

A COMPARISON OF TWO BEHAVIORAL TREATMENTS
FOR MODERATE INSOMNIA

by

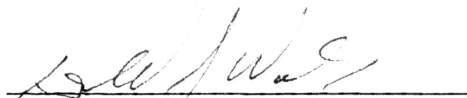
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A handwritten signature in cursive script, appearing to read "D. J. Woods", is written over a horizontal line.

Donald J. Woods

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ABSTRACT

A Comparison of Two Behavioral Treatments
for Moderate Insomnia
(April 1978)

Carrie Styner Burns

Eighteen sleep disturbed college students received either systematic desensitization or muscle relaxation training. After a one week baseline self-observation period, subjects underwent three half-hour therapy sessions. There was no significant difference between the two treatment conditions after the third session. Both desensitization and relaxation training groups showed significant improvement in latency to sleep onset, number of awakenings, and degree of restfulness over the four weeks of the study. Difficulties in generalizing results from college students with moderate insomnia to chronic insomniacs in the general population are discussed.

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INTRODUCTION

Most persons have experienced an occasional night of troubled sleep. However, for many getting to sleep, and/or staying asleep, is a chronic and disturbing problem. Many forms of treatment of insomnia, from drugs to hypnosis have been attempted (see Sheehan, 1976, for a partial review), and have met with varying degrees of success. The objective of the present study is the comparison of a learning theory based method of treatment, systematic desensitization, with progressive muscle relaxation training, with mild to moderate insomniac college students.

The word insomnia comes from the Latin for "nonsleep", in and somnus. It may include difficulty falling asleep, broken sleep, awakening and being unable to get back to sleep, early awakening, or a combination of any or all of the above. Surveys indicate that about one in seven persons in the general population report instances of troubled sleep "often", with the figure being considerable higher in older persons, while one-half of those surveyed report troubled sleep "sometimes" (Luce & Segal, 1969; Webb, 1975). The surveys also indicate that insomnia does not discriminate based on race, nationality, or socioeconomic status. By convention, the usual criteria for insomnia are averaging less than six hours of sleep per night or greater than thirty minutes latency to sleep onset, plus a feeling of sleepiness during the day and feeling a need for more sleep (Borkovec, Slama, & Grayson, 1977). However, individual differences in the need for sleep are such that no single figure can be used as a definition of insomnia.

Types of insomnia

Insomnia may take many forms. It may be the case of a natural short sleeper who believes he must meet the norm of seven to eight hours of sleep a night in order to get all the sleep he needs. Or, an older person who is unable to attain the quantity and quality of sleep he once could. A person suffering from imaginary insomnia may protest that he "didn't sleep a wink", when in fact he has slept several hours by EEG and behavioral criteria. However, a closer look at the sleep experienced indicates marked differences from the normal night's sleep. Monroe (1967) examined differences between good and poor sleepers over two nights in a sleep laboratory. Before the experiment, poor sleepers reported an average of 59 minutes to fall asleep, but even in the strange confines of the sleep laboratory, attached to several monitoring devices, the poor sleepers averaged only 15 minutes to fall asleep. During sleep, however, they showed significant differences from good sleepers in their physiological state of arousal and in their EEG recordings, with poor sleepers being more aroused and showing less REM sleep and more stage 2 sleep. The poor sleepers also awakened twice as often during the night. Other studies indicate the imaginary insomniac has many wake-like thoughts running through his mind during sleep (Luce & Segal, 1975). Although he may be misjudging the amount of time he spends asleep during the night, believing himself to have been awake when he has actually been asleep, imaginary insomnia is very real to its victim.

Insomnia may also occur as a transient response to some situation or problem in the person's life, such as the death of a loved one, a major examination, loss of a job, etc. Situational insomnia is usually

characterized by recent onset and/or limited duration. Laboratory studies of medical students under stress of final examinations showed less delta sleep (delta sleep, or Stage IV, is associated with very deep, dreamless sleep). The students also showed more galvanic skin activity (Luce & Segal, 1969). Treatment in the case of situational insomnia lies in dealing with the problem causing the disturbance and in reassuring the patient about the transient nature of the problem.

