

## The Effectiveness of a Training Program using Neuro - Linguistic Programming (NLP) to Reduce Test Anxiety in Consideration of Biological Feedback

Review Article

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### Abstract

This research aims to study the influence of NLP training program in reducing test anxiety by analyzing biological feedback. This empirical study assessed pre- and post-tests of a study sample consisting of 30 students aged 19.6 years that were diagnosed with high test anxiety. The students were divided into an experimental group and a control group; each with 15 students. The experimental group was trained on 24 units of NLP strategies for 3 months, i.e. 2 units per week with each unit lasting for 40-60 minutes. The anxiety test scale was applied on par with observations of vital biological changes (heart rate and blood pressure). The results showed statistically significant differences in the average scores of test anxiety before and after applying the aforementioned program mean  $\pm$  SD  $198 \pm 11.9$  ( $P < 0.05$ ) for the post-test results were better than the pre-test ones. Moreover, there were statistically significant differences between the experimental and control groups indicating better results achieved by the experimental group when they took the post-test. In sum, the NLP program had a highly positive influence in reducing test anxiety and undesirable biological changes when applied to the experimental group.

**Keywords:** Neuro-Linguistic Programming; Test Anxiety; Biological Feedback.

### Introduction

Test anxiety is an anxiety that occurs during evaluation and is a serious emotional problem that students face. In the second half of the twentieth century, test anxiety has become a serious problem requiring study and research [26].

Tests have become an important and essential tool in the curriculum, and all students have experienced tests at least once in their academic lives [35]. Many studies examined and diagnosed test anxiety and its relationship with many variables, and these studies showed negative effects of test anxiety-this results in poor academic performance and low motivation [23, 5, 12]. Liebert and Morris believe that the fear of the evaluation is an essential reason for test anxiety [19].

Test anxiety has many factors including cognitive, physiological, emotional and behavioral. The cognitive component appears in the negative thoughts experienced by students during tests and the negative attitudes towards the different assessment approaches. The physiological component appears in muscle tension and

chills. The behavioral component is expressed through a lack of test skills and forgetfulness [22]. Students consider tests to be a direct source of anxiety and discomfort with feelings of injustice because they thought that tests impede their ability to show real achievements [36].

Several studies have confirmed that high test anxiety is the main factor for the decline in the performance of students at the university level; this issue is confirmed by a study investigating the cognitive impact of test anxiety on the academic performance of the students. This study found that tests have a remarkable negative impact on the academic indicators [4].

The problem of test anxiety is the most important and complicated psychological problem faced by university students who need psychological comfort. They need to have reduced pain and study difficulties. There are programs and sciences that help humans to change including the NLP science. NLP can be employed effectively in improving and developing the performance outcome of students, teachers, administrators and the community [3]. Psychology researchers and scientists have developed the

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capacity for individuals to use methods based on psychological and mental attributes. In the late twentieth century, a style was adopted by psychologists and linguists that resulted in a new science in the 1970s by two American scientists-Richard Bandler who is a math specialist and John Grinder a Linguist. They used the scientific method to integrate all modes of human thinking including linguistic construction and internal sentimental forces. This science studies how to benefit from these three components and find incentives that lead humans permanently towards a improvement [2]. The main objective of NLP in education is to provide an experimental environment in which students can learn and train to improve the ability to reach the goal efficiently and effectively [8]. Also, there are numerous experiments that showed the importance of biofeedback to modify the general behavior and alleviate symptoms associated with anxiety. Here, knowledge results in behavior modification to enable conscious control of specific performances and thus ultimate outcomes. This form of biofeedback is considered the most effective way to teach self-regulation. Its simplest form is the biological information system of the individual. This information is sent or transmitted by the sensory organs and then it grows up and comes back again in a meaningful form [24].

Physiological indicators such as blood pressure, heart rate, and muscle strain are the most common symptoms associated with emotions including anxiety and stress. The emotional situation has a significant impact on the heart and the blood pressure rate because this rate increases with anxiety and intensity of emotion [30]. A study has also confirmed the correlation among blood pressure and emotional disorders especially anxiety and stress [1].

