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A study on the explicit and implicit memory bias among people with social anxiety disorder and normal participants

Ali Farhadi[1*], Yazdan Movahedi[2], Mohammad Almasian[3], Abdolkhalegh Minashiri[4], Galavizh Karimi Javan[5], Soheila Khazaee[4]

[1]Department of Social Medicine, School of Medicine, Lorestan University of Medical Sciences, Khorramabad, Iran; [2]General Psychology, University of Tabriz; [3]Department of the English Language, School of Medicine, Lorestan University of Medical Sciences, Khorramabad, Iran; [4]Department of Speech Therapy, Tabriz University of Medical Sciences; [5] Clinical Psychology
*E-mail: farhady.ali@gmail.com

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Abstract

Anxiety disorders, especially social phobia, are among the most important disorders among university students, which need particular attention. The present research was carried out to compare explicit and implicit memory among people with social phobia and normal subjects. In the present study which is of the causal-comparative type, the research subjects consisted of 50 individuals suffering from social anxiety disorder and 50 normal individuals, who were selected via screening from among the students of the University of Tabriz. Data collection was performed using the social anxiety scale, word stem completion task, and cued recall test. The collected data were analyzed using the multivariate analysis of variance method. The results of the study showed that there was a significant difference between the two groups in implicit memory when remembering positive and negative words, but no significant difference was observed between the two groups in explicit memory.

Keywords: Explicit memory, implicit memory, social anxiety disorder, social phobia

Introduction

One of the more common anxiety states is fearing one or several social situations. This anxiety state is called social phobia or social anxiety disorder. With a prevalence of 13 percent, social phobia is recognized as the third most common psychiatric disorder. This disorder is the permanent fear of one or several social or performance situations, in which the person is subject to close observation by others and is worried he/she may behave embarrassingly (Dadsetan 2003). People suffering from social phobia usually avoid frightful situations and rarely expose themselves to social or performance situations, but if they encounter such situations, experience intense anxiety (Rheingold et al, 2003).

In recent years, most research on social phobia has concentrated on data processing, i.e. the methods individuals use to understand environmental stimuli (Musa & Lepine, 2000). These theories state that bias in data processing plays a determining role in the continuation and probably emergence of mood and anxiety disorders. In this regard, researchers have identifies four data processing biases including, biased attention, bias in memory, biased interpretation, and biased judgment among anxious individuals (Williams et al., 1999).

The component of bias in data processing memory is of importance in this field. Memory has been classified into explicit and implicit memory. In implicit memory, the data is recalled without

awareness of or attachment to past places and times. It means that the individual knows the information without necessarily remembering how and where he/she acquired the information. However, in explicit memory, the individual consciously remembers his/her personal experience (Mayes et al., 1997). When functioning in a task requires the conscious recall of previous experiences, explicit memory is at work. When functioning in a task is facilitated without recall of the learning experience, implicit memory is involved.

Friedman et al (2000) and Coles and Hemberg (2002) have demonstrated that in individuals suffering from anxiety disorders, bias can be observed for the implicit memory of threatening words. Foa et al (2000) studied memory bias among individuals suffering from social phobia and compared them with the control group in terms of recognition of facial expressions. The results showed that, in comparison with the control group, people with social anxiety disorder recognized the faces with negative facial expressions more readily than other faces.

In a research by Foa et al (2000) which was conducted on a group of people with social anxiety disorder, and in which emotional expressions (facial expressions) were used, it was found out that people with social phobia showed a better memory for emotional expressions in comparison with the control group. Additionally, patients suffering from social anxiety disorder showed a strong recognition of negative emotional expressions in comparison with non-negative expressions, while the same phenomenon was not observed in the control group.

Rappe et al (1994b) examined the implicit and explicit recall among people with social anxiety disorder and normal individuals. They asked the participants to read neutral and socially-threatening words. Then the participants were given a cued recall test, in which the word stem (the first few letters of the word) was presented to them, and they had to complete the item based on what they had seen before (explicit memory test). In the word completion test, the participants were asked to complete the word stems with the first word that struck them without thinking (implicit memory test). The social anxiety group and the control group showed no significant differences in cued recall test, and word stem completion test. Both groups recalled neutral words better than socially-threatening words.

Perez-Lopez and Woody (2001) investigated the recognition of social representations among the people suffering from social anxiety disorder and the non-anxious control group. The participants were told that during the experiment they will present a speech and, then, they were asked to look at some photos taken from the audience. The faces in the pictures aroused threatening emotions (anger or hatred) or non-threatening emotions (happiness). Next, the participants prepared their speeches on a specific topic and turned it in to the experimenter. After the preparation of the speech, the participants completed a recognition task. The group suffering from social phobia recognized the kind and gentle faces better, while the recognition of threatening faces was not different with the control group.

