International Journal of Educational Research,
2008; 4(1): pp. 1-8

The Effects of Stress Inoculation, Physical Relaxation and Skills Acquisition Training on Managing Stress among University Undergraduates in Lagos Nigeria

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Abstract
The study investigated the relative effectiveness of stress inoculation, skills acquisition and physical relaxation in the management of stress among university undergraduates. The participants were 240 full-time 300 level students selected through cluster sampling from four departments in the University of Lagos, Akoka and Lagos State University, Ojo, Nigeria. The departments were randomly assigned to either of the three treatment conditions (stress inoculation, physical relaxation, and skills acquisition) or the control group. Data was collected using the psycho physiological symptoms checklist and Test Anxiety Inventory. Two research hypotheses were formulated to guide the study. The hypotheses were tested using the factorial Analysis of Covariance (ANCOVA). The findings show that the participants in stress inoculation, skills acquisition and physical relaxation group recorded significant reduction in psychophysiogical symptoms, worry and emotionality reactions at post-test than the participants in the control group. While the physical relaxation was more effective than the other treatment conditions in reducing psychophysiological symptoms, the stress inoculation was more effective in reducing the participants worry and emotionality reactions to evaluative situations.

Keywords: Stress Inoculation; Physical Relaxation; Stress Management.

Introduction

University students often experience a variety of difficulties as they transit from a structured supervised secondary school context to a relatively unstructured university life. Many students enter the university with very high aspirations based on the idyllic pictures painted sometimes by their parents, a utopian picture of stress free and trouble free environment. Whittle (2007) observed that during this period, most students are for the first time attempting to live on their own, away from their family members. They are required to choose appropriate courses and work hard in order to prepare for productive careers, developing lasting friendship with room mates, course-mates, future life partners and make adult decisions. In Dumbleton's (2007) view, these factors put some pressure on university students (most of whom are youths) and consequently become sources of stress to them.

Stress, the perception of a threat to one's wellbeing and the apprehension that one is unable to cope with the perceived threat, is brought about by the continual adjustments and demands that individuals place upon themselves as they react to a given stimuli (Berkowitz, 2001). In the complicated world of our universities, these demands can come from a variety of directions: academic, social, financial, familial, daily hassles and others.

Stress is a part of every student's life. Each student's personal stress requirements and the amount which the student can tolerate before he/she becomes distressed vary with the student's life situation and age. As university students, the greatest sources of events they experience as stressful are likely to be relationships, academic and social situations, environment and lifestyle (University of Texas Counselling and Mental Health Centre, 2007). Leaving home or commuting daily, managing finances, living with roommates, combining school with part-time or full-time job, attending lectures, and handling relationships all contribute to the normal stress of being in the university. It is not uncommon for students to feel overwhelmed and anxious about wasting time, meeting high standards or being lonely.

A university student grapples with two kinds of stressors: academic and social stressors. The academic stressors for undergraduate students include scholastic difficulties, academic failure, fear of examinations and competition for good grades. The social stressors include loneliness, poor relationship with room mates and course mates, poor appearance, concerns about dating, poor sexual relationship, inability to secure a permanent spouse, break-up of important relationship, overwhelming pressure to join or leave a secret cult, sexual harassment, financial constrains, contraction of sexually transmitted disease, etc.

In spite of all the negative publicity stress receives, it is not necessarily a bad thing. According to Selye (1974), to be without stress is to be dead. Stress is said to add flavour, challenge and opportunity to life. Life without stress would be dull and unexciting. Stress could be harmless or harmful. Stress is harmless when it wards off boredom. At this point it is described as positive stress or eustress. Eustress is positive stress needed for the growth and development of the individual. Berkowtiz (2001) pointed out that physiologically, eustress sharpens an individual's awareness and boosts overall energy level. In this context, if university students have knowledge and ability to harness this eustress energy, they will be able to complete assignments on time and meet other targets.

Stress is harmful and problematic when it becomes excessive. Excessive stress is synonymous with distress or negative stress. Distress, the chronic feeling of being overwhelmed, oppressed and behind tasks, generates a lot of unhealthy physical and psychological state for an individual that makes it difficult for him to adapt effectively to his environment (Onuzulike, 1998). When this negative stress becomes excessive or out of control, it triggers unpleasant physiological reactions, upsetting thoughts and ineffective behaviour.