Insomnia often accompanies psychological illness, as a contributing factor or as a result. It is frequently seen as a companion to depression, in the form of less total sleep and in early morning awakenings (Kales & Berger, 1970). Also, unlike the regular, orderly cycle of brain-waves shown by a healthy person's sleep, the depressed person's rhythms are erratic (Luce & Segal, 1969).

Treatments of insomnia

Many treatments of insomnia are possible. An often used treatment is the prescription of a hypno-sedative drug. But use of a drug can lead to unwanted side effects including respiratory depression due to overdosage, confusional states, hypersensitivity reactions (especially in the form of skin reactions), metabolic effects on the liver, a hang-over effect of the drug on behavioral performance the next day, and abnormal sleep patterns (Clift, 1975, pp 316-320). Hypnotic drugs have been shown to suppress REM sleep (Webb, 1975). As the patient habituates to the drug, higher doses are necessary to produce the same amount of sleep while simultaneously reducing REM time.

In view of the possible undesirable side effects of using drugs to treat insomnia, a nonpharmacological treatment is often indicated.

Traditional psychotherapy and psychoanalysis have proven ineffective. Classical conditioning has been somewhat successful (Evans & Bond, 1969; Pendleton & Tasto, 1976; Sheehan, 1976). It involves pairing a stimulus such as a metronome or counting to a certain number with relaxation or with falling asleep due to injection of a sleep inducing drug. The patient should become conditioned to fall asleep upon presentation of the stimulus alone. Operant stimulus control is another method of treatment which has been useful in relieving insomnia (Bootzin, 1969; Haynes, Price, & Simons, 1975). Any association between bed related stimuli and behaviors incompatible with sleep is avoided. The subject is instructed to remain in bed only as long as he feels sleepy, and to get up and go into another room if he wishes to eat, study, read, worry, etc. The use of eidetic imagery is another technique which has been reported to produce positive results (Sheikh, 1976). The subject is asked to recall situations when he was extremely tired and sleepy but external demands required him to remain awake, for example, studying for a major examination or finishing a long task. Concentrating on this scene will make the subject drowsy, and he is then instructed to disregard the external demand and allow himself to fall asleep. At this point, the subject should indeed fall asleep.

Biofeedback is another technique which has proven effective in the treatment of insomnia (Freedman, 1975). Hypnosis has been used successfully to relieve the symptoms of insomnia in some cases (Luce & Segal, 1969), while it has not been shown to be effective in others (Graham, Wright, Toman, & Mark, 1975). It employs relaxation and post hypnotic suggestion. Weiss (1973) has reported improvement in minutes to sleep onset, amount of bed time spent awake, and in percent delta

sleep using the controversial treatment of electrosleep. The gains made during the experiment were found to have been maintained by four of the five members of the treatment group after a two year follow up study (Cartwright & Weiss, 1975). In a case study, Jason (1975) reported decreasing time required to fall asleep at night and eliminating daytime naps by use of self-monitoring of sleep time.

Systematic desensitization involves the replacement of an anxiety response to a situation or stimulus with a response incompatible with anxiety. It involves training in deep muscle relaxation followed by presentation of images that are weakly anxiety evoking and progressing to stronger and stronger anxiety arousing stimuli as long as the subject does not indicate the presence of any tension. Traditionally systematic desensitization has been used in the treatment of phobic reactions, but with slight modification it can be used to treat insomnia. This is based upon the assumption that the inability to fall asleep is related to anxiety and a high level of mental and physical tension. It is believed that the state of mind and body accompanying relaxation is incompatible with that present during anxiety. The attempt is made to have the subject replace the response of anxiety and tension to bed related stimuli with the response of relaxation. Desensitization is believed to cause the association of a new response to old stimuli.

Geer and Katkin (1966) reported successful use of single item desensitization in the treatment of a case of severe insomnia. Steinmark and Borkovec (1974) obtained significant improvement in latency to sleep onset using single item desensitization with a group of sleep disturbed college students.

