_____
_____	vomiting	_____
_____	leg aches	_____
_____	dizziness	_____
_____	weakness	_____
_____	diarrhea	_____
_____	breathing difficulty	_____
_____	facial blemishes	_____
_____	abdominal pain	_____
_____	flushing	_____
_____	general aching	_____
_____	depression	_____
_____	irritability	_____
_____	nervousness	_____
_____	eye pain associated with reading	_____

APPENDIX F

RELAXATION GUIDE

RELAXATION GUIDE

Relaxation is an important part of our training process. Since relaxation is a skill that you can learn with practice, you are asked to practice relaxation once daily. This sheet of materials should aid you in your practice.

Your tension-relaxation procedure should follow the one you learned here. You should tense each muscle group in the way and the order which you experienced them. Tense each one for 5 to 10 seconds and then say "relax" to yourself. Then give yourself another 20 to 30 seconds to continue releasing and relaxing. When you covertly say "relax", concentrate on that muscle group and release it immediately. Pay attention to the feelings of tension and of relaxation in each muscle group, identify and enjoy them. Think about relaxing each muscle group a little more and consciously release each a little more. When you are doing this, feel free to use any of the helpful phrases or suggestions you have learned here. At various points you should go back over and review the various muscle groups and let each go a little more, e.g., after your arms, after your neck and head area, after your chest and stomach area, and after your legs are finished.

To help you remember the tension-release exercises, you will find on the next page a list of the muscle groups in order and the methods for tensing them. Tense each group hard, but, not to the point of cramping.

Repeat any group in which you feel excessive tension. You will probably find that you have a few areas in which you experience most of your tension; these are the areas that you probably will want to repeat.

Muscle groups and exercises:

1. hands by clenching them
2. wrists and forearms by extending them and bending the hands back at the wrists
3. biceps and upper arms by clenching your hands into fists, bending your arm at the elbows, and flexing your biceps
4. shoulders by shrugging them

(review back over the arms and shoulder area)

5. forehead by wrinkling it into a deep frown
6. around the eyes and bridge of the nose by closing the eyes as tightly as possible (contact lens should be removed before beginning the exercises)
7. cheeks and jaws by grinning from ear to ear
8. around the mouth by pressing the lips together tightly
9. back of the neck by pressing the head back hard
10. front of the neck by touching the chin on the chest

(review the neck and head area)

11. chest by taking a deep breath and holding it, then exhaling
12. back by arching the back up and away from the support surface
13. stomach by sucking it in as far as possible
14. stomach by forming it into a tight knot

(review the chest and stomach area)

15. hips and buttocks by pressing the buttocks together tightly
16. thighs by clenching them hard
17. lower legs by pointing the feet back towards the face, like trying to bring the toes up to touch the knees
18. lower legs by pointing the toes away and curling the toes downward at the same time

(review the area from the waist down)

Check with your counselor at your next session if there are any questions or problems.

APPENDIX G

SESSION BY SESSION INSTRUCTIONS AND TRAINING PROCEDURES

Session 1

The subjects were given a rationale of the procedure which included a description of the major causes of insomnia and how the procedure will act upon these causes. The subjects then asked questions. They were then told that as a group they should not expect to see noticeable improvement in sleep latency times until approximately three weeks, so not to get discouraged but to keep practicing. They were asked to practice PRT once daily, in their own bed, preferably, just before going to sleep. The treatment rationale emphasized that the subjects were learning a new skill, and that it would take practice to master it. After further questions the sleep logs were handed out and explained. Also instructions about missing meetings and make ups were covered.

The training started, using Deffenbacher's (1973) manual for deep muscle relaxation procedure. Subjects were instructed to say the word 'relax' covertly before releasing each muscle group. Each muscle group was tensed and released two times, with the hand muscles, the arm muscles, and the leg muscles done together,

rather than each set of muscles done separately. All training sessions were done in a darkened room, with the subjects laying on a padded mat on the floor. All subjects were issued a handout covering the relaxation exercises to be done.

Session 2

The session began with the experimenter collecting the sleep logs and issuing new ones. Then any problems were discussed, and subjects were asked how it had gone in the last week. The subjects were asked if they had tried the relaxation procedure in any other situations. The experimenter explained that tension and relaxation could not occur at the same time, so if the subjects found themselves tense, they could relax the tension away. The relaxation procedure followed, but this time involved only tensing each group of muscles once.