Given the above-mentioned issues, the present study intends to examine bias in the implicit and explicit memory among people suffering from social anxiety disorder and among normal subjects. Therefore, given the theoretical foundations and research findings, the following hypotheses were proposed and studies. 1) Implicit memory is biased in people with social anxiety disorder in comparison with normal people. 2) Explicit memory is more biased among people with social anxiety disorder in comparison with normal individuals.

Methodology

Statistical Population and Sample

The present research is of the comparative-causal (ex-post facto) type. The statistical population consisted of all the students of the University of Tabriz, during the school year 2012-

2013. The study subjects were 50 students suffering from social anxiety disorder which were identified and selected using convenience sampling and screening. The control group also consisted of 50 students who were selected by matching with the experimental group. The age range of the participants was 19-24.

After explaining the objective of the study and the research methods and obtaining their consents, the social phobia inventory was administered to a large number of students. After scoring the tests, 50 students with scores higher than the cut-off score of 19 were selected. To select the members of the control group, 50 students were selected from among the students who had scores much lower that the cut-off score. In order to prevent explicit memory from affecting implicit memory, first the word stem completion test and then the cued recall test were administered. The DMDX software was used in order for each word to be presented for a precise amount of time. The program was set to display each word for 3 seconds. Then, the mean recalled words with positive, negative, and neutral connotations in the cued recall test and word stem completion test were compared between the two groups.

Research Instruments

Social Phobia Inventory (SPIN): or the social phobia questionnaire was first devised by Connor et al (2000) to assess social anxiety or social phobia. This questionnaire is a 17-item self-report scale which includes the three sub-scales of fear, avoidance, and physiological discomfort. Each item is scored based on a 5-point Likert scale. The psychometric properties of this questionnaire include a test-retest reliability with a correlation coefficient of 0.78 to 0.89 among the individuals with a diagnosis of social anxiety disorder. Internal consistency or the alpha coefficient has been reported as 0.94 for the whole scale among normal subjects. A cut-off score of 15 with a diagnostic efficiency of 0.78 distinguishes between subjects with a diagnosis of social anxiety disorder and the non-psychiatric control group, and a cut-off score of 16 distinguishes between subjects with social anxiety disorders and a psychiatric control group without social anxiety with an efficiency of 0.80 (Connor et al 2000).

Word stem completion test: To administer this test, first a set of words are displayed to the subjects without informing them that they will have to recall them later. Next, the first two or three letters of these words (e.g. sen…, be…, wi…) together with the first letters of words which subjects had not seen during the learning stage (non-facilitated words) are presented to them, and they are asked to complete these word stems with the first word that strikes them (Eliot and Green 1992; quoted by Karimi Javan et al 2007). This test evaluates the implicit memory. To measure the reliability of the test, the split-half method was used. After obtaining the correlation coefficient between the two halves of the test (80%), the reliability coefficient of the test was calculated as 88% using the Spearman-Brown formula.

Cued recall test: This test is used to evaluate explicit memory. To administer this test, first the stimuli (words) are presented to the subjects for the duration of three seconds each, then the counting-backward test is used. Next, the first two or three letters of the words presented during the learning stage are shown to the subjects, and they are asked to complete the incomplete words using the words they had observed before during the learning stage (Green and Mack 1992; as quoted by Karimi Javan et al 2007). The reliability and validity of the cued recall test has been determined in previous studies. For example, Karimi et al (2007) had obtained a reliability of 75% for this test.

Results

To analyze the data, first descriptive statistics was used, the results of which is presented in Table 1. To compare the two groups of subjects with social phobia and normal subjects, the multivariate analysis of variance was used (Table 2) and to determine which group has a higher

mean, and towards which group the significance leans, Tukey's post hoc test was use, the results of which are presented in Table 3.

Table 1: Descriptive statistics (mean and standard deviation) of individuals with social anxiety disorder and normal individuals

Variable	Component	Group	Mean	Standard Deviation
Implicit memory	Negative words	SAD	9.18	2.08
		Normal	7.06	2.13
	Positive words	SAD	6.82	0.71
		Normal	7.80	1.17
Explicit memory	Negative words	SAD	7.08	1.04
		Normal	6.82	0.91
	Positive words	SAD	6.96	1.06
		Normal	7.18	0.89

As can be seen in table 2, there is a difference between the two groups of subjects in implicit memory for negative and positive words, but no significant difference can be observed between the other variables. Additionally, to determine which group shows the social phobia symptoms more, a comparison was performed between the subjects in pairs. As can be observed from Table 3, the social phobia group obtained higher scores for negative words in the implicit memory test, but the normal group earned higher scores for positive words in the implicit memory test.

