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Exploring the Psychometric Properties of the Algerian Version of Grober & Buschk Test

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Abstract

Accurate psychological assessment and diagnosis rely on several facilitating factors, including the availability of tools that assist clinical psychologists, particularly in establishing accurate diagnoses for the disorders they encounter. Consequently, these tools help in finding appropriate solutions and ultimately achieving comfort and mental health for the individual in question. One important tool among these is psychological testing. In our study, we have constructed and standardized the Grober et Buschke test for the Algerian community, with the aim of examining its psychometric properties, such as validity and reliability, as well as its ability to measure the intended constructs. Thus, providing a tool that aids physicians and psychological professionals in facilitating the diagnostic process, especially in memory-related disorders. It is important to adapt tests to the Arab environment to enable professionals to use them with ease. Furthermore, it is necessary to apply the adapted test to a sample of patients to accurately demonstrate its significance.
Keywords: adaptation, personal memory, Grober et Buschke.

Introduction

Personal memory is considered one of the most important functions that every individual possesses. It enables individuals to remember everything related to their personal lives or their biography, especially their memories. However, personal memory can be influenced by various factors, whether psychological or organic. Therefore, it is necessary to conduct an objective and accurate diagnosis for those affected by such influences, and this can only be achieved through the use of specialized tests. Due to the scarcity of these tests, whether in Algeria specifically or in the Arab world generally, our study focuses on adapting the Grober et Buschke test. This test stands out from others in that it ensures the encoding process, and it remains essential to examine both the retention and retrieval processes. According to Pillon et al (1993), this is necessary for differential diagnosis between memory disorders caused by cortical brain injuries and those arising from subcortical brain injuries.

Adapting a test is not merely a process of translation, but rather a long-term endeavour that can take several months or even years. It requires a specific and rigorous methodology. To adapt a test to a specific community, it is necessary to rely on a bank of information consisting of words and pictures that align with the cultural standards of the country. In order to study the reliability and validity of the test, it is essential to employ important techniques and statistical tools. The

interpretation of test results should consider the influence of social, cultural, and demographic factors. Respecting these considerations is crucial for an accurate adaptation process.

1. Research Problem

There are various disorders that affect memory. In certain brain disorders such as Alzheimer's disease, Korsakoff syndrome, or traumatic brain injuries, difficulties in memory recall are a common factor. These difficulties often represent the internal formation of an individual and are also associated with their abilities to integrate socially, professionally, and within the family. For these reasons, assessing memory disorders is considered one of the most important functions of neuropsychology. In many cases, neuropsychologists rely on relatively old tests that are based on theoretical principles. These tests provide insights into the quality of abilities possessed by the individual compared to a control group, as well as identifying the nature of the deficits that affect these abilities. However, they do not allow for an understanding of the complexity of the mechanisms underlying memory or the specific disorders that affect it. Therefore, it can be said that these old tests do not provide accurate identification of memory disorders, which in turn hinders psychologists in diagnosing these disorders and consequently makes it difficult to direct them towards the most effective rehabilitation strategies.

One of the most significant disorders that affect memory is the disruption of personal memory in individuals, specifically the disturbances that affect the following regions:

- Posterior association cortex
- Medial temporal cortex
- Prefrontal cortex
- Cingulate cortex
- Diencephalic structures

Therefore, neuropsychological assessment is considered one of the most important and prominent steps that clinical psychologists must undertake. It enables them to gain a thorough and accurate understanding of the disorders affecting the patient in their care. To achieve this, the use of various psychological and neurological tests is essential. Given the lack of availability of tests in Algeria, we deemed it necessary to standardize the Grober et Buschke test. The purpose of our study is to explore the psychometric properties of this tool by standardizing it for the Algerian community and assessing its ability to measure the intended constructs.

2. Research Hypotheses

Based on the findings of previous studies, we can formulate five hypotheses as possible answers to the questions raised in the research problem. They are as follows:

- ✓ **Hypothesis 1:** We expect that the results will not be influenced by the gender of the participants.
- ✓ **Hypothesis 2:** We expect that the results will be influenced by the factors of educational level and age.
- ✓ **Hypothesis 3:** We expect that the Grober et Buschke test will be a reliable tool.
- ✓ **Hypothesis 4:** We expect that the Grober et Buschke test will be a valid tool. The importance and objectives of the research.