The current research is an attempt to solve the problems and difficulties faced by students through education to achieve better management and investment in their physical and psychological potentials. The students can then be motivated to minimize anxiety related to the courses they studied. Through NLP and feedback strategies educators can deal with their students to achieve effective and strong communication. This increases the efficiency of teaching methods and offers new study habits. This was confirmed by a study on the impact of NLP strategies to control student test anxiety. The most important results of this study are that (NLP) reduces anxiety among students [27].

Based on the above, this study aimed to study the impact and effectiveness of the training program of NLP in reducing test anxiety considering biological feedback that may contribute to the improvement of the learning process through good achievement in various academic tests.

## Materials and Methods

### Study Design

We used an experimental approach. It is an appropriate design that deals with the research problem and objectives. The following experiment was used:

The experimental groups include a people who underwent the training program and the control group who did not undergo the training program.

The following experimental measurements were conducted on the experimental group:

Pre-measurement for the experimental group before applying the training program and post-measurement after completion of the training program. The same measurements were done for the control group. The control group experienced the normal academic program only.

### Sample size

A polity study was conducted to detect differences ( $31 \pm 7.65$ ) in the total score of anxiety scale between groups before initiation of the study. The estimated difference in the sample size was calculated between groups with a statistical power of 80% and a significance level of  $\leq 0.05$ . Therefore, the sample size was estimated to be 30 participants in both groups. This sample was increased to 36 to compensate for an estimated 20% dropout rate [28].

### Participants and Setting

We enrolled 30 male participants from the college of Sport and Physical Activity of King Saud University. The homogeneity of the experimental group and the control group variables including age and level of anxiety and systolic and diastolic heart rate were verified. They were randomly split into two groups-a control group of 15 participants and an experimental group of 15. Participants were randomly assigned to experimental ( $n=15$ ) and placebo groups ( $n=15$ ). The allocation was performed using a computer generated randomized table. Participant allocation was concealed using a random numerical sequence in sealed opaque envelopes. The study was approved by the Research Ethics Committee of King Saud University, and all participants gave signed informed consent.

### Intervention and data collection

NLP was applied to the experimental group, and the training program using NLP is for a period of 3 months to cover 24 units or 2 units per week with an average duration of 40-60 apiece.

The NLP program consists of a mixture of styles, goal setting, time management, assertiveness skills, effective communication, relaxation skills, and internal representations models based on *Skills for Making Change Happen* [11, 18].

The test anxiety measure was used. This test has been proven to have a high degree of validity and reliability. It consists of 93 items. The scores were recorded on a three-point Likert scale of 1-3 where: 1 = Rarely feel the test anxiety, 2 = Sometimes I feel test anxiety, and 3 = I often feel test anxiety. The maximum degree was (279) and the minimum was (93). These items were distributed into six divisions: Awe of the test (26) items where the maximum degree was (78) and the minimum was (26). The test confusion (19) items where the maximum degree was (57) and the minimum was (19). Test performance tension (15) items where the maximum degree was (45) and the minimum was (15). Discomfort test consists (12) items where the maximum degree was (36) degree and the minimum was (12). Lack of test skills consists (14) items where the maximum degree was (42) and the minimum was (14). Disorder when taking consists (7) items where

the maximum degree was (21) and the minimum was (7). The items of this test are answered, and corrected by giving a mark to each of the six sub-scales individually. These are combined to get the total score [33].

Several methods were used to study the psychometric properties including the sincerity of the participants.

A digital sphygmomanometer was used for systolic blood pressure (Sys), diastolic blood pressure (Dis) and heartbeats per minute (HR/min).

### Statistical Analysis

Statistical analyses were performed using SPSS software (Statistical Package for the Social Sciences, version 18.0, SPSS Inc. Chicago, IL, USA). The qualitative variables were presented in terms of frequencies and percentage, and the quantitative variables were presented using mean and standard deviation. For analyses within the groups, we used a t test for paired data. The unpaired t test was used for within and between groups. Values at  $p < 0.05$  were considered statistically significant.

