A Comparison of the Matching Familiar Figures Test (MFFT) and the Test of Visual Perceptual Skills (TVPS) in Children

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Background and Aims

Attention control is important in the academic setting. A child must be able to pay attention to a task for a specific amount of time in order to complete the activity. Without the necessary attention control, a child may become easily distracted from the task and be unable to accurately complete the assignment.

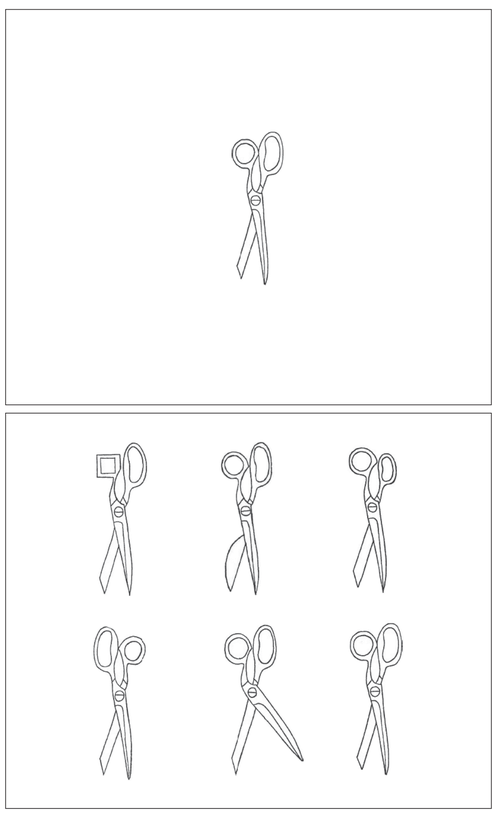
The Matching Familiar Figures Test (MFFT) is an assessment of a child's impulsivity, which is a common attribute of attention deficit hyperactivity disorder. A child looks at a picture and is asked to find the exact match from six similar pictures. The child is timed to the first response and is allowed up to 6 tries to correctly answer the question. There are 2 sample pictures and 12 test pictures. From the results, the accuracy and degree of reflection can be determined. A child may fall into one of the 4 categories: 1. Impulsive and inefficient, 2. Reflective and inefficient, 3. Reflective and efficient, and 4. Impulsive and efficient. Testing takes approximately two minutes.

The Test of Visual Perceptual Skills (TVPS) is used for diagnostic purposes to assess visual perceptual strengths and weaknesses of students aged 4 year to 18 years, 11 months. The test contains seven subcategories each with 16 items arranged in order of increasing difficulty. These include visual discrimination, visual memory, spatial relations, form constancy, sequential memory, figure ground, and visual closure. Scores are based on each of the seven subscales as well as an overall score. Testing takes approximately 30 minutes for the entire battery.

During a visual perceptual evaluation, numerous tests are performed causing the amount of time spent on any given test to be crucial. Any time a shorter test can be substituted, it is theorized that performance on other tests will be improved as there is less chance of fatigue. This study assesses a patient's performance on the MFFT as compared to the non-memory aspects of the TVPS.

Methods

Seventy-five children between the ages of 7-12 years old were to be recruited to participate in the study, and sixty-one children actually participated in it. The participants had presented for comprehensive vision examinations and were asked to voluntarily participate in the study upon consent of the child's parent or legal guardian. Each participant was administered the MFFT and the TVPS during the comprehensive examination. Roughly half of the participants were administered the MFFT first and then the TVPS while the other half were administered the tests in the reverse order.



Because the MFFT does not have a memory component to the testing, the entire TVPS was not administered to each child. Instead, the following sections of the TVPS were administered in the order listed: visual discrimination, spatial relations, form constancy, figure ground, and visual closure. The scaled scores for each of the sections of the TVPS were calculated based on the patient's raw score on that section. Additionally, the total errors and total time on the MFFT were used to calculate z-scores based on the patient's age for errors and latency. To determine the patient's impulsivity, the z-score for latency was subtracted from the z-score for errors, and to determine the patient's efficiency, the z-scores for latency and errors were added together.

The criteria to participate in the study included best corrected visual acuity of 20/20 at distance and near in each eye. The testing was performed with the correction in place that allowed for 20/20 acuity. Additionally, the child could have not have any current strabismus or history of an eye turn or vision therapy.

Results and Discussion

Sixty one children participated in the study by taking the MFFT and the TVPS. This sample was a convenience sample because it was comprised of children who had presented to the clinic for comprehensive vision examinations, fit the inclusion/exclusion criteria, and consented to go through the study. This sample may have affected the data because it was not a normal or random sample, and thus, it may not be generalizable to a larger population.