The University of Texas Counselling and Mental Health Centre (2007) outlined the signs and symptoms of stress to include headache, backache, stiff neck, digestive problems and spasms, palpitation of the heart, shallow breathing, tense muscles, lack of concentration, lack of sleep, constant fatigue, loss of appetite or continual hunger, grinding of teeth, tapping of fingers, clenching of fists, stuttering, aggression in speech, hostile language, self doubts, negative self-talk and many others. Excessive stress in a student can cause behavioural changes such as emotional distress, anxiety, forgetfulness, panic attack, fear, isolation, general irritability, drug use, and either inability to communicate or excessive talking (Georgia Institute of Technology Health Promotion Centre, 2008).

Some university students can cope with academic/social difficulties without help. However, for some others, the negative effects of stress can be really troubling and they may resort to ineffective coping strategies. The danger in students using ineffective coping strategies to deal with stress is that they can become habitual, even addictive or fatal.

In the past, various stress management techniques were used to help people acquire coping strategies to life problems. For instance, the practice of relaxation, medication and self-hypnosis techniques on a regular basis provides wonderfully calming and relaxing feelings that have lasting effect for many people (Holmes, 1984). Many of the management techniques used in the past were aimed at helping the individual to acquire adaptive behavioural, physical, cognitive and emotional responses. Some others also focused on increasing the individual's self esteem, self respect and self confidence. Though there are research reports that highlighted the superiority of one type of technique over another, there is no consistent pattern on the efficacy of any stress management technique. This study was therefore designed to investigate the extent stress inoculation; skills acquisition training and physical relaxation techniques would alleviate students' stress reactions.

Research Hypotheses

The following hypotheses were tested in the study:

1. There is no significant difference in the post-test scores on psycho-physiological symptoms of participants in stress inoculation, skills acquisition training, physical relaxation and control groups.
2. There is no significant difference in the post-test scores on worry and emotionality scales among participants in treatment and control groups.

Method

The Research Design

The research design used for the study was the quasi experimental pre-test and post-test control group design. This type of design requires that participants be tested with the same instruments before and after treatment. To determine the effects of the treatment, the result of the participants in the treatment groups will be compared with the scores of participants in the control group. The design comprised of two independent variables: experimental conditions (three treatments and one control) and gender (male and female).

Participants

The participants for the study consisted of two hundred and forty full-time 300 level undergraduate students of two universities in Lagos State, Nigeria. The participants were mostly unmarried youths. The participants were selected through cluster sampling. In this context, a department represents a logical cluster. In each university four departments were randomly selected from an estimated eight faculties. The students in the selected department formed members of an experimental group.

Research Instruments

Two research instruments were used to obtain relevant data for the study.

1. Psychophysiological Symptoms Checklist

The Psychophysiological Symptoms Checklist (PSC) is a 50-item instrument developed by Omoluabi (1988) to measure stress reactions. It is scored on a 5-point Likert scale format. The PSC have means of 49.89 and 49.78 for men and women respectively. It has high internal consistency with an alpha of 0.78 and split half reliability coefficient of 0.87.

2. Test Anxiety Inventory

The test anxiety inventory (TAI) is a 20-item instrument developed by Spielberger (1980) to measure anxiety proneness in tests, examinations and evaluative situations. The TAI consists of two components – worry and emotionality. Worry refers to excessive preoccupation and concern about the outcome of a test, especially

the consequences of failure. Emotionality on the other hand, refers to an individual' behavioural reactions and feelings aroused by test situation. In this instrument, the worry items have an alpha coefficient of 0.73 while the emotionality items have an alpha coefficient of 0.79 (Omoluabi, 1993).

Administration of the Instruments
One week before the treatment session, the psycho physiological symptoms checklist and the test anxiety inventory were administered to all the participants. The same instruments were re-administered to the participants a week after the treatment sessions.

Treatment
The four experimental conditions (stress inoculation training, skills acquisition training, physical relaxation and control) were randomly assigned to the four departments chosen for the study. A conducive lecture room within the faculty served as venue for the experiments. Each treatment lasted for six weeks of one session per week. Each session lasted for 60 minutes.

The stress inoculation training is intervention strategies designed to help participants develop cognitive skills which will enable them cope with a variety of stressful situations. The negatively stressed students are helped to become aware of their negative self-defeating thoughts and irrational appraisals of stressors that usually exaggerate the magnitude of the problem. The participants were trained to identify these negative self-defeating and irrational appraisals and to replace them with task directed positive self enhancing statements and self instructions relevant to effective stress management.

The skills acquisition training programme conceives distress as a normal reaction which occurs when students lack necessary positive coping skills for dealing with stressful situations in the university environment. The skills acquisition training helps the negatively stressed participants to learn and acquire effective coping strategies for successful management of stress. Participants in this programme were also assisted to learn how to use positive self-enhancing self statements and task directed instructions to counter negative self defeating thoughts in stressful situations.