### Results

After comparing scores of the experimental group and the control group (Table 1), it is clear that the score level of all members in the experimental group are lower than the degree level of the members in the control group in the dimensions of the scale testing the biological feedback variables and test anxiety. The differences were significant. The P value  $< 0.05$  suggesting a statistically significant difference between the control group and the experimental group in favor of the experimental group in terms of test anxiety total  $198 \pm 11.9$  ( $P < 0.05$ ).

This indicates the presence of statistically significant differences in awe of the test post-intervention between the control group and the group experimental  $51 \pm 5.3$  ( $P < 0.05$ ). This indicates the presence of statistically significant differences in the test confusion between the control group and the experimental group  $46 \pm 3.5$

( $P < 0.05$ ). This indicates the presence of statistically significant differences between the control group and the experimental group in the post-test performance tension  $33 \pm 2.6$  ( $P < 0.05$ ). This indicates the presence of statistically significant differences between the control group and the experimental group in terms of discomfort  $25 \pm 3.5$  ( $P < 0.05$ ), and this indicates the presence of statistically significant differences between the control group and the experimental group in lack of test skills  $33 \pm 2.3$  ( $P < 0.05$ ).

This indicates the presence of statistically significant differences between the control group and the experimental group in the test taking disorder  $9 \pm 1.5$  ( $P < 0.05$ ). There are significant differences at the level of significance ( $P < 0.05$ ) between the average biological indicators including heart rate ( $75 \pm 6.95$ ;  $P < 0.05$ ), the diastolic blood pressure ( $90 \pm 5.65$ ;  $P < 0.05$ ), and systolic blood pressure ( $119 \pm 11$ ;  $P < 0.05$ ). The diastolic blood pressure between the control group and the experimental group were different and favored the experimental group.

After comparing the scores of the pre- and post-intervention in Table 2, it is clear that the scores of all the individuals in the experimental group are lower than their scores on the post-intervention test and post-measurement test. This is significant and indicates the presence of statistically significant differences between the pre- and post-intervention in awe of the test  $51 \pm 5.3$  ( $P < 0.05$ ). This indicates statistically significant differences in the test confusion in the pre- and post-intervention  $46 \pm 3.5$  ( $P < 0.05$ ). This indicates the presence of statistically significant differences between pre- and post-intervention in test performance tension  $33 \pm 2.6$  ( $P < 0.05$ ). This indicates the presence of statistically significant differences between pre- and post-intervention in the discomfort test  $25 \pm 3.5$  ( $P < 0.05$ ), and this indicates the presence of statistically significant differences between the pre- and post-intervention for the lack of test skills  $33 \pm 2.3$  ( $P < 0.05$ ). There are statistically significant differences between the pre- and post-intervention in test taking disorder  $9 \pm 1.5$  ( $P < 0.05$ ). There are significant differences between the heart rate and blood pressure between the experimental group before applying the program and after the completion. Completion improves these metrics.

**Table 1. Baseline demographic characteristics of the students.**

	Experimental	Control	p value
Age	19.6	19.7	0.71
Anxiety level			
Awe of the test	58	58	0.88
the test confusion	51	53	0.1
test performance tension	38	38	0.6
Discomfort test	33	32	0.88
lack of test skills	37	38	0.45
Taking the test disorder	17	16	0.64
test Total	234	237	0.08
Heart rate	86	86	0.8
Diastolic blood pressure	88	87	0.71
systolic blood pressure	136	133	0.01

No significant differences between groups ( $p > 0.05$ ).

Table 2. Test anxiety and feedback scales between groups.