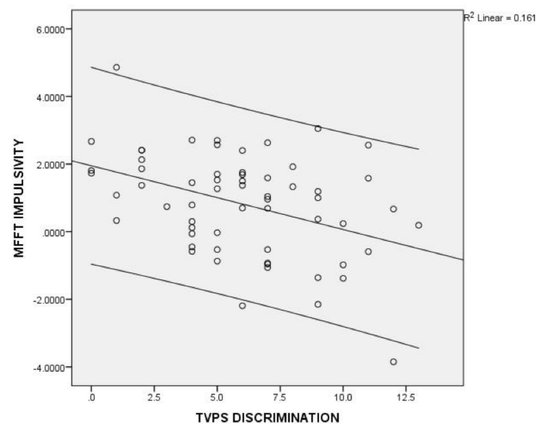
A statistical analysis was completed comparing the scaled scores on each of the subsections to the impulsivity and efficiency scores from the MFFT. The form constancy section of the TVPS is the only non-memory section that had no correlation to either of the scores on the MFFT. The visual discrimination and figure ground sections of the TVPS showed a significantly negative association with the impulsivity score on the MFFT, with the correlation being significant at the 0.01 level. This means that as children performed better on the discrimination and figure ground sections of the test, their impulsivity scores decreased, meaning they were more reflective on the MFFT. The spatial relations and visual closure sections of the TVPS showed a significantly negative association with the impulsivity and efficiency scores on the MFFT. The impulsivity was significant to the 0.01 level, while the efficiency was significant to the 0.05 level. This means that as a child's score increased on the spatial relations and closure sections of the TVPS, their impulsivity and efficiency scores decrease. This would indicate that a child was more reflective but also more efficient on their performance on the MFFT.

Table 1: Association of MFFT and TVPS

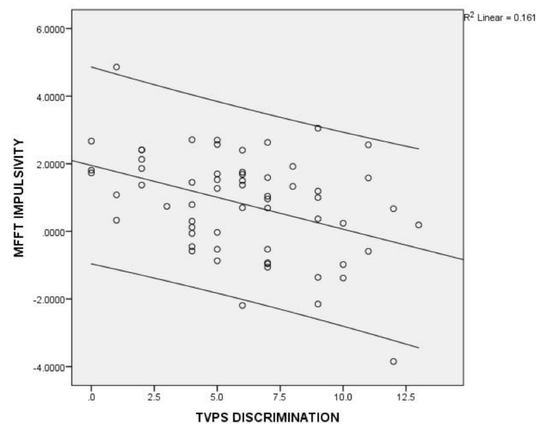
		MFFT Impulsivity	MFFT Efficiency
TVPS Discrimination	Pearson Correlation	-.401**	-.248
	Sig. (2-tailed)	.001	.054
	N	61	61
TVPS Spatial Relations	Pearson Correlation	-.425**	-.289*
	Sig. (2-tailed)	.001	.024
	N	61	61
TVPS Form Constancy	Pearson Correlation	-.133	-.085
	Sig. (2-tailed)	.308	.517
	N	61	61
TVPS Figure Ground	Pearson Correlation	-.383**	-.251
	Sig. (2-tailed)	.002	.051
	N	61	61
TVPS Visual Closure	Pearson Correlation	-.393**	-.255*
	Sig. (2-tailed)	.002	.047
	N	61	61

***Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).*

Graph 1: Association of TVPS Discrimination and MFFT Impulsivity



Graph 2: Association of TVPS Spatial Relations and MFFT Efficiency



The relationship between age of the child and his performance on the TVPS and the MFFT was also analyzed. There was a significantly negative correlation between the age of the child and his score on the visual discrimination, spatial relations, and figure ground sections of the TVPS. The correlation was significant to the 0.01 level for discrimination and figure ground and to the 0.05 level for spatial relations. This means that older children tended to have lower scores on those sections of the TVPS. The form constancy and visual closure sections of the TVPS in addition to both the impulsivity and efficiency scores on the MFFT showed no correlation with the patient's age.

Table 2: Association between Age, TVPS and MFFT Correlations

		Age in Months
TVPS Discrimination	Pearson Correlation	-.380**
	Sig. (2-tailed)	.002
	N	61
TVPS Spatial Relations	Pearson Correlation	-.276*
	Sig. (2-tailed)	.032
	N	61
TVPS Form Constancy	Pearson Correlation	.040
	Sig. (2-tailed)	.761
	N	61
TVPS Figure Ground	Pearson Correlation	-.391**
	Sig. (2-tailed)	.002
	N	61
TVPS Visual Closure	Pearson Correlation	-.085
	Sig. (2-tailed)	.516
	N	61
MFFT Impulsivity	Pearson Correlation	-.132
	Sig. (2-tailed)	.312
	N	61
MFFT Efficiency	Pearson Correlation	.176
	Sig. (2-tailed)	.176
	N	61

***Correlation is significant at the 0.01 level (2-tailed). *Correlation is significant at the 0.05 level (2-tailed).*

Conclusions

When performing a perceptual evaluation, the MFFT may be able to serve as an entry screening to determine if the entire TVPS is necessary. A higher score on the MFFT Impulsivity would indicate a decreased score on many of the sections of the TVPS. The scores on the TVPS were found to be negatively associated with age, which is likely related to our convenience sample. However, performance on the MFFT did not appear to be impacted by age.