3. Significance and Objectives of the Research

The significance and objectives of the research can be summarized as follows:

- ✓ To familiarize professionals with the tool and its importance in the field of clinical psychology.
- ✓ To demonstrate the suitability of the tool in detecting personal memory disorders.
- ✓ To provide practical training in using the employed methods to collect data and information related to the case under study. This allows the student researcher to acquire scientific and methodological expertise at a certain level of academic achievement, and to ensure the proper use of tools and steps in conducting applied scientific research.
- ✓ To provide a standardized tool for the Algerian community in the Arabic language, which can assist psychologists in their application. This is particularly important as psychology education in Algeria is conducted in Arabic.
- ✓ To enhance the repertoire of Algerian and Arab laboratories in terms of testing tools.

4. Methodological Steps

The methodology used is determined by the nature of the study, including the research topic, objectives, the researcher's capabilities, and the allotted time for the study. Since our study is exploratory in nature, our aim is to ensure the psychometric properties of the tool by applying it to a sample of participants following the steps of the descriptive methodology. The descriptive methodology can be defined as follows:

The descriptive methodology focuses on accurately stating the characteristics and features of the described object quantitatively and qualitatively. It is commonly used in the social sciences and

can be defined as a method of analysis and interpretation that aims to achieve specific purposes related to a specific social situation. It is a method for describing the studied phenomenon and portraying it quantitatively through the collection of standardized information about the problem, its classification, analysis, and subjecting it to meticulous study (Shurouk, 2003).

5. Study Sample

Sampling is one of the fundamental steps in research preparation. Errors in sampling can compromise the credibility of the research. While researchers often use random sampling, the nature of the research problem and its objectives may necessitate the use of purposive sampling to explore the desired characteristics. The purposive sample is defined as "the non-probability sample that faces fewer difficulties in selecting elements (Angres, 2004).

In our study, we relied on a purposive sample of 120 participants, consisting of 61 males and 59 females. All participants were healthy individuals with no medical history. They were intentionally selected. Below are some characteristics of this sample:

- Total sample size: 120 participants
- Gender distribution: 61 males and 59 females
- All participants were healthy and had no medical history

It's important to note that the purposive sample was selected based on specific criteria to ensure the suitability of participants for the study objectives.

Table 1 displays the characteristics of the sample according to age, gender, and educational level.

Educational level					
Total	13and above Higher Education	7-13 secondary	0-6 primary	**Gender**	**Age Group**
32	11	10	11	**males**	**Old**
54.24%	34.38%	31.25%	34.38%		
30	9	11	10	**female**	
49.18%	30.00%	36.67%	33.33%		
27	10	13	4	**males**	**Young**
45.76%	37.04%	48.15%	14.81%		
31	10	15	6	**female**	
50.82%	32.26%	48.39%	19.35%		
120	|40	49	31		

X2=0.27	df=2	p=,874

The table above illustrates the distribution of the sample according to the factors of age, gender, and educational level. The table demonstrates homogeneity in the sample among males and females, as well as between the elderly and youths across different educational levels. This is supported by a chi-square calculation of 0.29 with a significance level of 0.874, indicating that the differences in the sample based on age, gender, and educational level are not statistically significant.

6. Tools Used

The first step in designing the questionnaire was to familiarize and acquaint oneself with as many words as possible that would later aid in the design of the final test. This questionnaire contained information about the participants and a set of categories, totalling 30, including animals, transportation, vegetables, fruits, spices, weapons, occupations, buildings, school supplies, cleaning tools, work tools, cosmetics, beverages, food, geometric shapes, flowers, fish, trees, utensils, birds, insects, clothing, furniture, toys, sports, and body parts.

The researcher applied this questionnaire to a sample of 90 participants, all of whom were university students from various regions in Algeria. The sample included participants from the northern region (Algiers), southern region (Ouargla and El Oued), eastern region (Constantine), and western region (Oran). The researcher distributed the questionnaire to the students and asked them to name as many words as possible belonging to each category. They were given two minutes for each category. Therefore, the test required approximately one hour to complete.

After completing the application of the questionnaire, the researcher proceeded to record the collected information on an Excel sheet. The following data was recorded for each category:

- **Individuals**: Refers to the group of participants who completed the questionnaire.
- **Categories:** Each category is listed, for example, the category of animals, and all the animals mentioned by the participants are written without repetition.
- **Presence:** In this column, a "1" is entered next to the animal mentioned by a participant, while a "0" is entered next to animals that were not mentioned.
- **Ranking:** In this column, the ranking of each animal is recorded. For example, a number like "06" is written next to "cat," indicating that the cat was mentioned in the sixth position.

