The Effects of Self-Esteem, Friendship, Aggressiveness on Short and Long Visual Memories Assessed by ROCF Test

Ochilbek Rakhmanov[1], Senol Dane[2*]

[1]Department of Computer Science, Faculty of Natural and Applied Sciences, Nile University of Nigeria, Abuja, Nigeria

[2]Department of Physiology, Faculty of Basic Medical Sciences, College of Health Sciences, Nile University of Nigeria, Abuja, Nigeria

ABSTRACT

Introduction: The Rey-Osterrieth Complex Figure Test (ROCF), a visual memory test, is accepted as an important and useful tool to get and follow the achievement and some behavioral or neuropsychological factors.

Methods: A total of 123 Nigerian university students were involved in the study. Participants were 53 men and 70 women who were 16-18 years of age. The Rey-Osterrieth Complex Figure (ROCF) test developed by Rey and standardized by Osterrieth used to screen for visual memory. To get their self-esteem scores were used the Rosenberg Self-esteem Scale. Friendship graphing and the concept of the degree of the nodes were used. To take the aggression score was used the aggression questionnaire developed by Orpinas and Frankowski in 2013.

Results: In the present study, there were significant positive correlations between self-esteem score and short-term (Immediate recall) and long-term (Delayed recall) visual memories in the ROCF test, especially in female subjects. And, there was a negative correlation between self-esteem score and aggressiveness in the present study. Also, there were significant positive correlations between friendship and short-term (Immediate recall) and long-term (Delayed recall) visual memories in the ROCF test, especially in female subjects.

Conclusions: University students need low aggressiveness and depression and high self-esteem and friendship for high visual memory and even academic success. For this reason, the family and school support are necessary to increase friendship, to decrease aggressiveness, to decrease depression and to increase visual memory and school and life successes.

Key words: Rey-Osterrieth Complex Figure test, self-esteem, aggressiveness, friendship, visual memory, family support, school support

INTRODUCTION

The Rey-Osterrieth Complex Figure (ROCF) test is a non-verbal neuropsychological test and is used for the evaluation of visuospatial and visual memory [1]. Immediate recall (short-term visual memory) and delayed recall (long-term visual memory) can be assessed using the ROCF test. Immediate recall and delayed recall are closely related to the accuracy in visual memory [2]. In a recent study, there were negative correlations between depression score and short-term and long-term visual memories assessed by this test [3].

Self-esteem is explained as feelings of one's self-worth [4]. It is a person's overall subjective emotional evaluation of his or her worth. Also, self-esteem can be defined as positive or negative thoughts about ourselves [5]. Self-esteem is a valuable index of some behavioural, social and psychological parameters including school success [6,7], happiness [8], achievement in the family life [9], criminal behaviour [9] and left-handedness [10]. The relation between memory and the sense of self has been the main topic in scientific memory studies; the function of memory to establish personal identity, psychological self, and narrative has long been a major field of inquiry [11-13].

Friendship is a distinctively personal relationship that is grounded in a concern on the part of each friend for the welfare of the other [14]. Friendship is a close association between two people marked by feelings of care, respect, admiration, concern, or even love. Friendship is still a popular topic for researchers in the investigation of human behaviour. It is quite difficult to represent friendship in numbers, but still, many researchers tried it. They tried to represent friendship as a coefficient, while some others tried to bring it to the number the quality of friendship.

Arnold et al. tried to give coefficients for the friendship during their research on the effect of interpersonal relations to the political views and votes. They summarized the friendship coefficients as follows: "Friendship: The friendship variable is 0 when neither legislator names the other as a friend; 1 when one legislator in the pair names the other as a friend; and 2 when both legislators name one another as a friend." [15].

Markievicz et al. used a survey questionnaire of 23 items to identify the quality of friendship among their experiment participants [16]. The 23-item scale provides five subscales: companionship, help/support, closeness, security, and conflict. To more clearly represent the dyadic nature of the concept of friendship.

Aggression is a destructive behavioural expression that can result in pain and discomfort for others. There is a lot of aggressiveness questionnaires or inventory. One of the first and most widely used measures of aggression is the Buss – Durkee Hostility Inventory (BDHI) [17]. The aggression scale used in the present study was developed by Orpinas, et al.in 2013 [18]. They have actualized three studies in a report. In Study 1, the development of the scale, its content validity, and the consistency of students' responses are presented. In Study 2, the construct validity and internal consistency of the scores based on a small sample of sixth graders are described. In Study 3, the properties of the scale were cross validated in a large sample.