Table 2: The results of multivariate analysis of variance of the students with the objective of determining the difference between the two groups in terms of the variables

Source of variation	Variable	Component	Sum of squares	Degree of freedom	Mean of squares	F	Significance level
	Implicit memory	Negative words	36.112	1	36.112	24.25	0.001
Group		Positive words	01.24	1	21.24	19.25	0.001
		Neutral words	24.3	1	24.3	32.2	130.0
	Explicit memory	Negative words	69.1	1	69.1	74.1	190.0
		Positive words	21.1	1	21.1	24.1	267.0
		Neutral words	25.6	1	25.6	97.1	163.0

To determine the results of the analysis of variance weighs towards which group, Scheffe's post hoc test analysis was used. As the results of the analysis (Table 3) show, individuals with social anxiety disorders obtained higher scores in the bias of the implicit memory for negative words, and obtained lower scores for positive words. This difference is statistically significant. But in the components of explicit memory, no significant difference was observed between the social phobia group and the normal group.

Table 3: Paired comparison of individuals with symptoms of social phobia and normal individuals in terms of the research variables and the significance level

Variable	Component	Group		Difference between the mean of the two groups	Error df	P value
	Negative words	Social phobia	Normal	12.2	422.0	0.001
Implicit memory	Positive words	Social phobia	Normal	-980.0	195.0	0.001
	Neutral words	Social phobia	Normal	360.0	236.0	130.0
	Negative words	Social phobia	Normal	260.0	197.0	190.0
Explicit memory	Positive words	Social phobia	Normal	-220.0	197.0	267.0
	Neutral words	Social phobia	Normal	-500.0	356.0	163.0

Discussion and Conclusion

In this study, implicit and explicit memory were assessed in individuals with social anxiety disorder and normal individuals in the recall of positive, negative, and neutral words. The first objective of the present research was to study the bias in the implicit memory of people with social phobia in comparison with normal participants, and the second objective was to study explicit memory among them in comparison with normal subjects.

The results indicate that individuals with social anxiety disorder show bias in their implicit memories for negative words and recall negative and anxiety-provoking words better, and recall positive words less often in comparison with normal participants. This means that, after encountering social situations, individuals suffering from social anxiety disorder recognize negative events more easily, and recall fewer positive events. Based on the results obtained from the present research, it seems that the functioning of the implicit memory in individuals with social phobia is not the same as normal individuals in the processing of emotional information. That is, individuals with social anxiety disorder tend to process words with negative connotations more, but normal individuals recognize words with positive connotations more frequently. This finding of the present research is in accord with the findings of Amir et al (2000), Dally et al (1989), Mellings and Alden (2000).

The results of the study by Amir et al (2000) showed that there is bias towards threatening social information in the implicit memory of individuals suffering from social anxiety disorder. On the other hand, the explicit memory test has not shown any difference between the groups. Thus, in individuals with social anxiety disorder some sort of biased implicit memory can be observed, while no such bias can be seen in explicit memory. Dally et al (1989) asked volunteers with high and low stage fright (speech-making anxiety) asked to make a speech for an audience consisting of three people, and then asked them to recount what had happened during their speeches, then an incident memory test was administered to them which included questions about the environment. In the free recall, the two groups did not show any differences in remembering environmental information. But in the cued recall test, poorer recall of environmental information was observed in the high anxiety group. These findings have been confirmed in another study by Mellings and Alden (2000), in which they asked people with high and low social anxiety to talk to a stranger. The volunteers

returned the next day and recalled information about the conversation for a duration of time equal to the time of the conversation and answered questions which assessed different aspects of the memory related to the conversation. The two groups did not differ in terms of the amount of negative information which they recalled. But, the answers to the questions about their interlocutor showed that the group with social anxiety remembers less information about the interlocutor in comparison with the low anxiety group. Kimble et al (1982) found out that people with higher levels of self-consciousness remember less information about people they have met. Hope et al (1990) indicated that people with social anxiety disorder remember less information about social situations.

The other finding of the present study suggests that there is no significant difference between the two groups of individuals with social phobia and normal individuals in terms of bias in explicit memory. In explicit memory, the individuals recalls his personal experience consciously. When the functioning in a task requires knowingly remembering previous experiences, explicit memory is at work. To measure this issue, the cued recall test was used. When individuals with social phobia were asked to complete the words with while knowingly remembering previous experiences, they showed no difference with normal individuals in the recall and recognition of positive, negative, and neutral words. This finding of the present study matches the results of studies by Rapee et al (1994), and Cloitre et al (1995).

Rapee et al (1994) demonstrated that in the recognition and recall of social threats, physical threats and positive and negative words, there was no difference between patients suffering from social anxiety disorder and the control group. This finding indicating lack of bias in memory among individuals with social anxiety disorders was reaffirmed by Cloitre et al (1995) who found no difference between patients suffering from social phobia and a non-clinical control group in terms of free recall and recognition of neutral and socially threatening words.

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