After transcribing all the data for each category and conducting the necessary statistical analysis, the researcher adopted the words that fell between ranks 06 and 20 in each category in descending order. These selected words were then included in the final format of the test, which consisted of both word format and picture format.

The word format included the following vocabulary: "cow, sword, ear, sunflower, book, doll, chicken, garlic, boat, saw, strawberry, coat, worm, television, broom, kettle."

As for the picture format, it included the following vocabulary: "bed, broom, cup, pen, drum, peacock, pepper, bus, scissors, banana, fish, shoe, camel, cannon, eye, scorpion."

In 1987, researchers Grober and Buschke designed a test that measures verbal memory and learning. In our study, we adapted this test to the Algerian community. The following is a detailed description of the test and its application:

- The selection of vocabulary in the test was done meticulously, ensuring that it does not contain the most typical examples of specific categories.
- The words in the first list were selected from real-life examples ranging from ranks 6 to 20.
- As for the words in the second list, they were chosen as distractors during the recognition process. The selection was made based on the following criteria:
- Four words with similar weight.
- Four words with similar shapes.
- Four prototypical words.
- Fourwords that are unrelated to the other words, neither in weight nor in semantic meaning.
- Statistical Tools

Descriptive statistics (frequencies, means, and standard deviations) were used to analyze participants' responses at each stage of the test. T-test (Student's t-test) was employed when comparing two groups, while analysis of variance (ANOVA) was used when comparing multiple groups or variables. Pearson's correlation coefficient was calculated to analyze correlations. All tests were conducted using SPSS-13 software.

7. Study Results

7.1 The Effect of Gender on Test Results

During this phase, the researcher applied the t-test to the sample to examine whether there were differences in results between males and females.

Table 2 shows the test values"T" in the sample in terms of sex

standard deviation	Mean	sample	Gender	Part of the Test
Image Version				
1.125	14.97	61	**Males**	**Coded Recall**
1.170	15.10	59	**Females**	
1.117	13.95	61	**Males**	**Free Recall 1**
1.050	14.00	59	**Females**	
0.741	15.57	61	**Males**	**Coded Recall1**
0.494	15.78	59	**Females**	
0.949	14.31	61	**Males**	**Free Recall 2**
0.770	14.42	59	**Females**	
0.401	15.80	61	**Males**	**Coded Recall2**
0.484	15.80	59	**Females**	
0.587	15.70	61	**Males**	**Free Recall 3**
0.508	15.81	59	**Females**	
0.218	15.95	61	**Males**	**Coded Recall3**
0.183	15.97	59	**Females**	
0.721	31.48	61	**Males**	**Recognition "Pictures"**
1.008	31.32	59	**Females**	
Words Version				
0.648	15.48	61	**Males**	**Coded Recall**
0.795	15.46	59	**Females**	
1.062	14.15	61	**Males**	**Free Recall 1**
1.095	14.20	59	**Females**	

0.788	15.52	61	**Males**	**Coded Recall 1**
0.609	15.54	59	**Females**	
0.820	14.62	61	**Males**	**Free Recall 2**
0.653	14.51	59	**Females**	
0.413	15.79	61	**Males**	**Coded Recall 2**
0.503	15.76	59	**Females**	
0.549	15.64	61	**Males**	**Free Recall 3**
0.507	15.68	59	**Females**	
0.250	15.93	61	**Males**	**Coded Recall 3**
0.281	15.92	59	**Females**	
0.816	31.03	61	**Males**	**Recognition - Words**
0.964	31.03	59	**Females**	

Based on this table and the calculation of the independent samples t-test, it is evident that there are no statistically significant differences between males and females in all types of recall, whether it is in the picture format or the word format.

7.2 The Effect of Age and Educational Level on Results in Word Format

- ✓ **First Free Recall**

Based on the analysis of variance, the results regarding the effect of age and education level on free recall in the word format are as follows:

There is no significant effect of age: ✓ $F(1) = 0.96, p = 0.327$.

There is no significant effect of education level: ✓ $F(2) = 1.50, p = 0.223$.

There is no significant interaction between age and education level: ✓ $F(2) = 0.17, p = 0.842$.