Numerous studies have shown deep muscle relaxation to give positive

results in the treatment of insomnia (Borkovec, Kaloupek, & Slama, 1975; Davison, Tsujimoto, & Glaros, 1973; Freedman, 1975; Haynes, Woodward, Moran, & Alexander, 1974; Kahn, Baker, & Weiss, 1968; Lick & Heffler, 1977; Nicassio & Bootzin, 1974; Pendleton & Tasto, 1976; Steinmark & Borkovec, 1974). In this procedure, the client is asked to successively tense and release various muscle groups throughout the body, with accompanying suggestions of warmth, relaxation, and calmness. He is asked to focus his attention on the contrast between the feeling of tension when he contracts his muscles and the feeling of relaxation when he releases them. Again, the assumption is made that physical and psychological tension are related to the inability to get to sleep. Deep muscle relaxation teaches the subject a new skill, the ability to relax, which he can then utilize to overcome his sleeping problem.

Lick & Heffler (1977) compared progressive relaxation training, with and without a supplementary recording of relaxation procedures which the subjects played at home, with an expectancy placebo therapy condition and a no-treatment control group. They found the relaxation training procedures to be significantly more effective than placebo and no-treatment controls in modifying sleeping behavior, in reducing consumption of sleep-inducing medication and in influencing a self-report anxiety measure. The supplementary relaxation tape did not increase effectiveness.

Haynes, Woodward, Moran, and Alexander (1974) also found relaxation treatment to show significantly more improvement in sleep patterns than an expectancy placebo therapy control group. The fact that placebo therapy also produced significant improvement over time indicated contributions from expectation and demand characteristics.

Steinmark and Borkovec (1974) conducted a study comparing relaxation training, single item desensitization, placebo and no treatment controls under counterdemand and positive demand instructions. The subjects were told not to expect improvement until after the fourth session of treatment. Relaxation training and desensitization produced significantly greater improvement in latency to sleep onset than placebo and no treatment conditions during the counterdemand period prior to the fourth session. All three treatment conditions produced significantly greater improvement than no treatment after the fourth session, during the positive demand period. Freedman (1975) reported that frontalis EMG biofeedback and progressive relaxation training produced significantly more improvement in sleep onset in insomniacs than a placebo set of "relaxation" exercises, and did not differ significantly from each other.

Davison, Tsujimoto, and Glaros (1973) found that subjects who were led to believe their improvement during treatment was due more to a self produced relaxation procedure than to a drug maintained their improvement to a significantly greater degree than subjects who believed their dosage during treatment was optimally effective in helping them sleep. All subjects had been given 1000 mg of chloral hydrate per night and relaxation and sleep scheduling procedures. Following treatment, one group was told they had received an optimal dosage of the drug and the other group was told that the dosage they had received was too weak to have been responsible for any gains.

The present study investigated the effects of a multi-item systematic desensitization treatment, as compared to progressive muscle relaxation training, as treatments for moderate insomnia in college students. Subjects in one treatment condition received muscle relaxation training

alone. Subjects in the second treatment condition received muscle relaxation training plus multi-item desensitization. In their study, Steinmark and Borkovec (1974) had a muscle relaxation group and a single item desensitization group among the treatment conditions. They did not find any significant difference between these two conditions. The present study attempted to show that the use of multi-item systematic desensitization is more effective than muscle relaxation alone. It was hypothesized that subjects in the muscle relaxation plus desensitization treatment condition would show relatively greater improvement in insomnia symptoms than subjects in the muscle relaxation training alone treatment condition.

METHOD

Subjects

Subjects were recruited from the introductory psychology course at Texas A&M University by means of a notice posted on the experiment sign up board. The notice limited the experiment to persons suffering from insomnia. Forty-five persons were interviewed and 20 were retained for the study. Two subjects later dropped out of the study, leaving 11 females and 7 males. After a one week baseline measure, subjects were retained based on the criteria of averaging 6.5 hours of sleep a night or less and/or a 30 minutes or more latency of sleep onset. Those who completed the experiment received credit for participation to fulfill a course requirement.

