EFFECT OF TEST ANXIETY ON SECONDARY SCHOOL SCIENCE STUDENTS’ ATTITUDE

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ABSTRACT

This research study was conducted to explore the relationship of secondary school students’ test anxiety with attitude towards science. Test Anxiety Inventory (TAI) and Test of Science-Related Attitudes (TOSRA) were used to measure students’ test anxiety and attitude towards science respectively. The data was collected from a sample of 1,885 secondary school science students studying Physics, Chemistry, Biology and Mathematics as science subjects. Simple correlation (r), Multiple regression analyses (R) and standardized regression coefficients (β) were used to investigate the relationships between test anxiety and attitude towards science. The results of the study indicated that test anxiety was negatively correlated with attitude of science students towards science.

KEYWORDS: Test Anxiety, Attitude Towards Science, Test Anxiety Inventory (TAI), Test of Science-Related Attitudes (TOSRA)

INTRODUCTION

During examination, many students have to face different kinds of anxieties. Sarason and Stoops (1978) have described that anxiety has negative effect among students at different levels during the examination. The students getting lower achievements, doesn’t mean that they are not intelligent, it may be the result of test anxiety. Sarason (1984) refers to test anxiety as “A widely studied personality variable in part because it provides a measure of the personal salience of one important definable class of threatening situations in which people are evaluated” (p. 292).

A very important definition of test anxiety is given by Zeidner (1998), “The set of phenomenological, physiological and behavioral responses that accompany concern about possible negative consequences or failure on the examination or similar evaluative situation” (p. 17). On the other hand, Hong (1998) has given the definition of test anxiety as “a complex multidimensional construct involving cognitive, physiological, and behavioral reactions to evaluative situations” (p. 51).

Similarly, there is another term “attitude” which is very common in our daily life. Different researchers have given their own meanings and definitions for attitude. If this attitude regards to science, it becomes attitude towards science. According to Fraser (1981), “There is a considerable consensus of opinion that the promotion of favorable attitude is an important aim of science education. There is confusion about what meaning should be placed on the ‘attitude’ to science” (p. 1).

Schibeci (1984) has described that science-related attitudes are generally divided into two categories: scientific attitudes and attitude towards science. Gardner (1975) has associated scientific attitude to scientific method or thinking styles of students only. On the other hand, Bennet (2003) has described that attitude towards science refers to the views of students developed for science as the results of experiences in different environments in the field of science education.
REVIEW OF RESEARCH STUDIES ON TEST ANXIETY AND ATTITUDE TOWARDS SCIENCE

There are some research studies which have shown relationship between test anxiety and attitude towards science.

Fraser and Fisher (1982) explored the relationship between anxiety and various science-related attitudes. The data was collected from a sample of 116 eighth and ninth grade students. Simple correlations between anxiety scale and attitude scale ranged from -0.10 to -0.37. The results of the study made it clear that there was negative correlation between anxiety and science-related attitudes. It was also concluded that anxiety was creating problem for the achievement of attitudinal aims.

Anthony, Devito, Tryon, and Kane (1983) conducted a research on test anxiety and attitudes of the students. Data was collected from 515 students. Test anxiety was measured by Test Anxiety Inventory (Spielberger, 1980) and attitudes of the students were measured by Survey of Study Habits and Attitudes (Brown & Holtzman, 1967). Pearson product-moment correlation coefficients were computed between attitude scale and anxiety scale. The results after data analysis explored that there was a significant but negative correlation between attitudes of the students and test anxiety for both males and females.

OBJECTIVES

The objectives of the study were: 1) to provide descriptive data related to test anxiety and attitude towards science, and 2) to find relationship between students’ test anxiety and attitude towards science.

SIGNIFICANCE OF THE STUDY

The study is very significant due to following reasons: (1) This study used the combination of Test Anxiety Inventory (TAI) and Test of Science-Related Attitudes (TOSRA) for the determination of relationships among test anxiety and attitude towards science, which could suggest the ways to control test anxiety of students and improve attitudes of the students towards science. (2) The factors of test anxiety and attitudes towards science may help the curriculum planners, researchers, science educators, policy makers and parents to help the students to reduce their test anxiety and have favorable attitude towards science. (4) Attitude towards science and test anxiety will guide the students for selection of future science subjects and lead them to their careers.

METHODOLOGY

Sample

The sample was selected from rural and urban areas of Punjab province in Pakistan. The sample included 1,885 secondary school science students. 550 male students were selected from urban areas and 448 from rural areas. Similarly, 647 female students were selected from urban areas and 240 from rural areas.

Instruments

The researcher used Test Anxiety Inventory in the present study in order to measure test anxiety of 10th grade science students. Test Anxiety Inventory was developed by Spielberger (1980). It consists of 20 items and three subscales: Test Anxiety Worry (TAI-W), Test Anxiety Emotionality (TAI-E) and Test Anxiety Total (TAI-T). According to Chapell, Blanding, Silverstein, Takahashi, Newman, Gubi, and McCann (2005), “Test Anxiety Inventory is the most important and widely used instrument for the measurement of high school and college students’ test anxiety”.