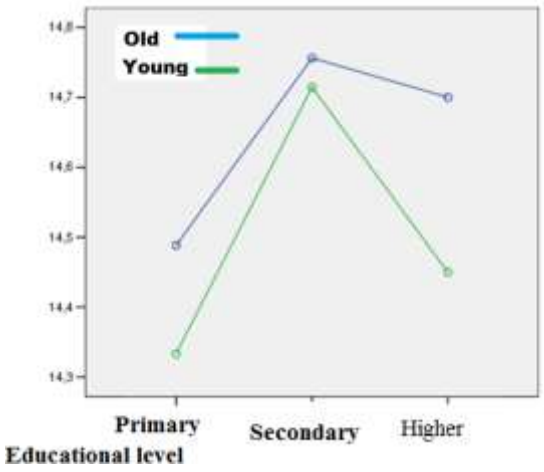

Figure 1 illustrates the distribution of the sample's average scores during the first free recall in the word format, taking into account the variables of age and gender.

The data depicted in this figure reveals a notable pattern in the distribution of average scores during the first free recall task related to word-based stimuli, taking into consideration the variables of age and educational level. Specifically, it is observed that among the elderly participants, those with lower educational levels tend to exhibit lower average scores. However, a noteworthy improvement in scores is observed among elderly individuals with a secondary educational level. Interestingly, a subsequent decline in scores is observed among elderly participants with higher educational levels. Similar trends are observed among the younger participants, but the decline in average scores among individuals with higher educational levels is more pronounced compared to their elderly counterparts.

✓ **The Second Free Recall Task**

Regarding the second free recall task, the analysis of variance examining the effects of age (2 levels) and educational level (3 levels) yielded the following results:

There was no significant effect of age	$F(1) = 0.42, p = 0.517$
There was no significant effect on the educational level.	$F(2) = 1.57, p = 0.209$
There was no significant interaction between age and educational level	$F(2) = 0.21, p = 0.810$

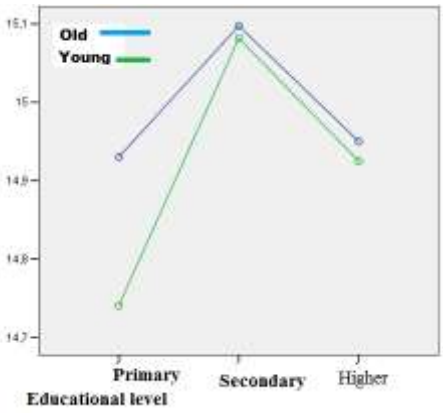

Figure 2: The distribution of average scores within the sample during the second free recall task in the word format, taking into consideration the variables of age and gender.

According to this figure mage, we observe that the average scores of the elderly are lower among those with a primary educational level, then improve among those with a secondary educational level, and subsequently decline among those with a higher educational level. The same pattern is observed among the youth, but this time we notice a similar intensity of decrease between the elderly and the youth.

- ✓ **Verbal format, - The third free recall task**

There was no significant effect of age on performance, as indicated by the F-statistic (1)=0.52, p=0.471.

Similarly, there was no significant effect of educational level on performance, as indicated by the F-statistic (2)=0.08, p=0.919.

Furthermore, there was no significant interaction effect between age and educational level on performance, as indicated by the F-statistic (2)=0.09, p=0.911.

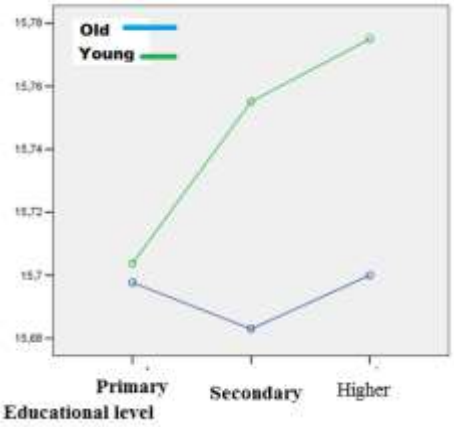

Figure 3: The distribution of the sample's average scores during the third free recall task in the verbal format, taking into account the variables of age and gender

Figure 3 reveals that older adults with elementary education perform better than those with secondary education in the third free recall task in the verbal format. Furthermore, the performance

of older adults with higher education approaches that of those with elementary education. This indicates that after initially having a higher average score among individuals with elementary education, the average score decreases among those with secondary education and then increases again among those with higher education. As for the younger participants, we observe an improvement in the average score with higher educational attainment. Additionally, it is noteworthy that the average score of the younger participants is significantly higher than that of the older adults.