Instruments

At the initial screening interview, a questionnaire was used (see Appendix A) asking subjects their average number of hours of sleep per night, latency of sleep onset, whether waking during the night was a problem, how often the subject experienced insomnia, and duration of the insomnia problem. Throughout the study, each subject kept a daily record of his sleeping habits. Each morning he filled in a form recording the estimated number of hours of sleep and time to fall asleep, the number of wakings during the night and a rating of degree of restfulness on a 1 to 7 scale, where a rating of 1 indicated no restfulness and 7 indicated extreme restfulness. Each form covered 7 days. At the beginning of the first treatment session, each subject was given the State Trait Anxiety Inventory (see Appendix B). At the end of the first treat-

ment session each subject was presented with a statement asking for a rating regarding his expectancy of success of his treatment (see Appendix C).

Apparatus

Treatment sessions took place in a small room containing a reclining chair for the subject, the experimenter's chair, and two small tables. During each session, the subject sat in the fully reclined position, the lights were dimmed and a progressive relaxation training tape was played. The tape consisted of 30 minutes of instructions given by a clinical psychologist experienced in behavior therapy instructing the subject to tense one muscle or group of muscles and then to relax completely. The tape began with the subject contracting all muscles in his body and then relaxing. It then proceeded to focus on one muscle group at a time. Interspersed throughout the tape were suggestions of warmth, comfort, and well being.

Procedure

Subjects were randomly assigned to one of two treatment conditions. Group I, N = 10 (6 females, 4 males), received muscle relaxation training alone. Group II, N = 8 (5 females, 3 males), received muscle relaxation training plus multi-item desensitization procedures. Each subject met with the experimenter for a one hour treatment session once a week for three weeks. At the first meeting, each subject was presented with a rationale for his treatment approach and given the State Trait Anxiety Inventory. Subjects in Group II (desensitization) were asked to suggest some activities and stimuli consistently associated with going to bed. During the remainder of the session, the relaxation group listened to

the tape of progressive relaxation training instructions while lying back in the reclining chair. Subjects in the desensitization group received the same progressive relaxation instructions followed by desensitization procedures while the subject was in the relaxed state. During desensitization, he was presented with a series of three or four scenes taken from the activities suggested earlier by the subject himself. He was asked to imagine himself, as vividly as possible, at home doing one of the activities described earlier. The subject was asked to indicate if he experienced any tension or anxiety by raising a finger. If no tension was indicated, he was then asked to visualize another activity. If tension was indicated, he was instructed to relax, and then the scene was presented again. At no time was it necessary to present a scene more than two times.

At the end of the first treatment session, all subjects were instructed to practice the muscle relaxation procedures at night after going to bed. Each subject was asked to rate the degree of relaxation attained on a 1 to 100 scale, where a rating of 1 indicated "not relaxed at all" and 100 indicated "the most relaxed you have ever been in your life." Each subject was then presented with a statement asking him to rate his expectancy of success (see Appendix C). Finally, subjects were given a new sleep record to be filled out during the following week.

At the second and third treatment sessions the relaxation group listened to the progressive relaxation training tape and the desensitization group listened to the tape and received desensitization procedures. Each subject also received a new sleep record to fill out, and was reminded to practice the relaxation procedures every night. One week after the third treatment session all subjects returned their last sleep record.

RESULTS

Baseline data

A two-way analysis of variance with repeated measures on days was performed on the pretreatment week data for each of the four dependent variables: the number of minutes before falling asleep the previous night (latency to sleep onset), the number of hours slept, the number of wakings during the night, and the rating of degree of restfulness on a 7-point scale. These analyses showed no significant differences between treatment groups on hours of sleep ($F(1, 17) = 3.68; p < .07$), minutes to fall asleep ($F(1, 17) < 1$), or on the number of awakenings ($F(1, 17) = 2.29; p < .15$). There was a significant difference between the two groups on the degree of restfulness variable, $F(1, 17) = 5.33, p < .04$. The group receiving muscle relaxation training displayed significantly greater self-report of restfulness ($M = 4.44$) than the systematic desensitization group ($M = 3.38$). The effect of trials was significant for the hours of sleep variable only, $F(6, 102) = 3.77, p < .005$. Subjects reported relatively more hours of sleep on day 5 ($M = 7.62$) than on the other six days (closest M to day 5 was day 7 where $M = 6.26$). There were no statistically significant group by trials effects in the analyses of baseline data.