This study was conducted to explore the effects of self-esteem and friendship on Immediate recall (short-term visual memory) and Delayed recall (long-term visual memory) subtests of the ROCF in the first-year university students.

METHODS

Participants

Students (One hundred twenty-three) who had classes at the time of the study were approached and requested to participate in the study. All of them accepted to participate in this study (53 men, average age=17.91 years, standard deviation, SD=1.31: 70 women, average age=17.43, SD=1.38). They were the first-year students of the two different faculties (Faculty of Natural and Applied Sciences, College of Health Sciences) at Nile University of Nigeria, private tertiary institution in Abuja, Nigeria. The age of the participants was not different statistically by sex.

Inclusion criteria

Willingness to participate.

Only students could participate.

Only undergraduate students studying were included in the study.

Exclusion criteria

The study excluded participants that were not willing to be involved.

Students with respiratory, metabolic, cardiac, psychiatric or central and autonomic nervous system disease that might change the self-esteem, aggressiveness scores, and visual memory scores were not involved.

Procedure

The experimental protocol was by following international ethical standards. The study was performed per under the Helsinki Declaration (1975, revised in 1996-2013) [19]. It was a descriptive cross-sectional study. The aims and objectives of the study were explicitly explained to the participants before the commencement of the study. All participants voluntarily gave written informed consent to participate in the study. The study was anonymous. A paper-and-pencil based method of filling questionnaires was utilized. All questionnaires were distributed only among first-year students of medicine and computer science departments. The study was made between December 2019 and January 2020.

Self-esteem

Rosenberg Self-esteem Scale [20] was used to collect the scores associated with self-esteem. The reliability and validity of the Rosenberg Self-esteem Scale have been well-demonstrated [21, 22]. The participants were asked to rate the degree to which they agree with each of the statements using a five-point Likert rating scale that ranges from "strongly agree" to "strongly disagree."

Friendship

Friendship graphing and the concept of the degree of the nodes were used in the present study [23]. The used graph representation of the friendship links to show that when there are tightly knit family groups, which they referred to as family circles, in a social network, they can improve the accuracy of link prediction models. To identify the number of friendship links was used a method presented by Parker and Asher [24]. Subjects were asked to write down their 3 best friends and later requested to choose one of them as the best friend.

Graph: A simple (undirected) graph G=(V,E) consists of V, a nonempty set of vertices (or nodes) and E, a set of edges. Each edge has either one or two vertices associated with it, called its endpoints. An edge is said to connect its endpoints [25].

Friendship Graph: A simple graph was used to represent whether two people know each other, that is, whether they are acquainted, or whether they are friends. Each person in a group of people is represented by a vertex. An undirected edge is used to connect two people when these people know each other when we are concerned only with acquaintanceship, or whether they are friends [25].

Degree of vertex: The degree of a vertex in an undirected graph is the number of edges incident with it. The degree of the vertex v is denoted by deg(v). In our case, deg(v) would represent the number of persons who mentioned vertex v as a friend.

Coding and library: Python programming language was used with open source library Network X during visualization and analysis of the graph [26]. This library can easily prosses the graph information and produce all the necessary tools for further observations.

Students were given a plain sheet and were requested to write down their best 3 friends who are classmates. It was optional to write up to 3 names, as some students mentioned only 2 or 1 name, and we had a group of students who didn't mention any name. Students who didn't mention any name on paper we manually acquainted with a person named Nil, which means no friend. Papers with names were collected and converted to spreadsheet format. We encoded names to keep privacy during research. Every student is assumed as one node. If the student has a friendship connection with some other student, then an edge is created between these 2 nodes. Hence, for instance, a student whose name was mentioned 3 times, would have 3 edges connected to it. Distance between nodes is constant, 1 unit. Repetitive connections (like John-Mike and Mike-John) counted as 1 connection. Figure 1 is a sample graph for the Computer Science group (Figure 1).
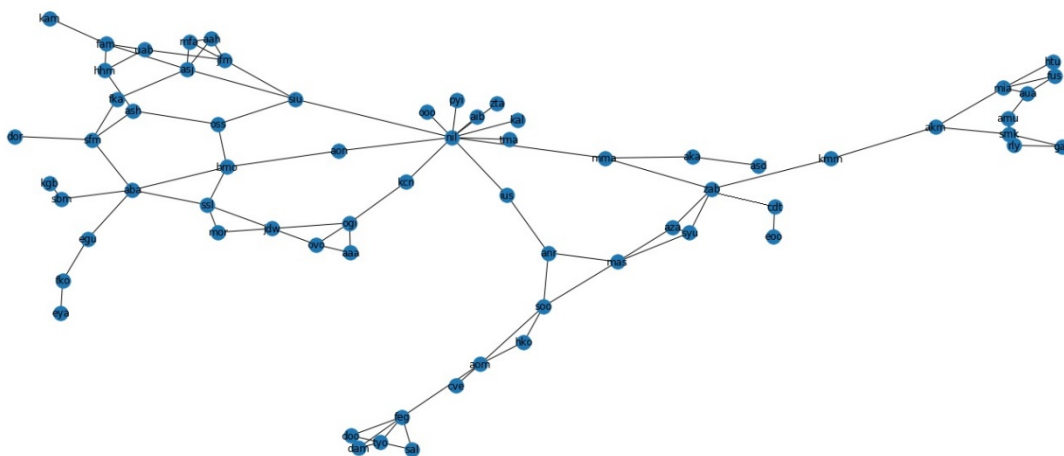

