

Psychological Stress in Relation to Achievement among Male and Female Science Students

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Abstract

This study attempts to assess the psychological stress among male and female senior secondary science students in relation to achievement. A sample of 631 (419 male and 212 female) senior secondary science students was randomly selected from different types of institutions of Meerut district. They were administered Psychological Stress Scale for Science Students developed by researchers themselves which measures 12 dimensions of psychological stress. Results showed that both male and female science students significantly differed on psychological stress and achievement. There was also significant relationship between psychological stress and achievement of male and female science students.

Introduction

The present scenario is coming up with technological revolution, web technology and web culture. Naturally it is the achievement of people especially in the field of science besides humanities. It is well considered opinion proven rationally that science and technology has great potential for the development of a country. Hence science education in every country occupies a significant place in education right from the beginning. The very structured knowledge in science education demands good intellect people with scientific attitude and rational

mind. Even very intelligent students find science comparatively a difficult subject of study as compared to humanities. Difficulty in understanding of science experienced by students in general, fear of science and underachievement in science subjects are the common problems due to which students suffer. Science also exerts a number of additional demands on students. The science curriculum requires enormous commitment and hard work by students. The intense curriculum may produce stress on science student's life. The school setup, teacher's expectations,

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infrastructure facilities, modalities of teaching etc. promote the feeling of pressure associated with being in the science stream. Most of the time, science students complain of dwelling in between their efforts for better achievement and teacher's/parent's expectations. Even after investing time and efforts they find it difficult to learn science and get easily stressed. The transition from one programme to another has been reported to result in increased stress levels for students (Beck, Hackett, Srivastava, McKim, & Rockwell, 1997). It is being experienced by parents and teachers in schools that science students suffer from psychological stress which influence their achievement.

For preparing students for their future roles in science, it is important to identify stressful factors that may affect their successful development. Most of the studies in different responses to stress have been carried out on dental, medical, nursing, university and college students (Supe1998, Grannis 1992, Jones 1996, Helmers, et al.1997, Dill and Henley 1998, Sinha et al. 2000, Kurupparachchi et al. 2002, Clarke, V. A. and Ruffin, C. L.1992, Gupchup, G.V. et al. 2004, Polychronopoulou, Argy and Divaris, Kimon 2005). Lazarus and Folkman (1984) describe stress as a specific stimulus-response transaction, which threatens an individual. One study identified the major academic stressors among college students as tests, grade competition, time demands, professors and classroom environment, and career and future success (Murphy & Archer, 1996). Another study reported that stress may be associated with the type of institution the student attends

(e.g., public, private, undergraduate, graduate professional (Hudd et al., 2000). Misra, et al., (2000) found that academic stress among college students varies across year in school and gender. Specifically, freshmen and sophomores had higher academic stress levels than juniors and seniors, and females reported higher academic stress than males. There were not many researches that studied the stress among science students at senior secondary level in Indian context emphasising gender differences.

Objectives

1. To study the relationship between psychological stress and achievement of male and female science students.
2. To study the difference between male and female science students on psychological stress.

Hypotheses

1. There is no significant difference between male and female science students on psychological stress.
2. There is no significant relationship between psychological stress and achievement of male science students.
3. There is no significant relationship between psychological stress and achievement of female science students.

Method

Descriptive survey method has been used to conduct the present study.

Sample

In this study, science students enrolled in 12th standard were taken from seven types of institutions running in Meerut

district. Using simple random sampling, 100 science students were selected from each type of school, thus constituting a sample of 700 students in all. Out of 700 science students only 631(419 male and 212 female) students were finally taken because 69 students did not fill the scale properly.

Materials and Procedure

To achieve objectives of this study Psychological Stress Scale for Science Students (PSSSS) developed by the researchers was used to measure psychological stress of science students. It was structured around 12 dimensions of psychological stress i.e. curriculum transaction in science, content of science, infrastructure for science, science teachers, peers, workload in science, examination and achievements, home and family environment, vocational

aspiration, health, communication problems and society. Thus, PSSSS is a 96 items scale with a Likert type response format (5= Always, 4= often, 3= sometimes, 2= rarely, and 1= never). Reliability of the scale was determined by split-half method and was found 0.96. Achievement in science of the students was considered as the marks obtained in science in 12th class board examination.

