DEVELOPMENT AND VALIDATION OF A TOOL ON COGNITIVE PERFORMANCE OF HIGH SCHOOL STUDENTS

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Abstract

In the present study, Cognitive performance scale has been developed and validated of the High School Students. This scale consists of 58 statements. The simple random sample technique was used for this study. The sample consists of 50 High School Students are randomly selected from the Kancheepuram Districts. The 't' value was used to standardize the tool and finally 37 statements were retained for the final study.

Keywords: Cognitive Performance; High School Students.

1. Introduction

The cognitive performance refers to a set of psychological processes associated with so called higher cognitive or thought processes which corresponds with adaptive and future oriented behavior unique to humans.

Definition of Cognitive performance
In cognitive psychology, the term 'performance' refers to the measurement of several processes that can be represented both in cognitive and somatic functions of the brain. "The term performance denotes abilities and skills from the psychological functional ranges of perception, attention (concentration), learning and retention, thinking and intelligence, and psychomotor activity, all of which can be assessed by test".

So, cognitive performance is not defined by a single value like the intelligence quotient but rather as a combination of performance of several cognitive functions and processes (Budde and Barkowsky, 2008).

2. Objectives of the Study

The objective of the present investigation is to develop a tool to measure the cognitive performance of high school students. As there is no suitable tool available for the purpose the investigator has constructed and validated one in order to realize her objectives. The Cognitive Performance Inventory (CPI) is a five point scale. i.e. "Likert-type scale".

Pilot Study

This inventory of 58 statements intended for pilot study was administrated to the sample, 50 high school students studying in the Kancheepuram district. Then their responses have been scored carefully and the marks secured by all the students have been arranged in the descending order from the highest score to lowest score. Then, they were subjected to item analysis.

Item Analysis

The next step in the standardization of cognitive performance inventory after pilot study is to find out the 't' value of each statement which forms the basis for item selection in order to build up the final inventory.

The Likert-type scale calls for a graded response to each statement on a five-point scale ranging from "Strongly Agree (SA)", "Agree (A)", Uncertain (UC)", Disagree (DA)" and "Strongly Disagree (SDA)". The different points on the scale are assigned arbitrary weights, for example 5, 4, 3, 2 and 1 in the order of response for the positive statements (43 items). The scoring scheme is reversed for the negative statements (15 items). The scoring key given in below Table -1.

Table 1: Scoring key of the inventory according to the nature of items

Nature of the Items	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
Positive: 1, 2, 4, 5, 6, 7, 9, 11, 12, 13, 15, 17, 18, 19, 20, 22, 27, 28, 30, 31, 32, 34, 35, 36, 37, 38, 40, 41, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 54, 55, 56, 57, 58.	5	4	3	2	1
Negative: 3, 8, 10, 14, 16, 21, 23, 24, 25, 26, 29, 33, 39, 42, 53.	1	2	3	4	5

Table 2: Cognitive performance Inventory Dimension wise according to the nature of items

Dimension	Nature of the Items		Total
Memory	Positive	1, 2, 4, 5, 6, 7,9,11, 12, 13, 15	
	Negative	3, 8, 10, 14, 16	16
Attention	Positive	17,18, 19, 20, 22, 27	
	Negative	21, 23, 24, 25, 26	11
Flexibility	Positive	28, 30, 31, 32, 34, 35, 36, 37, 38	
	Negative	29, 33, 39	12
Self-Perception	Positive	40, 41, 43, 44, 45, 46, 47	
	Negative	42	8
Thinking	Positive	48, 49, 50, 51, 52, 54, 55, 56, 57, 58	
	Negative	53	11
	Total		58

Table 3: Cognitive performance Inventory dimension wise according to the selected items

Dimension	Nature of the Items		Total
Memory	Positive	1, 2, 4, 6, 7, 11, 12, 13, 15	
	Negative	10, 16	11
Attention	Positive	17,18, 19, 20	
	Negative	23, 25, 26	7
Flexibility	Positive	30, 34, 35, 37	
	Negative	33, 39	6
Self-Perception	Positive	40, 44, 45, 46, 47	
	Negative	-	5
Thinking	Positive	50, 52, 54, 55, 56, 57, 58	
	Negative	53	8
Total			37

Items Selection

To select the items to from the final draft of the Cognitive Performance Inventory, the difficulty index of the each item was analyzed. According to Edwards (1957), "the value of 't' is a measure of the extent to which a given item differentiates between the high and low groups. If the 't' value is equal to or greater than 1.96, it indicates that the average response of the high and low groups to a statement differs significantly, provided here are 14 or more subjects in the high group and also in the low group".

The 't' value for all the 58 items of the CPI were obtained to select the items for the final draft. Out of 58 items, 37 items were found to be selected as having 't' value more than 1.96. They are given in table - 4.

