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Factor Analysis of the Creative Thinking Test – Graphic Production[2]

Extended summary

In the modern world, society is constantly changing and requires people to be adaptable. Therefore, it is of great importance to design instructions that foster freedom of expression, flexibility, and originality, making the school a creative and cooperative community tailored to the needs of all students. A thorough review of the available literature reveals that the factor analysis of TCT-DP has been applied to students with normal development but not to students with intellectual disabilities (ID). The purpose of this study is to determine the factor structure of the Test of Creative Thinking - Drawing Production (TCT-DP) in a sample of students with ID. The sample included 76 students with ID ranging in age from nine to 14. The mean age of the participants in the sample was twelve years (M=11.54; SD =1.75). Thirty-six (47.4%) boys and 40 (52.6%) girls participated in the study. One-way analysis of variance revealed no significant statistical differences between participants of different gender (p=0.11) and calendar age (p=0.27). Exclusion criteria included children with neurological and multiple impairments. The study was conducted in Serbia in elementary schools attended by students with intellectual disabilities. The nonverbal creative potential of students with ID was assessed using the Test of Creative Thinking - Drawing Production (TCT-DP), which is considered one of the best instruments for assessing creative potential.

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The examination was conducted in smaller groups (up to 5 participants). A pleasant and stimulating atmosphere was created, which included relaxed conversations with the students and instrumental music in the background. Descriptive statistical data for TCT-DP were presented using measures of central tendency: Mean, standard deviation, distribution shape (skewness and kurtosis). A correlation matrix was constructed and the Kaiser-Meyer-Olkin (KMO) test and Bartlett's sphericity test were applied to assess the adequacy of the correlation matrix for factor structure. To determine the number of factors to be extracted in the final solution, a scree plot and parallel analysis were performed using the Monte Carlo PCA program. Structural equation modeling (SEM) was used for a better understanding of the relationships between the extracted factors. The first step required for factor analysis, normal distribution of the data, was satisfied because there were no atypical data points among the cases analyzed. The mean values indicated that students with ID completed drawings by continuing, completing, and adding new elements to the given drawing.

The correlation matrix contains a significant number of coefficients greater than 0.30. The values of the Kaiser-Meyer-Olkin index (0.716) and Bartlett's sphericity test (χ^2=362.483; df=78, p <.001) confirm that the processed data are suitable for factor analysis. The Kaiser criterion was the first technique we used to extract three factors. The second technique used to determine the number of factors was the Scree Plot. The inflection point is on the second factor, which means that two factors should be retained. To make a final decision, we performed Horn's parallel analysis, which supported our conclusion based on the Scree Plot. The two-component solution explained a total of 67.6% of the variance in the TCT-DP values, with the first component contributing 44.5% and the second component contributing 23.1% of the variance. The primary factor loadings for the first factor, termed unconventional thinking, included items such as boundary crossing dependent on fragments, boundary crossing independent of fragments, humor, and novel items. For the second factor, termed conventional thinking, the highest factor loadings are associated with items such as connection with lines, continuation, completion, and connection contributing to the theme. In this two-factor solution, the items "manipulation of materials" and "use of abstract items" explain the least amount of variance in common factors. The two extracted components are significantly correlated (0.69), suggesting that both conventional and unconventional thinking are required for the manifestation of creative potential in students with ID. Significant predictors of scores in both components include all identified factors, with humor being the most significant in the first component, while the "connection with lines" factor is the most significant in the second component.

The main conclusion from this research highlights the need to include humor and its adaptation to the subject in the teaching process in order to support the development of the creative potential of students with ID.

Practical implications of this research include providing guidance for teachers to better understand the strengths and weaknesses of the creative potential of students with ID during the educational process in schools.

The authors of the study hope that this work will motivate future researchers to gain new insights related to assessing the factor structure of TCT-DP in children, adolescents, and adults with ID.

Keywords: creativity, factor loadings, students with intellectual disabilities

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