✓ **Recognition task**

During the recognition task, the analysis of variance was conducted to examine the effect of age (2) and educational level (3), yielding the following results:

Age showed a non-significant effect	F(1) = 0.29, p = 0.588
Educational level exhibited a significant effect.	F(2) = 9.66, p = 0.000
There was no significant interaction between age and educational level	F(2) = 0.35, p = 0.698

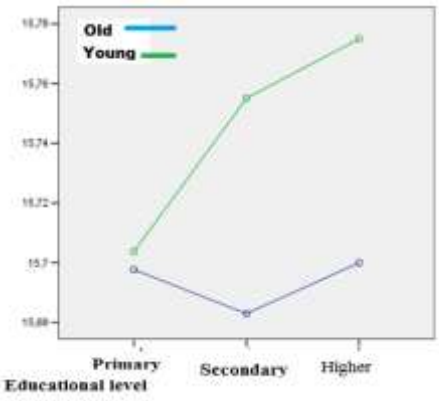

Figure 4 illustrates the distribution of the sample's average scores during the recognition task in word format, considering the variables of age and gender.

Through this figure, it becomes evident that both the average scores of the elderly and the youth improve with higher levels of education. Additionally, the average scores of the youth are significantly higher than those of the elderly. This trend is observed for individuals with both elementary and higher education levels. However, for individuals with secondary education levels, the average scores in the elderly group are higher compared to the youth group. Therefore, there is a significant impact of education level on the recognition task.

7.3 The Effect of Age and Education Level on Results in Image Format

✓ **Free Recall 1**

Regarding this first free recall in the image format, the analysis of the variance study on the effect of age (2) and education level (3) indicates the following:

There is no significant effect of age	F(1) = 0.002; P = 0.880
There is no significant effect of education level	F(2) = 0.16; P = 0.845

There is no significant interaction between age and education level F(2) = 0.05; P = 0.945

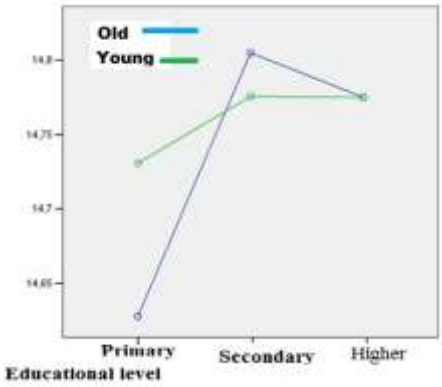

Figure 5: illustrates the distribution of average scores within the sample during the first free recall of the picture format, considering the variables of age and gender

The figure reveals that the average scores of elderly individuals improve with higher levels of education until reaching the secondary level, after which they begin to decline. As for the youth, their average scores also improve and are similar among those with secondary and higher education levels.

- ✓ **Free recall of the second task**

Regarding the analysis of variance to study the effect of age (2) and education level (3) on the free recall of the second task in the image format, the following results were obtained:

There is no significant effect of age F(1) = 0.06; P = 0.804
There is no significant effect of education level F(2) = 1.11; P = 0.331
There is no significant interaction effect between age and education level F(2) = 0.74; P = 0.474

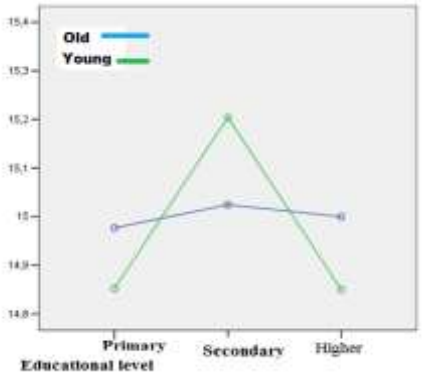

Figure 6: illustrates the distribution of the average scores of the sample during the free recall of the second task in the image format, taking into account the variables of age and gender.

This figure illustrates that the average scores of the elderly individuals are relatively similar across the three educational levels, with a slight improvement observed among those with a secondary education before declining again. In contrast, among the youth, individuals with a

secondary education exhibit a significant superiority compared to the other educational levels. Additionally, the average scores of individuals with an elementary education are comparable to those with a higher education level.