The physical relaxation training exposes the participants to progressive muscle and deep breathing exercises. Physical relaxation exercises help an individual to relieve muscle tension and manage the effects of "flight" response on the body in stressful situations.

The participants in the control group were exposed to series of lectures on hazardous life styles (smoking, drug abuse, alcoholism and prostitution).

Method of Data Analysis
The two hypotheses formulated in the study were tested using a factorial (2 x4) analysis of covariance (ANCOVA). The level of significance was determined at 0.05 level.

Results
Table 1 show that the physical relaxation group recorded the greatest reduction in psychophysiological symptoms. This was followed by the skill acquisition group and the stress inoculation group.

Table 1: Means, Standard Deviations And Mean Differences Of Pre-test And Post-test Scores On Psychophysiological Symptoms Across Groups

Experimental Conditions		Pre-test scores		Post-test scores		
	N	Mean	S.D	Mean	S.D	Mean Difference
Stress Inoculation	60	52.20	11	44.35	6.02	7.85
Skills Acquisition	60	52.70	10.02	41.32	7.17	-10.38
Physical Relaxation	60	51.27	9.54	37.27	8.24	-14.00
Control Group	60	55.44	16.88	54.32	15.9	-1.12
Total	240	52.46	5.12	46.81	14.98	-5.65

Table 2: 2 X 4 Analysis of Covariance on Differences in Psychophysiological Symptoms at Post-Test

Source of Variation	Sum of Squares	df	Mean Square	F cal	Sig. of F
Mean Effects	4540.79	5	9188.16	30.32	*
Experimental Conditions	29136.71	3	9712.24	32.05	*
Gender	214.00	1	214.0	0.71	n.s.
Gender X Experimental Conditions	654.15	3	218.5	0.72	n.s.
Residual	70007.6	231	303.06		
Total	104553.25	239			

* Significant, $p < 0.05$ F critical (3, 231) = 2.65 n.s. = not significant

The results in table 3 indicate that a calculated F value of 32.05 for the experimental conditions is greater than the critical F value of 2.65 at 0.05 level of significance. This led to the rejection of null hypothesis one which stated there is no significant difference in post-test scores on Psychophysiological Symptoms Checklist among participants in the four experimental groups.

Table 3: Means, Standard Deviations and Mean Differences of Pre-test and Post-test Scores on Worry reactions Across Groups

Experimental Conditions		Pre-test scores		Post-test scores		
	N	Mean	S.D	Mean	S.D	Mean Difference
Stress Inoculation	60	17.40	1.40	13.25	2.68	-4.15
Skills Acquisition	60	17.83	1.67	15.62	5.67	-2.21
Physical Relaxation	60	17.68	1.77	14.12	2.69	-3.56
Control Group	60	18.21	1.70	17.33	1.59	-0.88
Total	240	17.78	1.66	15.08	6.45	-2.7

Table 5 shows that the stress inoculation group recorded the greatest mean reduction in worry reactions to evaluative situations. This was followed by the physical relaxation group and then the skills acquisition group.

Table 4: 2 X 4 Analysis of Covariance on Differences in Worry Reaction at Post-Test

Source of Variation	Sum of Squares	df	Mean Square	F cal	Sig. of F
Mean Effects	1260.92	5	252.18	21.65	*
Experimental Conditions	243.60	3	81.20	6.97	*
Gender	16.83	1	16.83	1.45	n.s.
Gender X Experimental Conditions	24.97	3	8.32	0.75	n.s.
Residual	2691.15	231	11.65		
Total	2976.55	239	118		

* Significant, p< 0.05 F critical (3, 231) = 2.65 n.s. = not significant

Table 4 shows that a calculated F value of 6.97 for the experimental conditions is greater than the critical F value. This led to the rejection of the null hypothesis two which states that there is no significant difference in post-test test anxiety scores among participants in stress inoculation, skills acquisition, physical relaxation and control group.

Table 5: Means, Standard Deviations and Mean Differences of Pre-test and Post-test Scores on Emotionality reactions Across Groups

Experimental Conditions		Pre-test scores		Post-test scores		
	N	Mean	S.D	Mean	S.D	Mean Difference
Stress Inoculation	60	19.41	1.82	13.53	2.75	-5.88
Skills Acquisition	60	19.75	1.80	15.45	3.76	-4.3
Physical Relaxation	60	19.50	1.88	14.55	2.70	-4.95
Control Group	60	19.11	1.75	17.68	1.70	-1.43
Total	240	19.19	14.55	14.55	5.09	-4.64

As shown in Table 5, the stress inoculation recorded the greatest mean reduction in emotionality reaction to evaluation situations. This was followed by the physical relaxation group and the skills acquisition group.