Session 3

Logs were collected and new ones issued. The subjects were asked if they had experienced any improvement in their sleep onset times. Any questions or problems were brought up. The subjects were asked if they had an opportunity to use the relaxation training

in any other situations, and these were discussed. The subjects were asked if they had found any areas in their bodies which were harder to relax, and/or where they store tension, or where tension exhibits itself in their bodies. A discussion followed which centered on using these areas in the body as a cue for each subject to realize that they are experiencing tension, so as to allow them to use these cues for a guide for applying their relaxation techniques in other situations. The relaxation training followed. When the training was complete, and all the subjects were deeply relaxed, an in vivo practice of going to bed and using the PRT to get to sleep was conducted. Clients were given the following instructions. "Imagine you are at home. It is about your usual sleeping time. You're getting tired. Imagine you're getting changed out of your street clothing and into your sleeping clothing. You're getting ready to go to bed (brushing teeth, etc.). Now imagine you're setting your clocks to get up in the morning . . . you're laying down to go to sleep but your head is racing and/or your body is racing. Now turn your attention away from this and do your PRT." After they could imagine this series of events, the experimenter said the word 'relax' ten times very slowly so as to relax the subjects more. The subjects were

then asked to say 'relax' to themselves each time they exhaled. This was for a 90 second period. The subjects were then asked, "imagine that you're drifting off into a very deep and relaxing sleep . . . you're waking up in the morning, and you feel very relaxed and refreshed." The subjects were then aroused and the session ended.

Sessions 4 and 5

Logs were collected and new ones issued. Subjects were asked if they had noticed any improvements in their sleeping. A check for any problems or concerns followed. The subjects were asked if they had had an opportunity to use the training in any other situations. The subjects were instructed not to use as much tension when doing the exercises from then on. They were encouraged to just think about the muscle area and remember their feelings from the previous time. Doing this would allow them to bring on the relaxation at will. This was discussed at length, and any questions answered. The subjects were instructed that they would probably still have to do the exercises for some muscle groups, for example, the ones in which they store tension, but that they could eliminate some of the exercises for areas which they had no trouble relaxing. As the

number of sessions did not allow this procedure to be completed in the training sessions, the subjects were told the rationale, and given two sessions of practice, but they were told that they would be the ones to decide if they wanted to continue decreasing the amount of tension applied until they did not tense anymore or if they wanted to continue doing the same amount. It was stressed that the program was designed to meet their individual needs, and clients were encouraged to use procedures that helped them the most. Relaxation practice then occurred, with the experimenter deleting instructions dealing with applying a lot of tension during the tension phase, and also deleting reference to holding the tension or being aware of the tension. At the end of session five, subjects were instructed to come the following week to the regular meeting place and time for filling out a set of questionnaires and that the experimenter would not be there.

APPENDIX H

NUMBER OF SUBJECTS OF EACH SEX IN TREATMENT AND CONTROL GROUPS AT START OF TRAINING, AND NUMBER AND SEX OF DROPOUTS FROM EACH GROUP DURING TRAINING

NUMBER OF SUBJECTS OF EACH SEX IN TREATMENT AND CONTROL GROUPS AT START OF TRAINING, AND NUMBER AND SEX OF DROPOUTS FROM EACH GROUP DURING TRAINING

			Dropouts	
	Treatment	Control	Treatment	Control
Male	3	6	0	3
Female	12	11	4	1
Total	15	17	4	4

APPENDIX I

RELIABILITY AND VALIDITY OF THATCHER PSYCHOSOMATIC TEST AND THE GENERAL SLEEP QUESTIONNAIRE

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Reliability

A correlated t-test was conducted on the control group (N = 14) pre and post-test data. This test was conducted to provide test retest reliability on the Thatcher Psychosomatic Test and the General Sleep Questionnaire.

	Pre		Post		Correlation		
	$\bar{X}$	Sd	$\bar{X}$	Sd	Pre to Post	t	p of t
TPT	96	42	96	30	.57	.05	.96
GSQ	24	8	23	6	.64	.70	.50

Validity

Visual inspection of the Thatcher Psychosomatic Test reveals (see Appendix E) an extensive list of psychosomatic problems or complaints. With the addition of a measurement of frequency and severity of the complaints, a description of how each complaint is experienced by an individual is provided. The items on the Thatcher Psychosomatic Test are similar in range and content to items on other Psychosomatic tests, e.g., the Psychosomatic Checklist used by Cox, Freundlich, and Meyer (1975).

A visual inspection of the General Sleep Questionnaire (see Appendix D) reveals a thorough overview of general sleep habits. In addition, many items ask for the degree of the problem a person experiences, which allows for a more accurate description of the person's sleeping habits and problems. Many of the items on the General Sleep Questionnaire are similar in nature to items used by other sleep researchers to determine sleep problems, e.g., Borkovec and Fowles (1973) and Borkovec, Steinmark and Nau (1973).

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PROGRESSIVE RELAXATION TRAINING:

EFFECTS UPON INSOMNIA, PSYCHOSOMATIC COMPLAINTS,

AND GENERAL ANXIETY IN A POPULATION OF UNIVERSITY STUDENTS

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April 28, 1977