Relaxation rating

A two-tailed t -test was performed on the relaxation ratings that were obtained following the first treatment session. The data from one subject in the muscle relaxation training group was not collected due to an oversight of the experimenter. The average rating for the muscle

relaxation group was 86.44 (sd = 10.3). The average for the desensitization group was 81.16 (sd = 12.8). A significant difference was found between the two groups, $t = 2.22$, $df = 16$, $p < .05$.

Expectancy of success rating

A two-tailed t -test was performed on the ratings of expectancy of success. The average for the muscle relaxation group was 5.11 (sd = 1.6). The average for the desensitization group was 4.78 (sd = 1.5). The two groups were not found to be significantly different in their expectation of success, $t = 0.96$, $df = 16$, $p > .10$.

Principal analysis

The data were analyzed in two ways. First, a two-way analysis of variance with repeated measures on days was performed for the week following the last treatment session on each of the four dependent measures. The results are presented in Table 1. As is evident, there was no significant effect of treatment condition on any of the four variables. There was a significant effect of trials on latency to sleep, $F(6, 96) = 2.63$, $p < .03$. The mean number of minutes to fall asleep showed no clear pattern and ranged from 21.11 on day 3 to 37.61 on day 5. The effect of trials was not significant on the hours of sleep, number of wakings, or degree of restfulness variables. There were no statistically significant group by trials effects in the analyses of data from week four.

In order to provide a fuller test of possible differences due to treatment conditions, a second set of analyses were performed using the data from all four weeks of the study. A two-way analysis of variance with repeated measures on weeks was performed, using each subject's

Table 1

Summary of Analyses of Data from Week Four

	Mean Square	d.f.	F-ratio
Hours of Sleep			
Treatment Condition	23.11	1	2.17
Error	10.64	16	
Trials	3.88	6	0.93
Groups by Trials	3.54	6	0.84
Error	4.19	96	
Latency to Sleep			
Treatment Condition	7279.38	1	2.95
Error	2465.36	16	
Trials	857.50	6	2.63*
Groups by Trials	462.81	6	1.42
Error	326.11	96	
Number of Wakings			
Treatment Condition	3.81	1	1.08
Error	3.53	16	
Trials	1.76	6	2.08
Groups by Trials	0.39	6	0.46
Error	0.85	96	
Degree of Restfulness			
Treatment Condition	19.38	1	2.85
Error	6.79	16	
Trials	1.43	6	0.76
Groups by Trials	2.67	6	1.43
Error	1.87	96	

* $p < .03$

average value for each of the four dependent measures at the end of each week. This was done to determine if any significant differences between the two conditions developed over time but did not appear in the analyses of the first and last weeks' data alone. The results are presented in Table 2. The average values on each variable for the muscle relaxation group, the desensitization group, and all subjects together over each week of the study are presented in Table 3.

As can be seen from Table 2, the two groups did not differ significantly on the hours of sleep, latency to sleep, or number of wakings variables. There was an effect of treatment condition on the degree of restfulness. The group receiving muscle relaxation training reported a significantly higher degree of restfulness ($M = 4.95$) than the group receiving desensitization ($M = 3.93$). The effect of trials was significant for the latency to sleep and degree of restfulness variables. Subjects' self-report of the number of minutes required to fall asleep tended to decrease over the four weeks of the study ($M_{\text{week 1}} = 48.86$, $M_{\text{week 2}} = 35.19$, $M_{\text{week 3}} = 38.50$, $M_{\text{week 4}} = 28.76$). Subjects on the average reported a higher degree of restfulness each week, as can be seen in Table 3.

There was no significant effect of trials on the hours of sleep variable. The number of wakings showed an effect of borderline significance ($F(3, 48) = 2.40$, $p < .08$), with subjects showing a trend toward fewer awakenings over the course of the study ($M_{\text{week 1}} = 1.53$, $M_{\text{week 4}} = 1.06$). There were no statistically significant group by trials effects in the analyses of data over all four weeks.