Table 6: 2 X 4 Analysis of Covariance on Differences in Emotionality Reaction at Post-Test

Source of Variation	Sum of Squares	df	Mean Square	F cal	Sig. of F
Mean Effects	811.71	5	259.46	17.76	*
Experimental Conditions	778.38	3	162.34	10.86	*
Gender	38.91	1	38.91	2.60	n.s.
Gender X Experimental Conditions	29.66	3	9.89	0.66	n.s.
Residual	3453.45	231	14.95		
Total	4300.4	239			

* Significant, p< 0.05 F critical (3, 231) = 2.65 n.s. = not significant

The results in Table 6 show that the calculated F value for the experimental conditions (10.86) is greater the critical value (2.65) at 0.05 level of significance. The hypothesis two is rejected. It implies that the post-test emotionality scores of the participants in the four experimental groups differed significantly.

Discussion

The result of testing hypothesis one revealed that there was a significant difference in the level of psychophysiological symptoms exhibited by the participants among the experimental groups at post-test. The hypothesis was therefore rejected. The three treatment groups indicated significant reductions in psychophysiological symptoms when compared to the participants in the control group. The post hoc analysis showed that participants who received physical relaxation training manifested greater reduction in psychophysiological symptoms than those exposed to stress inoculation and skills acquisition training.

The superiority of physical relaxation training over stress inoculation and skills acquisition training in alleviating psychophysiological symptoms of stress could result from its greater capacity to help the body return to a balanced state and reverse the psychophysiological effects of stress response such as increased blood pressure, respiration and heart rates (University of Alberta Health Centre, 2007). This is consistent with the findings of Kleinke (1991) who states that when we practice relaxation exercises, our body slowdowns, our breathing rate and blood pressure decrease, our heart beats more slowly and our muscles are less tense.

The findings of this study concerning the efficacy of physical relaxation training in the reduction of psycho physiological symptoms of stress confirmed the assertion of the University of Florida Counselling Centre (2001) that engaging in relaxation exercises makes it possible for a college student to spend a short period of time in a state of profound relaxation. In this state, the body and mind are at rest thus replenishing the person's energy level and his ability to cope with the demands of the external world. In the view of Wittig and Williams (1984), the bodily relaxation is incompatible with stress reactions. It is impossible to experience all facets of stress when the muscles and hormonal system are at ease.

The analysis of hypothesis two showed that there is a significant difference in the post-test scores on worry and emotionality reactions of the participants due to experimental conditions. The pair wise comparison of the group means revealed that participants who received stress inoculation training witnessed a significant reduction in their worry and emotionality reactions to evaluative situations than those who received skills acquisition training and physical relaxation techniques. Similarly, the participants who received skills acquisition and physical relaxation training had lower worry and reactions than those who received placebo treatment. Stress inoculation training therefore proved to be more efficacious in reducing worry and emotionality reactions of university students towards examinations.

The findings of this study supports that of Sheeby and Horan (2004) who found that law students who received stress inoculation training displayed lower levels of anxiety, stress and irrationality over time. It is evident from the research findings that physical relaxation techniques were effective in reducing participant's worry and emotionality reactions. This finding seem to agree with the practice of the University Of Buffalo Counselling Services (2007) who encourage every college student to practice physical relaxation including deep breathing exercises whenever they feel tensed particularly during examinations.

Conclusion and Recommendations

Some university students when stressed by academic, social or financial demands tend to use ineffective coping mechanisms. These ineffective coping strategies include isolation, withdrawal from other students, substance, aggressive behaviours, avoidance of lectures, feigning illness, engaging in antisocial behaviours or suicidal thoughts that may lead to suicide attempts. These types of students need professional counselling to enable them learn effective positive stress coping strategies that will help them achieve their life goals.

Counselling on stress management should start from the first year as part of students orientation programme. Right from the onset, students are taught positive stress coping skills that will help them tackle effectively the academic, social and environmental challenges in the university. Students who perceive themselves as having adequate levels of coping resources are less likely to become overwhelmed by stress factors. Counsellors should teach students how to maintain good physical and mental well being through adequate nutrition, physical exercises and adequate sleep. This is because if a student is irritable and tense from lack of sleep and not eating right, he will be less able to deal with stressful situations on campus. Through personal counselling, students can learn how to manage their time, prepare for examinations, develop good study habits and maintain good cordial relationship with course mates, room mates and peers.

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