Figure 1: The friendship graph representation for the computer Science group.

Aggressiveness

The aggression scale used in the present study was developed by Orpinas and Frankowski in 2013 [18]. The participants were asked to rate the degree to which they agree with each of the statements using a seven-point Likert rating scale that ranges from zero to 6.

Procedure for Rey–Osterrieth Complex Figure Test (ROCF)

The following instructions to conduct the ROCF test were followed [27].

All students were given 2 pieces of a blank sheet and were told they would be given a figure which they need to copy to blank paper in front of them. They were also informed that details are important rather than beauty and colorfulness of the picture. Finally, a copy of ROCF is given to everyone at the same time. The time limit was given as 3 minutes, but nearly everyone finished in 2 minutes time period.

All sketched papers and original ROCF papers were collected by the invigilator, which took approximately 2-3 minutes. So, by the instructions of (Meyers & Meyers, 1995), a break of 3 minutes was given [28].

Once Step 2 is done, students were requested to sketch the figure from their memory on a 2nd blank sheet. The time limit was given as 3 minutes again, and all figures were collected back once sketches are done. These sketches served as the Immediate Recall test.

Meyers, et al. suggested using 30-45 minutes time interval between the Immediate and Delay Recall test [28]. They also suggested using conducting some verbal tasks in between this interval. So, we discussed with students about modern scientists and inventors and their impacts on modern technology. This process took between 32-37 minutes in our case.

Lastly, students were given a blank sheet and requested to draw ROCF again from their memory. These sketches were served as the Delay Recall test.

Scoring of ROCF test

A quantitative scoring system was used. In Rey's scoring system, the ROCF stimulus is divided into 18 sections/units and each unit is scored separately in terms of both accuracy and placement. A standardized scoring system proposed by Meyers and Meyers was presented in Table 1 [28]. The total score of every sketch may range from 0.0

to 36.0. The scoring of the pictures was done by researchers personally.

Table 1: Scoring of ROCF test.

Score	Accuracy	Placement
2	Accurately drawn	Correctly placed
1	Accurately drawn	Incorrectly placed
1	Inaccurately drawn	Correctly placed
0.5	Inaccurately drawn, but recognizable	Incorrectly placed
0	Inaccurately drawn and unrecognizable, or omitted	Incorrectly placed

Statistical analyses

Measured values are given as a mean +/- standard deviation (SD). Statistical analysis was performed using SPSS for Windows version 18. The Pearson correlation test was used. A p-value of less than 0.05 was considered statistically significant.

RESULTS

In the total sample, there were significant positive Pearson correlations between self-esteem score and short-term (Immediate recall) (r=0.212, p=0.02) and long-term (Delayed recall) (r=0.176, p=0.052) visual memories in the ROCF test. Besides, there was a significant negative Pearson correlation between self-esteem score and aggressiveness (r=-0.210, p=0.015) (Table 2).

In male subjects, there was no significant correlation between self-esteem score and aggressiveness score (r=-0.252, p=0.04). Also, there were no significant correlations between self-esteem scores and short- and long-term visual memories (Table 2).

In female subjects, there was no significant correlation between self-esteem score and aggressiveness score. But there were significant positive Pearson correlations between self-esteem score and short-term (r=0.288, p=0.018) and long-term (r=0.219, p=0.073) visual memories (Table 2).

Table 2: Correlations between self-esteem and aggressiveness and self-esteem and short- and long-term visual memories.

