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The Effect of Loading Some Working Memory Components on Arithmetic Problem- Solving (Experimental Study)

by
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(Educational Psychology)

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Summary

The Title of the Study:

The Effect of Loading Some Working Memory Components on Arithmetic Problem- Solving (An Experimental Study).

The aim of the study :

The study aimed at investigating the contribution of memory components to mental arithmetic performance, arithmetic strategy choice and arithmetic strategy efficiency.

The Hypotheses of the study :

In the light of the study aim and previous studies, the following hypotheses were verified:-verify

1. Arithmetic performance (measured by accuracy and time) significantly does not vary according to the type of memory loading, namely phonological, visuo-spatial, episodic buffer).

2. The variety of mental arithmetic problem- solving strategies don't differ according to the type of memory loading, namely phonological, visuo-spatial , episodic buffer.

3. The frequency of using mental arithmetic problem- solving strategies significantly does not vary according to the type of memory loading ,namely phonological, visuo-spatial, episodic buffer).

4. The efficiency of mental arithmetic problem- solving strategies measured by accuracy significantly does not vary according to the type of memory loading,namely phonological, visuo-spatial, episodic buffer:

5. The efficiency of the mental arithmetic problem- solving strategies measured by time significantly would not vary according to the type of memory loading, namely phonological , visuo-spatial , episodic buffer:-

Procedures :

Participants :-

Participants were (40) students enrolled in the Arabic and the History Sections of the college of Education, fayoum university, second year, the academic year (2013/2014), with(19.57) mean and (0.34) standard deviation .They were divided into four groups(three experimental and one control)

Materials :-

The researcher used the following materials :-

1- **Simple mental arithmetic task** , developed by the researcher

2- **Tasks of loading on some working memory components** : developed by the researcher which include:

a-The Articulatory Suppression task (phonological memory loading

b-The episodic buffer loading task

c- The visuo-spatial loading task

3- **The Thinking aloud protocol** : developed by the researcher

4- **The Arithmetic Fluency Test**: developed by the researcher

Statistical Techniques :-

The researcher employed the following techniques :-

1. Frequency, Percentiles
2. One Way ANOVA
3. The Friedman Test

Results :-

1. Mental arithmetic problem- solving strategies didn't vary according to the type of memory loading, namely phonological, visuo-spatial, episodic buffer.

2. Arithmetic performance (measured by accuracy and time) didn't vary according to the type of memory loading , namely phonological , visuo-spatial , episodic buffer.

3. The phonological loading group time was statistically less than the, episodic buffer loading group and the no-loading group.

4. The variety of mental arithmetic problem- solving strategies didn't differ according to the type of memory loading, namely phonological, visuo-spatial , episodic buffer.

5. There are statistically significant differences in the frequency of using the "retrieval strategy" between the phonological loading group and no-loading group in favor of the phonological loading group.

6. There are statistically significant differences in the frequency of using the "transformation strategy" between the groups of visuo-spatial loading , no-loading and the phonological loading in favor of the no-loading group.

7. There are no statistically significant differences in the frequency of using the "counting strategy" between the four groups of the study.

8. There are no statistically significant differences in the accuracy of using the "transformation and retrieval strategy" between the four groups of the study.

9. There are statistically significant differences in the accuracy of using the "counting strategy" between the phonological loading group , and the two other groups of visuo-spatial loading and no-loading in favor of two other groups.

10. The phonological loading group time of using the "retrieval strategy" was statistically less than the time of the episodic buffer loading group.

11. The visuo-spatial loading group time of using the "transformation strategy" was statistically more than the time of the episodic buffer loading and the phonological loading groups.

12. The no loading group time of using the ""transformation strategy" was statistically more than the time of the episodic buffer loading and the phonological loading groups.

13. The visuo-spatial loading group time of using the "counting strategy" was statistically more than the other three groups