Similarly, Test of Science–Related Attitudes (Fraser, 1981) was used to measure students’ attitude towards science. According to Fraser (1981), TOSRA is designed to measure the secondary school students’ attitude towards science. There are seven scales of TOSRA given by Fraser. These seven scales are, “Social Implications of Science,
Normality of Scientists, Attitude to scientific Inquiry, Adoption of Scientific Attitudes, Enjoyment of Science Lessons, Leisure Interest in Science and Career Interest in Science” (p. 1). But in the present study five scales of TOSRA: Social Implications of Science, Attitude to scientific Inquiry, Enjoyment of Science Lessons, Leisure Interest in Science and Career Interest in Science were used.

Both the instruments were translated into Urdu language under the supervision of language and content experts. These translated versions were pilot tested on 200 science students selected from five different schools in Okara district of Punjab province. After pilot testing, factor analyses were conducted for the examination of internal structures of translated versions of Test of Science-Related Attitudes (TOSRA) and Test Anxiety Inventory (TAI). After factor analysis, all the three scales of Test Anxiety Inventory were merged into a single scale and two subscales of TOSRA: Enjoyment of Science Lessons and Leisure Interest in Science were merged into a single subscale named Classroom Enjoyment and Leisure Interest in Science.

**Statistical Techniques for Data Analysis**

The statistical techniques used for the analyses were following:

- Simple correlation analysis ($r$) was used to describe the bivariate relationships between single test anxiety scale and each individual attitude scale.
- Multiple regression analyses ($R$) were used to investigate the multivariate relationships between test anxiety scale with the set of four attitude scales as a whole.
- The standardized regression coefficients (regression weights) were also examined to interpret the significant multiple correlation.

**DATA ANALYSIS AND RESULTS**

As a result of data analysis, the relationship of test anxiety with attitude scale is explained in this section of the present study.

Table 1 shows the simple correlation ($r$), multiple correlation ($R$), and standardized regression coefficient ($\beta$) for relationship of Test Anxiety scale with all four TOSRA scales.

<table>
<thead>
<tr>
<th>Scale</th>
<th>Test Anxiety</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$r$</td>
<td>$\beta$</td>
</tr>
<tr>
<td>Social Implications of Science</td>
<td>0.03</td>
<td>0.06**</td>
</tr>
<tr>
<td>Attitude to Scientific Inquiry</td>
<td>-0.09**</td>
<td>-0.00</td>
</tr>
<tr>
<td>Classroom Enjoyment and Leisure Interest in Science</td>
<td>-0.29**</td>
<td>-0.03***</td>
</tr>
<tr>
<td>Career Interest in Science</td>
<td>-0.07**</td>
<td>-0.01</td>
</tr>
<tr>
<td>Multiple Correlation</td>
<td>R</td>
<td>0.29**</td>
</tr>
</tbody>
</table>

It is clear from above table that Test Anxiety had a negative correlation ($p < 0.01$) with Attitude to Scientific Inquiry, Classroom Enjoyment and Leisure Interest in Science, and Career Interest in Science for simple correlation analysis. On the other hand, there was no relationship of Test Anxiety with Social Implications of Science. It is also clear from the above table that there was a significant multiple correlation ($R$) ($p < 0.01$) between Test Anxiety and the set of all...
attitude scales. The standard regression coefficients were also examined to interpret the significant multiple correlation. The signs of standard regression coefficients (regression weights) show that the relationship between Test Anxiety and Social Implications of Science was significantly positive (p < 0.01) but negative for Classroom Enjoyment and Leisure Interest in Science (p < 0.001).

CONCLUSIONS

The results of this study indicated that test anxiety was negatively correlated with attitude of students towards science. The correlation of test anxiety with all of the four scales of TOSRA ranged from -0.09 to -0.29 in the present study. These correlations were not very strong but were replicating the results of a study by Fraser and Fisher (1982). Simple correlations between anxiety scale and attitude scale ranged from -0.10 to – 0.37. The results of the study made it clear that there was negative correlation between anxiety and science-related attitudes. It was also concluded that anxiety was creating problem for the achievement of attitudinal aims. Similarly, Anthony et al. (1983) also concluded that there was a significant but negative correlation between attitudes of the students and test anxiety both for males and females.

It is concluded from the above discussion that test anxiety is negatively correlated with the attitude of students towards science.

SUGGESTIONS FOR FUTURE RESEARCH WORK

The researcher has explored the correlations of test anxiety and attitude towards science by using adapted instruments of Test Anxiety Inventory (TAI) and Test of Science-Related Attitudes (TOSRA). This fact may be taken into account that more items of these instruments can be used in future work to improve their reliability. This research was conducted on the students of secondary level only. It is suggested that the same research or any other research similar to this one can be conducted on all levels i.e., from primary level up to university level. Similarly, this research may also be conducted on students taking subjects of arts. So, its results can be generalized for whole of the population including students of science as well as arts.

REFERENCES