	Aggressiveness	Short Visual Memory	Long Visual Memory
	Total Sample		
Self-Esteem	-0.219, 0.015	0.212, 0.02	0.176, 0.052
	Men		
Self-Esteem	-0.252, 0.068	0.098, 0.488	0.093, 0.510
	Women		
Self-Esteem	-0.159, 0.189	0.288, 0.018	0.219, 0.073

In the total sample, there were significant positive Pearson correlations between friendship score and short-term (Immediate recall) (r=0.205, p=0.025) and long-term (Delayed recall) (r=0.182, p=0.045) visual memories in the ROCF test. Besides, there was a significant negative Pearson correlation between friendship score and age (r=-0.257, p=0.004) (Table 3).

In male subjects, there was a statistically significant negative correlation between friendship score and age (r=-0.273, p=0.048). There were no significant correlations between friendship score and short- and long-term visual memories (Table 3).

In female subjects, there was a statistically significant negative correlation between friendship score and age (r=-0.262, p=0.029). Also, there were significant positive Pearson correlations between friendship score and short-term (Immediate recall) (r=0.351, p=0.003) and long-term (Delayed recall) (r=0.355, p=0.003) visual memories in the ROCF test (Table 3).

Table 3: Correlations between friendship and age and friendship and short- and long-term visual memories.

	Age	Short Visual Memory	Long Visual Memory
	Total Sample		
Friendship	-0.257, 0.004	0.205, 0.025	0.182, 0.045

Men			
Friendship	-0.273, 0.048	0.018, 0.898	-0.04, 0.775
Women			
Friendship	-0.262, 0.029	0.351, 0.003	0.355, 0.003

DISCUSSION

In the present study, there were significant positive correlations between self-esteem score and short-term (Immediate recall) and long-term (Delayed recall) visual memories in the ROCF test, especially in female subjects. In the previous study, self-esteem score was higher in left-handed students than in right-handed students [10]. These results suggest that high self-esteem scores may be associated with high academic and sports performance in university students. In universities, because balanced self-esteem not too little and not too much self-esteem is important for success, the emotional training programs can be useful to decrease many possible psychological problems and to increase academic achievement. The results of the current study should be replicated and reconfirmed by further robust replication studies.

Besides, there was a negative correlation between self-esteem scores and aggressiveness in the present study. Aggressiveness is highly prevalent among adolescents [29]. Both aggression perpetration and victimization increase the risks of externalizing and internalizing problems in adolescents [30]. Selfesteem evolves to reflect a person's level of status and acceptance in their social group [31]. Many studies on selfesteem have implicated it as a prime factor in a wide variety of mental health and adjustment outcomes [32]. These findings support the idea that both involvements in aggression and selfesteem are important issues affecting the health of adolescents.

Some studies on the relationships between aggression and selfesteem have found negative relationships [33, 34] but others did not [35, 36]. In a previous study, mean destructive aggressiveness was higher for the left- than the right-handed athletes. They suggested that the means of tolerance and insistence were higher for the right- than the lefthanded athletes. Higher aggressiveness and less tolerance and insistence in the lefthanders may be associated with their higher sports performance [37].

It has been known that aggressiveness [38] and depression in adolescents may result in low selfesteem [39]. Good family support can increase adolescent selfesteem [40] and reduce adolescent aggression [41]. There are gender differences in adolescent selfesteem [42], aggression [43], and depression [44-46].

In the present study, there were significant positive correlations between friendship and short-term (Immediate recall) and long-term (Delayed recall) visual memories in the ROCF test, especially in female subjects. Friendship entails interpersonal ties or bonds that are characterized by affection or esteem. Networks of friends provide distinctive lines of communication, channel the exchange of information and influence, establish a basis for interpersonal commitments and loyalties, and provide the social capital needed for goal attainment [47]. It can be stated that increased friendship is important for increased visual memory and even academic success.

In previous studies, the relationships of some environmental and hereditary factors such as gender, education, physical abnormalities, handedness, marital status, visual memory, and salivary testosterone with some psychologies including self-esteem, alexithymia, depression [3, 10, 45, 46, 48-50].

CONCLUSION

Consequently, university students need low aggressiveness, low depression, high self-esteem and high friendship for high visual memory and even academic success. For this reason, the family and school support are necessary to increase friendship, to decrease aggressiveness, to decrease depression and to increase visual memory and school and life successes. Schools should create some groups or clubs or associations among their students. For example, medical faculties can establish some research or science teams. Students should present their results in some seminars or conferences or congresses. These activities can increase their self-esteem score, decrease depression and aggressiveness scores and increase their visual memory and achievement.

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