Results

To find out the significance of difference between male and female science students on psychological stress and their achievement, t-test was used. To find out the relationship between psychological stress and achievement of male and female science students, Pearson product moment correlation coefficients were calculated. Results are presented in Table 1-4 respectively.

TABLE 1
Summary of t-test for difference between male and female science students on total psychological stress and its all dimensions

Dimensions of Psychological Stress	Male (N = 419)		Female (N = 212)		t-value
	Mean	S. D.	Mean	S. D.	
Curriculum Transaction in Science	23.66	5.89	22.02	5.86	3.30**
Content of science	21.13	5.93	20.21	5.88	1.85
Infrastructure for Science	22.59	7.77	20.03	8.41	3.79**
Teachers	24.86	7.04	22.79	8.84	3.19**
Peers	21.88	6.65	19.83	6.27	3.70**
Workload in Science	22.37	6.82	21.72	6.62	1.13
Examination and Achievement	24.86	6.45	24.43	6.98	0.76
Home and Family Environment	22.11	7.03	20.02	7.58	3.42**
Vocational Aspiration	23.88	6.73	22.11	7.11	3.05**
Health	20.53	8.03	17.68	7.52	4.30**
Communication Problem	21.65	6.85	18.28	6.41	5.96**
Society	21.11	7.22	18.49	6.73	4.41**
Total psychological Stress	270.63	56.94	247.63	58.67	4.74**

Note: ** Significant at 0.01 level

It is evident from Table-1 that t-values between the means of male and female science students on psychological stress dimensions-curriculum transaction science, infrastructure for science, science teachers, peers, home and family environment, vocational aspiration, health, communication problems, society and total psychological stress were found to be significant at 0.01 level. This reveals the fact that male and female science students differed significantly on total psychological stress and its dimensions curriculum transaction in science, infrastructure for science, science teachers, peers, home and family environment, vocational aspiration, health, communication problems, society. Since mean differences were in favour of male students, it indicates that male science students were found to be more stressed than female students. However, no significant difference was observed between means of male and female science students on psychological

stress dimensions-content of science, workload in science, and examination and achievement as the concerned t-values not significant at 0.05 level.

TABLE 2
Summary of t-test for difference between male and female science students on achievement

Sex	N	Mean	S. D.	t-value
Male	419	114.31	27.86	4.43**
Female	212	124.07	22.26	

** Significant at .01 level

Table 2 summarises that t- value between the means of male and female science students on achievement was found to be 4.43 which was significant at 0.01 level. It leads to the inference that male and female science students differ significantly on achievement. Since the mean of female students was higher than male students ($M=124.07 > 114.31$), it might be said that female science students had better achievement than male science students.

TABLE 3
Correlation between psychological stress and achievement of male science students (N = 419)

Variables	Mean	S.D.	Product	Correlation
Achievement	114.305	27.864	-----	-----
Total Psychological Stress	270.148	56.661	12747212	-0.289**
Curriculum Transaction in Science	23.556	5.610	1115709	-0.191**
Content of Science	21.055	5.739	989098	-0.288**
Infrastructure for Science	22.473	7.306	1060517	-0.185**
Science Teachers	24.862	7.042	1185745	-0.061
Peers	21.876	6.653	1028184	-0.252**
Workload in Science	22.368	6.821	1055670	-0.196**
Examination and Achievement	24.859	6.446	1171139	-0.259**
Home and Family Environment	22.105	7.033	1042480	-0.198**
Vocational Aspiration	23.883	6.735	1125825	-0.229**
Health	20.437	7.628	955899	-0.257**
Communication Problems	21.649	6.850	1018580	-0.229**
Society	21.026	6.853	998366	-0.108*

** Significant at 0.01 level

It is revealed from Table-3 that achievement of male science students was negatively and significantly correlated with total psychological stress and its dimensions viz- curriculum transaction in science, content of science, infrastructure for science, peers, workload in science, examination and achievement, home and family environment, vocational aspiration, health and communication problems at 0.01 level and with society dimension at 0.05 level. But it was not significantly correlated with science teachers.