- ✓ **Third Task Free Recall**

Regarding the free recall task in the third phase, and upon conducting the analysis of variance to examine the effects of age (2) and educational level (3), the researcher found the following:

There is no significant effect of age	F(1) = 2.96; P = 0.087
There is no significant effect of educational level	F(2) = 0.62; P = 0.535
There is no significant interaction effect between age and educational level.	F(2) = 1.39; P = 0.251

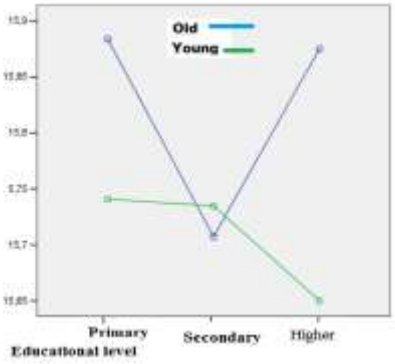

Figure 7: illustrates the distribution of average scores in the free recall task during the third phase, specifically in the visual format, taking into account the variables of age and gender

It is evident that the average scores of older adults, after being satisfactory among those with a primary education level, significantly decline among those with a secondary education level, and then improve again among individuals with a higher education level. As for young adults, their average scores decrease as their educational level increases.

- ✓ **Recognition**

Regarding the analysis of variance for studying the effect of age (2) and educational level (3) on recognition, the following results were obtained:

There is a significant effect of age	F(1)=3.97, p=0.047
There is no significant effect of educational level	F(2)=1.44, p=0.238
There is a significant interaction between age and educational level.	F(2)=2.12, p=0.032

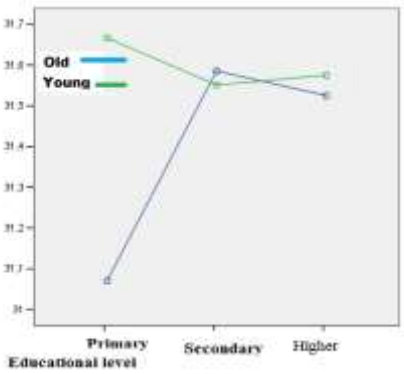

Figure 8: illustrates the distribution of the average scores of the sample during recognition in the visual format, considering the variables of age and gender

Scores are high among those with a primary education level, average among those with a secondary education level, and low among those with The figure tells that the average scores for the elderly individuals are high among those with a secondary education level, average among those with a higher education level, and low among those with a primary education level. As for the younger individuals, we observe a contrasting pattern. The average is a higher education level. Therefore, there is a significant effect of age and an interaction effect between age and education level.

8. Reliability Calculation

To ensure the reliability of the instrument, the researcher applied Cronbach's alpha equation, and the results indicated the following:

Table 3: displays the values of Cronbach's alpha coefficient

The value of Cronbach's alpha coefficient for the standardized items	Cronbach's alpha coefficient
0.793	0.749

According to the above table, it is evident that the value of Cronbach's alpha coefficient is high, indicating a high level of internal consistency for the test. This confirms that the Grober et Buschke tool is reliable.

Table 4 below presents the correlations between the test parts and Cronbach's alpha values if an item is deleted:

The test	The correlation coefficient between each test part and the total	Cronbach's Alpha if the item is deleted
Recall Symbol "S"	0.237	0.756
Free Recall 1 "S"	0.331	0.741
Coded Recall 1 "S"	0.318	0.738
Free Recall 2 "S"	0.425	0.727

Coded Recognition 2 "S"	0.290	0.742
Free Recall 3 "S"	0.464	0.729
Coded Recall 3 "S"	0.355	0.745
Recognition "S"	0.361	0.734
Coded Recall "K"	0.423	0.729
Free Recall 1 "K"	0.411	0.730
Coded Recall 1 "K"	0.424	0.729
Free Recall 2 "K"	0.353	0.753
Coded Recall 2 "K"	0.317	0.740
Free Recall 3 "K"	0.465	0.730
Coded Recall 3 "K"	0.474	0.739
Recognition "K"	0.366	0.734

It is evident that the correlation coefficients between the test parts vary. For example, the correlation coefficient for Symbol Recall 3, which is specific to the word format, represents the highest coefficient, whereas the general Symbol Recall, which pertains to the picture format, exhibits the lowest coefficient.