Table 2

Summary of Analyses of Data over Four Weeks

	Mean Square	d.f.	F-ratio
Hours of Sleep			
Treatment Condition	4.31	1	1.63
Error	2.65	16	
Trials	0.55	3	1.18
Groups by Trials	0.45	3	0.96
Error	0.47	48	
Latency to Sleep			
Treatment Condition	1633.31	1	0.93
Error	1765.95	16	
Trials	1267.98	3	4.80**
Groups by Trials	325.21	3	1.23
Error	264.30	48	
Number of Wakings			
Treatment Condition	4.72	1	1.71
Error	2.77	16	
Trials	0.74	3	2.40
Groups by Trials	0.56	3	1.80
Error	0.31	48	
Degree of Restfulness			
Treatment Condition	18.25	1	5.07*
Error	3.60	16	
Trials	2.62	3	7.03***
Groups by Trials	0.10	3	0.28
Error	0.37	48	

* $p < .04$ ** $p < .01$ *** $p < .001$

Table 3

Average Scores on Each Dependent Variable over Four Weeks

	Overall Average	Week 1	Week 2	Week 3	Week 4
Hours of Sleep					
Muscle Relaxation	6.07	5.77	6.24	6.24	6.03
Desensitization	6.56	6.38	6.36	6.61	6.90
All Subjects		6.04	6.29	6.41	6.42
Minutes to Fall Asleep					
Muscle Relaxation	33.57	45.53	35.83	30.49	22.40
Desensitization	43.15	53.00	34.39	48.51	36.70
All Subjects		48.86	35.12	38.50	28.76
Number of Wakings					
Muscle Relaxation	1.01	1.08	0.92	1.13	0.91
Desensitization	1.52	2.09	1.44	1.33	1.25
All Subjects		1.53	1.15	1.22	1.06
Degree of Restfulness					
Muscle Relaxation	4.95	4.44	5.02	5.17	5.16
Desensitization	3.93	3.31	4.06	4.03	4.34
All Subjects		3.94	4.59	4.66	4.79

DISCUSSION

The objective of the present study was the comparison of two behavioral treatments of insomnia. It was hypothesized that subjects in the systematic desensitization treatment condition would show relatively greater improvement in insomnia symptoms than subjects in the muscle relaxation training alone treatment condition. The results did not support this hypothesis. There was no statistically significant difference between the two groups on any of the four dependent variables, hours of sleep, minutes to fall asleep, number of awakenings, or degree of restfulness. However, the ability to directly compare the two groups is open to question due to their difference in reported degree of restfulness during the baseline week and in their ratings of relaxation experienced during the first treatment. The results of this study are in agreement with those reported by Steinmark and Borkovec (1974), who found no significant differences between a relaxation treatment condition and a single item systematic desensitization condition. The indication is that systematic desensitization does not contribute any additional therapeutic benefit in the treatment of moderate insomnia. As systematic desensitization is designed to change a learned response to the sleep situation, it may be the case that the moderate insomnia reported by college students in both studies is not due to a maladaptive learned response. Perhaps insomnia in college students in general is due to the pressures of their situation and a generally higher level of mental and physical arousal. Whereas muscle relaxation may be a sufficient treatment for moderate insomnia, the possibility remains that systematic desensitization is a more appropriate treatment for severe insomnia. As

severity or duration of the condition increase, the probability of a conditioned anxiety response to the sleep situation may also increase. Studies of the relationship between treatment method and type or severity of insomnia would help clarify this.

Another problem with using college students as subjects occurs when measuring the number of hours slept each night. College students seem to have fewer hours to spare to spend asleep. Evidence of this can be seen in the effect of trials on the first week's data. Subjects reported relatively more hours slept on Day 5 than on any other day of Week 1. Day 5 was a Saturday, when students usually have more free time than on other days of the week.

Thus for the reasons cited, a possible difference in type of insomnia and in hours available for sleep, this study may not be a fair test of the usefulness of muscle relaxation as compared to systematic desensitization for treatment of chronic to severe insomnia in the general population.