Variables	Baseline		Post-intervention	
	Experimental (n=15)	Control (n=15)	Experimental (n=15)	Control (n=15)
	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD
Anxiety level				
Awe of the test	58 $\pm$ 6.0	58 $\pm$ 5.06*	51 $\pm$ 5.3 $\neq$ †	61 $\pm$ 7.4
Test confusion	51 $\pm$ 3.7	53 $\pm$ 2.7*	46 $\pm$ 3.5 $\neq$ †	52 $\pm$ 5.0
Test performance tension	38 $\pm$ 3.1	38.7 $\pm$ 2.6*	33 $\pm$ 2.6 $\neq$ †	39 $\pm$ 4.2
Discomfort test	33 $\pm$ 3.1	32 $\pm$ 3.4*	25 $\pm$ 3.5 $\neq$ †	33 $\pm$ 3.9
Lack of test skills	37 $\pm$ 5.0	38 $\pm$ 2.8*	33 $\pm$ 2.3 $\neq$ †	39 $\pm$ 3.8
Test taking disorder	17 $\pm$ 3.2	16 $\pm$ 2.8*	9 $\pm$ 1.5 $\neq$ †	17 $\pm$ 2.6
Test Total	234 $\pm$ 17.1	237 $\pm$ 12.0*	198 $\pm$ 11.9 $\neq$ †	340 $\pm$ 19.9
Heart rate	86 $\pm$ 2.6	86 $\pm$ 2.9*	75 $\pm$ 6.95 $\neq$ †	85.7 $\pm$ 3.0
Diastolic blood pressure	88 $\pm$ 7.5	87 $\pm$ 1.8*	69 $\pm$ 5.65 $\neq$ †	86.5 $\pm$ .51
Systolic blood pressure	136 $\pm$ 3.1	133 $\pm$ 1.6*	119 $\pm$ 11 $\neq$ †	133 $\pm$ 1.7

\* No significance between groups at baseline and within control group ( $P > 0.05$ ).

$\neq$  Significant within experimental group ( $P < 0.05$ ).

† Significant between groups post-intervention ( $P < 0.05$ ).

## Discussion

This study clearly illustrates the existence of statistically significant differences between the average scores of the control group and the experimental group in a post-measurement of test anxiety research variables as well as the biological measurements in favor of the experimental group and between the pre-and post-measurements for the experimental group. This was true for test anxiety and feedback. These results confirm many studies that use a number of programs and strategies to reduce test anxiety [7, 25, 14, 31, 21, 10].

The NLP program helps individuals develop and acquire skills to perform tests and to succeed in them. This reduces the fear of tests reduces test anxiety. This was confirmed by a previous study [16] who used NLP to reduce anxiety and increase control of the experimental sample. The results of the study agreed with [29] in who showed that one session of hypnosis and NLP can decrease severe anxiety.

The results also showed statistically significant differences between groups for heart rate and blood pressure. The treated group was more healthy suggesting that the NLP program markedly reduces stress, which is consistent with the literature [9]. Biological feedback and relaxation techniques help individuals to reduce the level of blood pressure and heart rate and other physiological indicators. This method provides the individual with a physiological self-organization that may lead to change in the mental state of the individual. This decrease in the physiological indicators is a result of the intervention of NLP. It can also help people control their emotions, and the results of this study confirms the study conducted by Yahav and Cohen (2008) where they used biological feedback to identify the effect of a cognitive behavioral treatment program to reduce anxiety and test anxiety. Our study stressed the effectiveness of the cognitive behavioral therapy in reducing case anxiety and test anxiety in favor of

the experimental group. This indicates that the NLP program achieves real and sophisticated improvement towards the level of test anxiety. This was confirmed with biological indicators and shows that the NLP makes positive improvements.

## Conclusion

The current study reduced all variables of test anxiety including biological indicators. These features were better in the treated group. This emphasizes the impact of NLP on reducing test anxiety as confirmed by many studies. All findings support the call for designing combined programs and techniques of NLP that are highly effective and have fast results in the treatment of test anxiety.

## Recommendations

- Application of NLP programs in reducing test anxiety among students at various levels of education.
- Train faculty and counselors through courses and workshops to develop their performance in the use of NLP techniques.
- Include NLP programs in psychology courses and training of students.

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