In terms of reliability, we obtained a Cronbach's alpha coefficient of 0.749, which is an acceptable result that confirms the test's reliability. On the other hand, if we investigate the items that, when deleted, would lead to an increase in the test's reliability, we observe from the table that Cronbach's alpha coefficient for the general Symbol Recall was 0.756. This indicates that deleting this item would result in an improvement in the test's reliability. We also note that the coefficient values for Symbol Recall 3, specific to the picture format, are close to Cronbach's alpha coefficient for the overall test. Furthermore, the items with Cronbach's alpha coefficients of 0.727 for Picture Recall 2, and 0.729 for Symbol Recall 1, General Symbol Recall (word format), and Free Recall 3 (picture format) are considered to be the items that contributed to an improvement in the test's reliability.

From the analysis, we can conclude that the Arabic version of the test is reliable. However, the general Symbol Recall for the picture format and the Free Recall 2 for words show slightly lower internal consistency compared to the other parts of the test. This suggests that these specific items may have less homogeneity with the rest of the test components.

9. Validity of the instrument

To assess the validity of the instrument, the researcher calculated the correlations between the instrument and other utilized measures on one hand, and the correlation between the word format of the instrument and the picture format of the instrument on the other hand.

Table 5: shows the correlation coefficients between the three free recall tasks and recognition tasks in relation to both formats (word and picture) compared to the other measures in the test

Recognition (Words)	Free Recall 3 (Words)	Free Recall 2 (Words)	Free Recall 1 (Words)	Recognition (Pictures)	Free Recall 3 (Pictures)	Free Recall 2 (Pictures)	Free Recall 1 (Pictures)	
-0.0514 P=0.579	0.0207 P=0.823	0.0617 P=0.505	0.0405 P=0.662	0.1480 P=0.108	-0.375 P=0.686	-0.1430 P=0.121	-0.283 P=0.760	PM47
-0.1771 P=0.205	-0.0367 P=0.692	-0.0367 P=0.780	-0.1793 P=0.051	0.0490 P=0.597	-0.0142 P=0.878	-0.1449 P=0.116	-0.1844 P=0.045	Animals - Linguistic Fluency
0.0177 P=0.848	0.1855 P=0.043	-0.0052 P=0.955	0.1265 P=0.170	0.0046 P=0.960	0.0423 P=0.648	0.0426 P=0.645	-0.0072 P=0.938	Clothes - Linguistic Fluency
-0.0720 P=0.436	-0.0435 P=0.639	-0.0764 P=0.409	-0.0651 P=0.482	-0.0425 P=0.646	-0.0825 P=0.375	0.0216 P=0.815	-0.0720 P=0.436	Letter "H" - Linguistic Fluency
-0.0642 P=0.488	-0.2470 P=0.007	-0.0012 P=0.990	-0.2160 P=0.018	-0.0883 P=0.339	-0.0986 P=0.286	-0.1101 P=0.233	-0.0747 P=0.421	Letter "M" - Linguistic Fluency
-0.0863 P=0.351	-0.413 P=0.655	-0.2193 P=0.017	-0.1084 P=0.241	-0.0755 P=0.415	-0.0293 P=0.752	-0.1546 P=0.093	-0.0007 P=0.994	Sequential Number Recitation - Same Direction
0.0442 P=0.633	-0.0721 P=0.436	-0.0497 P=0.592	0.1758 P=0.056	-0.0482 P=0.603	-0.1176 P=0.203	-0.2630 P=0.004	0.0922 P=0.318	Sequential Number Recitation - Reverse Direction
0.0183 P=0.844	0.0007 P=0.004	0.0084 P=0.928	0.0255 P=0.783	0.755 P=0.414	0.389 P=0.065	0.0028 P=0.976	0.0117 P=0.899	MMSE - Mental Estimation

It is evident from the table that tests such as Linguistic Fluency, Number Recitation, Mental Estimation (MMSE), and PM47 Intelligence Test do not measure the same construct as the "Personal Memory" tool. The correlations between these tests and the tool are generally weak, with only a few cases showing significant associations out of 64 comparisons. For example, the

correlation between the first Free Recall test for pictures and PM47 is 0.045, and the correlation between the second Free Recall test for images and Reverse Number Recitation is 0.004. As for the Free Recall test for words, it is only correlated with Linguistic Fluency for the letter "M" at 0.018. In the second Free Recall test for words, there is a correlation of 0.017 with Number Recitation in the same direction. Regarding the third Free Recall test, there is a correlation of 0.043 with Linguistic Fluency for "Clothes" and 0.007 with Linguistic Fluency for the letter "M".