Table-4 clearly shows that achievement of female science students was negatively and significantly correlated with total psychological stress and its dimensions viz- content of science, workload in science, examination and achievement and vocational aspiration at 0.01 level. Negative and significant correlation

was also found for psychological stress of female students with dimensions viz peers, home and family environment and communication problems at 0.05 level. But it was not significantly correlated with curriculum transaction in science, infrastructure for science, science teachers, health and society. It means that achievement of female science students is significantly and inversely correlated with total psychological stress and its dimensions viz- content of science, peers, workload in science, examination and achievement, home and family environment, vocational aspiration and communication problems.

Implications of the Study

The findings of the present study may be utilised by educational planners and administrators and teachers in order to assess and modify their schemes and teaching methodologies pertaining to the development of science students.

TABLE 4
Correlation between psychological stress and achievement of male science students (N = 212)

<i>Variables</i>	<i>Mean</i>	<i>S.D.</i>	<i>Product</i>	<i>Correlation</i>
Achievement	124.071	22.260	-----	-----
Total Psychological Stress	246.986	58.108	6432672	-0.233**
Curriculum Transaction in Science	22.024	5.863	575962	-0.120
Content of Science	20.208	5.881	523641	-0.284**
Infrastructure for Science	19.863	8.142	517872	-0.119
Science Teachers	22.509	7.620	587367	-0.131
Peers	19.835	6.274	517306	-0.149*
Workload in Science	21.722	6.617	564768	-0.211**
Examination and Achievement	24.434	6.985	634809	-0.239**
Home and Family Environment	20.019	7.580	520360	-0.173*
Vocational Aspiration	22.113	7.112	575089	-0.195**
Health	17.495	6.986	455761	-0.134
Communication Problems	18.278	6.410	476162	-0.152*
Society	18.486	6.726	483575	-0.084

** Significant at 0.01 level

1. The present study concludes that care and consideration of the effects of stress among science students should be given by faculties and curriculum designers, and in addition, that stress awareness and the learning of coping strategies should be an integral part of the educational programme.
2. The findings of the study may be of immense interest for teachers, headmasters and principals to re-orient their efforts to help the students. They should be involved in designing the various tasks.
3. The findings of this study may be useful to the persons those are involved to assess the impact of the workload on students welfare and to prepare students for challenges in their life.
4. The findings of this study may also be useful for parents because parents often feel stressed and frustrated too, but they must realise that the brains of teens are physically different from adults, they don't see things in the same way and they react differently. Parents can help enormously by setting a good example, being patient, spending time with students and listening to them.
5. It is believed that the findings of this study will provide valuable data and information which may come handy to School Counselors when assisting science students in charting what best ways or techniques to adopt in coping, adapting and managing study.
6. The study will give an impetus to

research in education and would encourage the young researchers to think in the new direction of the problem and to undertake further research in the area on newer dimensions relating to science education.

Conclusion

The findings obtained on account of the differences between male and female science students disclosed that male science students have more psychological stress on almost all the dimensions of psychological stress. The reasons may be forwarded by temperament male students are inherently more negligent, they generally have more outward activities, yet quite concerned about their performance, consequently suffer with more psychological stress. Female students on the other hand are generally more regular to their studies, generally remain confined to home and then give more time to their study, hence feel less stressed. The findings of the present study are not supported by the results of the studies of Stone (1986), Archer et al. (1991), and Polus-Sseniawsaka and Kocanda (1988), Siddiqui (1983), Eunsook Hong (1998) Mishra and Mckean (2000), Hudd et al. (2000) because they found that female students reported higher level of stress than male students. While some researchers like Gupta (1979), Clarke and Ruffin (1992), Supe (1998), Rosalind Murray-Harvey et al. (1999), Lee et al. (2002) found no significant difference between male and female science students on stress. Polychronopolou and Divaris (2005) found gender differences in most of the perceived stressors. Male

and female science students were also found to be differed significantly on achievement. Female science students had better achievement than male science students. Achievement of both male and female science students was negatively and significantly correlated with total psychological stress and some of its dimensions. These finding are not supported by the findings of the studies of Kasem (1973) and Soliman (1979), Jones (1996), as they found insignificant relationship between achievement and anxiety of female science students.

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