Table 4: Items selected for the draft of the CPI based on their 't' value between upper and lower group

Item No.	't' Value	Remarks	Item No. in the final draft of Cognitive performance
1	**2.500**	**Selected**	**1**
2	**2.386**	**Selected**	**2**
3	0.126	Not Selected	-
4	**3.484**	**Selected**	**3**
5	1.161	Not Selected	-
6	**4.204**	**Selected**	**4**
7	**2.621**	**Selected**	**5**
8	0.611	Not Selected	-
9	0.380	Not Selected	-
10	**2.356**	**Selected**	**6**
11	**4.163**	**Selected**	**7**
12	**2.053**	**Selected**	**8**
13	**2.879**	**Selected**	**9**
14	1.000	Not Selected	-
15	**2.110**	**Selected**	**10**
16	**2.340**	**Selected**	**11**
17	**2.223**	**Selected**	**12**
18	**3.347**	**Selected**	**13**

19	**3.631**	**Selected**	**14**
20	**2.623**	**Selected**	**15**
21	1.636	Not Selected	-
22	0.366	Not Selected	-
23	**3.000**	**Selected**	**16**
24	0.400	Not Selected	-
25	**7.948**	**Selected**	**17**
26	**2.261**	**Selected**	**18**
27	0.465	Not Selected	-
28	1.908	Not Selected	-
29	0.434	Not Selected	-
30	**2.876**	**Selected**	**19**
31	0.979	Not Selected	-
32	0.586	Not Selected	-
33	**2.066**	**Selected**	**20**
34	**3.553**	**Selected**	**21**
35	**2.590**	**Selected**	**22**
36	0.945	Not Selected	-
37	**3.319**	**Selected**	**23**
38	1.145	Not Selected	-
39	**2.154**	**Selected**	**24**
40	**3.347**	**Selected**	**25**
41	1.336	Not Selected	-
42	0.747	Not Selected	-
43	0.231	Not Selected	-
44	**3.465**	**Selected**	**26**
45	**4.413**	**Selected**	**27**
46	**4.048**	**Selected**	**28**
47	**3.800**	**Selected**	**29**
48	1.847	Not Selected	-
49	0.000	Not Selected	-
50	**3.889**	**Selected**	**30**
51	0.576	Not Selected	-
52	**4.020**	**Selected**	**31**
53	**4.702**	**Selected**	**32**
54	**2.621**	**Selected**	**33**
55	**3.242**	**Selected**	**34**
56	**2.347**	**Selected**	**35**
57	**1.961**	**Selected**	**36**
58	**3.823**	**Selected**	**37**

Here, the investigator has mentioned 37 selected statements in below Table - 5

Table 5:

S. No.	Statements;	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree
	MEMORY					
1.	I remember concepts through written practice.					

2.	I am good at memorizing tables.					
3.	I can easily memorize the concepts with lot of illustration.					
4.	I am good at remembering information.					
5.	Instead of memorizing, I like to understand all the subjects.					
6.	I have difficulty in writing without spelling mistake.					
7.	I am able to memorize the theorems and laws easily.					
8.	For better understanding of new topic, I used to go through many materials.					
9.	I am very good at remembering the things I have committed to do.					
10.	I used to memorize all my lessons as it is in the book.					
11.	I used to get confuse, when writing the years in history subject.					
	ATTENTION					
12.	I consciously focus my attention on information.					
13.	I focus on the meaning and significance of new information.					
14.	I am able to focus on important task throughout the day.					
15.	I can study with full concentration for a long time.					
16.	I couldn't concentrate on the subject at the time of group study.					
17.	I used to have daydream in the class.					
18.	Due to lack of attention, I couldn't substitute a correct formula in a right place.					
	FLEXIBILITY					
19.	I used different learning strategies depending on the situation.					
20.	I don't like to follow the same route while performing a task.					
21.	In order to solve problems, I will take other's suggestion also.					
22.	I am ready to make changes.					
23.	I consider myself to be flexible and adaptive to change.					
24.	I can't easily adapt to the new environment.					
	SELF-PERCEPTION					
25.	I am quick to see and take advantage of new opportunities.					
26.	I have no fear in challenging the views of others.					
27.	I work to get things done as efficiently as possible.					
28.	I thrive on working under pressure.					
29.	I will always be true to myself, no matter what the situation.					
	THINKING					
30.	I think I can guess the correct answer.					
31.	I enjoy very much in deep thinking about learning strategies.					
32.	While solving any mathematical problems I never think					

	about the step to follow.					
33.	I think of several ways to solve a problem and choose the best one.					
34.	I am proud that I can think correct answer.					
35.	I usually think of different ways to answer a question.					
36.	I used to memorize my science lessons as it is, without thinking and analyzing about the scientific facts.					
37.	I used to think about the easy method to solve any calculations.					

3. Reliability

In order to establish the reliability of Cognitive Performance inventory, the spilt-Half method was used. The reliability of Cognitive Performance inventory was found to be 0.95. Hence, Cognitive Performance inventory was considered as reliable.

4. Validity

The index of validity which is the square root of the reliability was found to be 0.97. Hence, Cognitive Performance inventory selected for the study was considered to be highly valid.

5. Conclusion

The investigator is hopeful that this inventory would be helpful to measure the level of Cognitive Performance in the high school students. Hence, this tool will be very useful for the investigator to measure to what extent the level of Cognitive Performance is in the High School Students and it may be utilized and extended in the same for the future researchers.

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