There is evidence for the therapeutic effects of both treatments in the treatment of insomnia in the trials effect over the four weeks of the experiment on latency to sleep onset, number of wakings, and degree of restfulness. This is only a tentative conclusion, however, due to the lack of control groups in the study. It is possible that simply monitoring one's sleep patterns over time produces improvement in symptoms of insomnia (Jason, 1975). Also, it may be the case that expectancy of success of treatment or demand characteristics cause improvement.

Haynes, Woodward, Moran, and Alexander (1974) compared group relaxation to group placebo treatment as an expectancy control. They found both conditions to produce significant improvement in sleep patterns,

but the relaxation group demonstrated significantly greater improvement than placebo therapy. Their findings indicated that expectancy characteristics account for a portion of the effects of treatment. The majority of the evidence, however, indicates that an expectancy control group in the form of a placebo therapy condition does not report a significant improvement in insomnia symptoms (Borkovec & Fowles, 1973; Borkovec, Kaloupek, & Slama, 1975; Lick & Heffler, 1977; Steinmark & Borkovec, 1974). In addition, studies which have included a no-treatment control group have shown that insomnia symptoms did not improve with monitoring over time (Borkovec & Fowles, 1973; Borkovec, Kaloupek, & Slama, 1975; Lick & Heffler, 1977; Nicassio & Bootzin, 1974; Steinmark & Borkovec, 1974). Thus, although the conclusion that both systematic desensitization and muscle relaxation training produced therapeutic effects must be considered tentative due to lack of control groups, there is evidence to suggest that improvement was indeed due to treatment received.

In summary, this study did not find the hypothesized superiority of systematic desensitization over muscle relaxation in treatment of insomnia. Rather, the two methods appear to be of equal therapeutic value. As was discussed, this conclusion is open to question due to lack of control groups. There are also difficulties in generalizing results from college students with moderate insomnia to chronic insomniacs in the general population. It may be that there is a stronger learned component with insomnia of greater severity or longer duration. Future studies are indicated in differences in types of insomnia and methods of treatment most appropriate to each.

APPENDICES

EVALUATION OF THE GROSS ENERGY CONTENT
IN THE MILK OF THE EQUINE

by

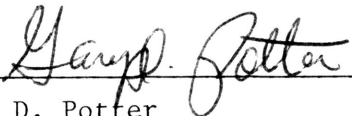
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ANIMAL SCIENCE

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G. D. Potter

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APPENDIX A

INTERVIEW QUESTIONNAIRE

INITIAL INTERVIEW

1. On the average, how many hours of sleep do you get a night?
2. How long does it usually take you to fall asleep?
3. Do you wake during the night? How many times? How long does it usually take you to get back to sleep?
4. How long has insomnia been a problem for you?
5. How often do you experience insomnia? i.e., every day, only before tests, only at school ...
6. How would you describe the sleep you get in terms of restfulness?

APPENDIX B

STATE TRAIT ANXIETY INVENTORY

SELF-EVALUATION QUESTIONNAIRE

NAME _____

I.D.# _____

DIRECTIONS: A number of statements which people have used to describe themselves are given below. Read each statement and then circle the appropriate number 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 tire quickly	1	2	3	4
23. I feel like crying	1	2	3	4
24. I wish I could be as happy as others seem to be.	1	2	3	4
25. I am losing out on things because I can't make up my mind soon enough	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 am inclined to take things hard	1	2	3	4
32. I lack self-confidence	1	2	3	4
33. I feel secure	1	2	3	4
34. I try to avoid facing a crisis or difficulty.	1	2	3	4
35. I feel blue.	1	2	3	4
36. I am confident.	1	2	3	4

	Almost Never	Sometimes	Often	Almost Always
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	.1	2	3	4

APPENDIX C

EXPECTANCY OF SUCCESS MEASURE STATEMENT

I would like to have your honest opinion on the effectiveness of this treatment approach. Based on what you have seen here today, how would you rate your expectancy of success of this treatment in helping your sleeping problem?

very low			moderate			very high
1	2	3	4	5	6	7