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Cognitive Capacity in Bajo's Children

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ABSTRACT
Cognitive capacity is an important concern to be explored in children who live in rural areas. The academic success of students in schools is the goal of why it is necessary to focus on these cognitive aspects. The purpose of this study is to describe working memory capacity, fluid intelligence, and working memory capacity based on fluid intelligence. Research subjects are 30 students of Bajo tribe who are in fourth grade elementary school. In measuring working memory using backward digit span and fluid intelligence, researchers use coloured progressive matrices (CPM). The results showed that the capacity of working memory from most of the subjects were classified as moderate and low, while fluid intelligence was generally classified as average and below average, but there were three subjects classified as above average. In fact, fluid intelligence is not always an indicator of working memory capacity. The implications of this study consider the cognitive aspects of working memory as predictors of academic success.
Keywords: *cognitive capacity, children, academic*

1. INTRODUCTION

Experts have reported low cognitive capacity in children who are living in rural areas or villages [1], [2]. Cognitive capacity is intended, for example working memory [3], [4], [5]. Fluid intelligence is a cognitive performance that also predicts students' academic performance [6], in addition to working memory [7], [8], [9]. Both working memory and fluid intelligence both support academic performance, but differ in function and are independent of each other [10], [11]. Nonetheless, WM capacity predicts fluid intelligence [12]. Previous studies suggest that fluid intelligence can be increased by training working memory capacity [13].
This study aims to describe the capacity (a) working memory of Bajo tribe children; (b) fluid intelligence; and (c) working memory capacity based on fluid intelligence. Research related to the cognitive capacity of working memory of Bajo tribe children, especially in Southeast Sulawesi has never been conducted. On the other hand, based on information obtained from the teacher that a student's academic performance tends to be low.

2. METHOD

This study was a survey of 30 Bajo tribe children who were in class IV of SDN 9 Tinanggea, Torokeku Village in South Konawe Regency, Southeast Sulawesi. The survey was conducted to describe the capacity of working memory and fluid intelligence of research subjects.
The measurement of working memory capacity (WM) use backward digit span. The measurements are categorized as Table 1. The WM capacity score is based on the number of correct answers of 17 items.

Table 1 Working memory capacity category

Category	Number of Correct Answers	WM Capacity Score
Low	0-5	0.00 to 29.41
Moderate	6 -11	35.29 to 64.71
High	12 -17	70.59 to 100.00

The measurement of fluid intelligence using coloured progressive matrices (CPM) are categorized as in Table 2.

Table 2 Fluid intelligence category

Intelligence Category	Score
Below Average	< 24
Average	24-30
Above Average	>30

3. RESULTS AND DISCUSSION

Based on the results of measurements of working memory capacity of 30 subjects, the results obtained are as in Table 3.

Table 3 Working memory capacity of bajo children's

Capacity of Working Memory Category	The Average Score	Frequency	Percentage
Low	26.24	13	43.33
Moderate	51.56	17	56.67
High	-	-	-
Total	40/59	30	100

Table 3 shows that the subject's working memory capacity is in the moderate and low categories, and no subject has a high category of working memory capacity.
The results of this study support previous studies that children from disadvantaged areas experience limited cognitive capacity [14]. Limited cognitive capacity contributes to students' academic failure. Children who live in rural areas have the potential to experience barriers to cognitive development if they do not get proper training [15], for example through classroom teaching strategies [16]. Thus, in order to optimize the working memory capacity, it is necessary to provide training with the right teaching strategies.

Table 4 Results of fluid intelligence measurement of bajo children's

Fluid Intelligence Category	Frequency	Percentage
Below average	8	26.67
Average	19	63.33
Above average	3	10.00
Total	30	100.00

Table 4 shows the result of fluid intelligence measurements on 30 subjects. Most research subjects have fluid intelligence with an average category, while the rest have fluid fluency with a category below average, and only a small portion with an above average category average. In Table 4, it can be seen that there are three subjects who are categorized as above average in fluid intelligence. However, high fluid intelligence (above average) does not indicate that working memory capacity is also high. In this regard, the following is stated that the subject's working memory capacity based on fluid intelligence level.
Research findings support previous studies of the intelligence of children who live in rural areas are generally lower than children who live in cities [17]. Fluid intelligence also contributes significantly to students' academic performance [18].

Table 5 Working memory capacity (WM) according to fluid intelligence categories of Bajo children's

Fluid Intelligence Category	Frequency	The Average Score WM Capacity	WM Capacity Category
Below average	8	24.26	Low
Average	19	45.20	Moderate
Above average	3	54.90	Moderate
Total	30	40.59	Moderate

Table 5 shows that three subjects with intelligence categories are above average, and 19 subjects with average fluid intelligence have a medium capacity of working memory. While subjects with intelligence categories are below the average and have a working memory capacity with a low category. Overall, it shows that the average score of working memory capacity of Bajo children is 40.59 with the category of medium working memory capacity.
The results of the study found that the capacity of working memory is not always directly proportional to fluid intelligence. This can be seen in Table 5 that none of the subjects has a high working memory capacity even though there are three subjects who have above average fluid intelligence. This result is supported by previous research on the ability to solve story problems in elementary school students who have average fluid intelligence but low working memory capacity [19-21]. Even though, previous studies have reported that there is a positive correlation between fluid intelligence and working memory capacity [22]. However, the speed of processing information is strongly associated with high and low working memory capacity [23], and strategies for increasing working memory capacity also contribute in increasing fluid intelligence [24].
The results of the study illustrate that even though fluid intelligence is high but if the Bajo children do not get proper training, then their working memory capacity is not optimal. Therefore, future research needs to consider the design of training to increase the capacity of working memory for children who have learning difficulties.

4. CONCLUSION

The results of this study provide information on the importance of exploring the cognitive capacity of children living in rural areas. It aims to plan the provision of appropriate cognitive interventions for children to be able to achieve academic success in school.

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