Table 6 displays the correlation coefficients between the Grober et Buschke tool in image format and the Grober et Buschke tool in Word format

	General Symbol Recall	**Specific Recall 1**	**Specific Symbol Recall 1**	**Specific Recall 2**	**Specific Symbol Recall 2**	**Specific Recall 3**	**Specific Symbol Recall 3**	**Recognition**
General Symbol Recall	0.1283 P=0.165	0.2813 P=0.02	0.2089 P=0.023	0.2103 P=0.022	-0.0163 P=0.860	0.2025 P=0.027	0.0207 P=0.823	-0.0432 P=0.641
Free Recall 1	0.2211 P=0.016	0.1232 P=0.182	-0.0810 P=0.381	0.0900 P=0.330	0.1025 P=0.267	0.3327 P=0.000	-0.1127 P=0.222	0.1907 P=0.038
Specific Symbol Recall 1	0.0745 P=0.421	0.0356 P=0.700	0.1326 P=0.151	0.2582 P=0.005	0.0282 P=0.761	0.0542 P=0.558	0.0062 P=0.946	0.2483 P=0.006
Free Recall 2	0.2230 P=0.015	0.3242 P=0.000	0.0887 P=0.338	0.1683 P=0.067	0.0434 P=0.639	0.2137 P=0.020	-0.1243 P=0.178	0.0674 P=0.466
Specific Symbol Recall 2	0.0636 P=0.492	0.0286 P=0.757	0.0851 P=0.357	0.0832 P=0.368	0.1983 P=0.031	0.1406 P=0.127	-0.0174 P=0.851	0.2536 P=0.005
Free Recall 3	0.4161 P=0.000	0.2776 P=0.002	-0.0654 P=0.480	0.2338 P=0.010	0.2140 P=0.019	0.2430 P=0.008	-0.0274 P=0.767	0.1744 P=0.058
Specific Symbol Recall 3	0.3648 P=0.000	0.1272 P=0.186	-0.0590 P=0.524	0.2068 P=0.024	0.0981 P=0.289	0.3154 P=0.000	-0.0408 P=0.659	0.3496 P=0.00
Recognition	0.2518 P=0.06	0.1623 P=0.078	-0.148 P=0.873	0.0873 P=0.345	0.1489 P=0.106	0.1716 P=0.062	0.0942 P=0.308	0.1530 P=0.097

According to the table, it is evident that there is a significant correlation between the two versions of the Grober et Buschke instrument, namely the Picture Version and the Word Version, as indicated by the p-values. For example, if we consider the General Symbol Recall of the Picture Version, we find that it is correlated with Free Recall 1, Free Recall 2, Free Recall 3, Specific Symbol Recall 3, and Recognition of the Word Version. Similarly, the Free Recall 3 of the Picture

Version consistently shows correlations with the General Symbol Recall, Free Recall 1, Free Recall 2, Free Recall 3, Specific Symbol Recall 3 of the Word Version, and so on.

Thus, we can infer the presence of convergent evidence that supports the validity of the Grober et Buschke instrument.

Main Findings

In this section, the researcher aims to provide a concise overview of the findings obtained during this study:

1. The study revealed that both age and educational level did not have a significant impact on the participants' performance in the administered test.
2. After conducting the "T" test, no statistically significant differences were found between older adults and younger adults, as well as between females and males. This is consistent with Van der's results (Van der Linden et al, 2004).
3. The results of this study demonstrated that the Grober et Buschke tool is a psychometrically sound instrument. The computed Cronbach's alpha coefficient yielded a value of 0.749, indicating high internal consistency and reliability.
4. When examining the effect of item deletion on the tool's reliability using Cronbach's alpha, it was observed that removing the general coded recall item for the image format led to an increase in the test's overall consistency.

The researcher further assessed the validity of the tool through:

- Exploring the correlation coefficients between the tool and other administered tests, which revealed that Grober et Buschke primarily measures personal memory, distinguishing it from other tests that assess different cognitive functions.
- Investigating the correlation between the image format and word format of the tool, which indicated a strong and significant relationship between the two formats, further supporting the tool's construct validity. The same was confirmed by the study of Tounsi et al (1999).

Recommendations

- Adaptation of tests to the Arab context should be prioritized in order to facilitate their use by psychologists and ensure cultural appropriateness.

- Application of the Grober et Buschke test on a sample of patients and comparing it with a control group will provide a clearer understanding of its significance and effectiveness.

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