"Path Analysis of the Relationships between Spatial ability, Spatial anxiety, Persistence, Reading comprehension and word problems solving in Elementary School Students"

The aim of the present study is twofold:
(1)Investigate whether skills component (spatial perception, reading comprehension) explain unique variance in the level of word problem solving skills in primary school pupils.
(2) Examine the direct and indirect (via reading comprehension) effects on word problem solving.
The Method: A stratified random sample of 300 pupils from the fourth and fifth grades of primary school in Fayoum governorate was withdrawn and then divided into two equal samples; the first was to verify the psychometric properties of the study tools; the other was used as a basic sample to analyze the study data and answer its questions. In order to achieve the objectives of the study, five measures were applied: spatial perception scale, spatial anxiety scale, persistence scale, reading comprehension test and word problems solving test in group and individual sessions. The data were then analyzed using a number of parametric statistical techniques (path analysis, Goodman, Aroian, and Sobel equations to estimate the significance of indirect effects, exploratory and confirmatory factor analysis, as well as descriptive statistics).
Results: the hypothesized path model provides a good fit to the data approximately 100% according to the fit indices. A statistically significant positive direct effect was found for both spatial perception and reading comprehension on the word problems solving in the study sample. As well, direct positive effects were statistically significant for spatial perception and persistence in reading comprehension, while the direct effect of spatial anxiety was negative in reading comprehension. Moreover, indirect effects were found to be statistically significant for both spatial anxiety and spatial perception on the word problems solving in the study sample through reading comprehension, finally, the indirect effect of persistence through reading comprehension was statistically significant.
Conclusion: the components of ability (spatial ability and reading comprehension) impacts directly on the performance of word problems solving, as well as Spatial anxiety and spatial perception indirectly affect the ability to solve verbal problems implicitly indicating the importance of reading comprehension, spatial anxiety and spatial perception factors to improve the ability to Solve the problems of arithmetic in elementary school students.
The study introduced a number of recommendations and proposed a number of future researches related to the field of solving mathematical computational problems so as to enable researchers to develop this field in the future.
Key Words: Spatial ability- Spatial anxiety- Persistence- Reading comprehension - word problems solvin