

The Effect of Test-Anxiety on Memory among Iranian High School Students

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Abstract

The purpose of this paper is to determine the effect of test-anxiety on memory. The paper is based on a study, which was carried out among adolescents in Iran. The respondents of the study were 400 high school students (200 males and 200 females) in the age range of 15-19 years old. Instruments used for data collection were Test-Anxiety Inventory (25 items) and Wechsler Memory Scale –3rd Edition (WMS-III). The finding showed that test-anxiety and memory were significantly correlated, ($r=-0.12$, $P\leq 0.04$). Thus, it is recommended that in enhancing academic achievement and mental health in school setting, support strategies such as educational guidance and counseling, teaching life skill programs and psychotherapy should be promoted. Limitation of this study was that this study is limited to only students aged 15-19 years in public school and should not be generalized to the other private schools and to adolescents or young adult population.

Keywords: Test-Anxiety, Memory, High School Students, Adolescents

1. Introduction

Memory is the process by which information is retained for later use (Kassin, 2004). Many factors impact on memory and one of them is test-anxiety. According to Eysenck (2001), test-anxiety creates irrelevant thought, preoccupation, and decrease attention and concentration that lead to memory difficulties. This is because test-anxiety disrupts attention and concentration. When attention and concentration are impaired, they disrupt memory. According to Needham (2006) and Eysenck's interference model of test anxiety (1972), test anxiety contribute to the dysfunction of memory. In addition, Sansigirry and Sail (2006) agreed that test anxiety can decrease attention and span memory. This paper attempts to determine the relationships between test-anxiety and memory among Iranian high school students.

2. Literature review

According to Zeidner (1998), test anxiety is a multidimensional signs that was described as a group of phenomenological, physiological, and behavioral reactions to appear with possible negative consequences or failure on an exam or similar evaluative situation. Also, Stober (2004) found that test anxiety can be conceptualized as a situation-specific trait, namely as a disposition to react with heightened anxiety in the face of situations that are specifically related to tests and performance. Whereas, early conceptions viewed test-anxiety as multidimensional in nature. Also, Stober (2004) indicated that there are two main components of test-anxiety, "worry" that is referred to concerns about being evaluated and the consequences of failure, and second, "emotionally" which is referred to the perception of autonomic reactions evoked by the test situation. In his study, Putwain (2007) selected 1348 students, comprising of 690 students in the year 10 cohort and 658 students in the year 11 cohort from seven secondary schools in the North of the United Kingdom. In the study, he showed that female students had higher test-anxiety scores than male students, and students from Asian, black and other ethnic backgrounds reported higher test anxiety scores than students from white backgrounds. Also, Methia (2004) showed that rates of test-anxiety among elementary and secondary school students were 10% to 25% and

30% respectively. He indicated that more than 33% of high school students experience some test anxiety. Moreover, Rahimi (1999) found that 36.9 % of high school students in Sanandaj, Iran has severe anxiety.

In terms of memory, Santrock (2003) defined it as the retention of information over time through encoding, storage and retrieval. According to Emilien, Durlach, Antoniadis, Van der Linden and Maloteaux (2004), memory is an active process in which even the most concrete experiences are actually dynamic representational processes. They pointed that remembering is not merely the reactivation of an old engram, but it is the reconstruction of a new neural-net profile with features of the old engram and the elements of memory from other experience, as well as the influences from the present state of mind. This is particularly important for clinicians when interviewing patients about past events, including trauma.

According to processing efficiency theory (Eysenck, 2001), the additional demands on working memory resources made by task-irrelevant worry cognitions may decrease processing efficiency, but not necessarily the effectiveness. A highly test anxious student could sustain effectiveness on tasks requiring low working memory demands with extra effort to balance for lowered efficiency. A decline in processing effectiveness would only be predicted on assessment demands, making heavy demands on working memory resources. Only under these conditions, would a decline in task performance manifest.

Vasa, Roberson-Nay, Klein, Mannuzza, Moulton, Guardin, Merikangas, Caelino and Pine (2007) indicated that there is a significant difference in visual memory between young with and without a current anxiety disorder [$F(1, 50) = 510.24, p \leq 5.02$], with lower memory scores observed among anxious versus no anxious young ($M = 58.51$ and $M = 9.68$, respectively). In addition, An de Decker, and Raesand Eelen (2003) have conclusively supported the relationship between test-anxiety and memory deficits. They showed that anxiety, worry and subjective stress, were significantly related to the retrieval of specific memories.

3. Research methodology

A study was carried out in Sanandaj, Iran. The sample of the current study was 400 high school students (200 boys and 200 girls) in the age range of 15-19 years old. The sampling method employed in this study was stratified randomized sampling. The population in the study comprised of a number of subgroups, i.e. gender and age groups that may differ in the traits being studied. Nine public high schools have been selected from among a number of high schools in Sanandaj using simple random sampling technique. The number of students according to their age and gender was determined, and were selected by using simple random sampling method technique

A primary instrument used in the present study was the Test-Anxiety Inventory (TAI) (Abbolghasemi, 1988) which has been adapted to Iranian context. TAI is a self-administered 25-item test that has been previously used to determine the level of test-anxiety among students and take 15 minutes to complete. Each statement on the TAI is followed by a four -point Likert-type scale (never = 0, rarely = 1, some time = 2, and most of the time = 3). The minimum score on each of the twenty-five questions is zero and the maximum score for the whole test is seventy five. TAIs' score categories are based on normal distribution, whereby a score $M-1SD$ (Mean-1 Standard Deviation) denotes mild test anxiety and a score of $M+1SD$ as having high test-anxiety (Chapell, Blanding, & Silverstein, 2005). High scores indicate higher test anxiety. Cronbach Alpha for the present study was .92.

Meanwhile, memory was measured by Wechsler Memory Scale –3rd Edition (WMS- III). On average, the reliability coefficients for the WMS-III Primary Subtests and Primary Indexes were found to be higher than the WMS-R. Internal consistency reliability coefficients ranged from 0.70s to the 0.90s. In addition, data from the current study shows the reliability of the WMS-III, based on Cronbach's Alpha, was 0.70. In addition, this third edition updates the WMS-R and provides subtest and composite scores that assess personal information, logical memory, orientation, visual memory, learning of association, mind control and repeating numbers ahead and reverted. This will be assessed using the Wechsler Memory Scale.

The results of the study are presented in form of descriptive statistics, which include frequency and percentage distributions for level of test-anxiety and subdivisions of memory variables. A statistical analysis employed in this study is Pearson correlation, which was run to determine the relationship between test-anxiety and memory.

4. Results

Table 1 shows that the levels of test-anxiety among respondents. The results displayed 16.5 % of the respondents has mild test-anxiety, 65% of them has moderate test-anxiety and 18.5 % of the samples has severe test-anxiety. The mean (M) and standard deviation (SD) of the respondent's score of test-anxiety were 59.41 and 1.46 respectively. Table 2 reveals the distribution of respondents according to subdivision of memory. It shows that 80.6% of the respondents scored in mind control higher than the mean, while 19.4% of them were lower than the

mean. Also, 53.6% of respondents scored in logical memory lower than the mean, while, 46.4% of them scored higher than the mean. Furthermore, 86.3% of respondents scored in repeating numbers ahead and reverted were lower than the mean, and 13.7% of them scored higher than the mean. This implies that in this subdivision, respondents had lower memory than the other subdivisions. In contrast, respondents had higher score in mind control and learning of association than the other memory's subdivisions. Moreover, 56.8% of respondents scored in visual memory lower than memory while, 43.2 % of them scored higher than mean. Finally, 84 % of respondents asserted their memory related to learning of association higher than the mean, whereas, 16% of them reported lower than the mean.

Pearson's correlation test was utilized to examine the relationship between test-anxiety and memory. Table 3 reveals the result if the test. It shows that test-anxiety and memory were significantly correlated ($r = -0.12$, $p = 0.04$), which implies that there was a significant relationship between test-anxiety and memory.

5. Discussions

The results from the current study which is related to test-anxiety are different from the findings by Rahimi (1999) and Methia (2004). This difference may be contributed to the different tools for measurement of test-anxiety, different sample size, age of respondents, and psychological stress such as worry to take a test, irrelevant thoughts and cognitive impairments. For example, Eysenck (2001) found that there was a significant relationship between a high level of test anxiety and lowered cognitive performance.

This study found that test-anxiety and memory were significantly correlated. Data from the current study match with the finding of a study by Vasa et al. (2007), who indicated that there was a significant difference between visual memory and anxiety disorder, i.e., respondents experienced high test-anxiety had lower memory scores compare to respondents who were not experiencing test-anxiety. Result from the present study is also in agreement with the An de Decker et al. (2003).

Based on Eysenck (1992), limitation in working memory is a cause of cognitive impairment of highly test-anxious individuals. In other words, test-anxiety affects attention and concentration, and then, it leads to impairment in memory. In fact, students with high test-anxiety have encounter task-irrelevant thoughts, such as worries and anxious about self-evaluative aspects of failure, which engage working memory.

6. Conclusions

The current study has proved that test-anxiety impact on memory. The finding of this study implies that test-anxiety among adolescents could affect their memory. Moreover, test-anxiety could affect their learning motivation, and also their ability to pay attention and concentration in learning, and this could lead to academic failure. Thus, authorities that concern with the memory of the children should take preventive actions, such as developing programs related to counseling and psychotherapy.

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Table 1. The levels of test anxiety (n=400)

Test-anxiety's levels		Frequency	%
Mild test-anxiety	(≤ 44.72)	66	16.5
Moderate test-anxiety	(44.73-74.09)	260	65.0
Severe test-anxiety	(≥ 74.1)	74	18.5
M	59.41		
SD	1.49		
Min	28		
Max	9		

Table 2. Total scores of subdivision WMS of respondents (n=400)

Subdivision of memory	Frequency	%
Mind Control		
Lower than Mean	78	19.4
Higher than Mean	322	80.6
M		
7.52		
SD		
1.25		
Logical Memory		
Lower than Mean	214	53.6
Higher than Mean	186	46.4
M		
10.18		
SD		
2.85		
Repeating numbers ahead and reverted		
Lower than Mean	343	86.3
Higher than Mean	55	13.7
M		
8.12		
SD		
1.08		
Visual memory		
Lower than Mean	227	56.8
Higher than Mean	173	43.2
M		
10.26		
SD		
2.10		
Learning of association		
Lower than Mean	64	16
Higher than Mean	336	84
M		
13.9		
SD		
2.4		

Table 3. Correlation Coefficient(r) between depression and memory

Variable	Memory
Test-anxiety	-0.12 *

**p≤.01 *p≤.05