

## Influence of Pre-Match Logical Stimulus for Applying and Developing Strategy to Basketball Team of Faculty of Medicine Universitas Padjadjaran

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### Abstract

**Background:** Logical game is rarely used in sport program as a menu for athletes to prepare their condition in pre-match to improve their cognitive performance. The athletes who have good cognitive performance can think, analyze and solve the problem appeared. Griffith builds a method to improve the athletes' performance by stimulating their cognitive resources. This study aimed to know the influence of pre-match logical stimulus in applying and developing strategy in basketball players.

**Methods:** The subject of this study was the basketball team players of Faculty of Medicine Universitas Padjadjaran; they were chosen by total sampling based on inclusion and exclusion criteria. Then, they were divided into two groups randomly: control and exposed groups. Both groups will be compared based on the score of each item (in total of 17 items). The assessed items were technique and tactics in the game of basketball. This study was conducted in November 2012 for three weeks. The collected data were analyzed using paired-T test.

**Results:** Score increased significantly ( $p < 0.05$ ) in all items for first to third from four times of data retrieval in the exposed group, whereas in the control group, score decreased significantly ( $p < 0.05$ ) in all items for first to third from four times of data retrieval.

**Conclusions:** Pre-match logical stimulus can improve the performance, especially technique and tactic in the basketball game. [AMJ.2015;2(3):398-402]

**Keywords:** : Basketball, logical stimulus, strategy

### Introduction

Logic is the study of methods and laws used to distinguish the forms of right reasoning from wrong reasoning. The principle of exercise by using logic in sport was first introduced by Griffith who provides multiple methods of learning that can stimulate students' thought in improving their performance.<sup>1</sup> Related to the present focus; Kavussanu et al.<sup>2</sup> conducted a study on the effects of cognitive enhancement to the basketball players through biofeedback methods. The study asked subjects to perform free throw while being given distraction, which was aimed to divert their attention. As the result, they find factors that can affect the player in the successful and unsuccessful free throw as well as feedback to players in anticipation of the factors that make them fail.

In addition, Hong and O'neil<sup>3</sup> conducted a study by giving questionnaires to subjects to see the effect on performance of cognitive stimulation in motivating based on self-regulation, self-efficacy and effort. As the result, they find that motivated players are able to improve their performance.

This study aimed to know the influence of pre-match logical stimulus in tactical applying and developing for basketball players.

### Methods

This study was a double blinded and analytical research using T-paired test. The subject of this study was the basketball team players of the Faculty of Medicine Universitas Padjadjaran who were chosen by total sampling based on inclusion and exclusion criteria. The inclusion

**Table 1 Average of Personal Item**

Item	Average							
	K1 $\bar{X}_1$	K2 $\bar{X}_1$	K1 $\bar{X}_2$	K2 $\bar{X}_2$	K1 $\bar{X}_3$	K2 $\bar{X}_3$	K1 $\bar{X}_4$	K2 $\bar{X}_4$
Passing	65.89	67.22	63.56	69.78	61.89	72.00	60.22	74.33
Positioning	67.44	66.56	65.56	69.44	63.67	71.78	62.44	73.11
Stealing	67.11	66.56	65.67	67.89	64.44	69.89	63.56	71.11
Blocking	65.00	67.56	63.22	69.78	61.78	71.89	60.00	74.11
Decision	68.11	66.11	65.44	68.89	63.67	68.89	62.78	74.78
Team work	69.11	68.56	67.56	70.56	65.44	74.00	64.11	75.44
Vision	67.33	68.22	65.44	71.11	63.78	73.78	62.33	75.89
Fleeing	66.33	67.11	64.89	69.89	63.11	71.56	61.00	73.67
$\bar{X}$ total	67.04	67.24	65.16	69.54	63.47	71.72	62.06	74.06

Note: K1= Control Group, K2= Exposed Group,  $\bar{X}_1$ = Average score I,  $\bar{X}_2$ = Average score II,  $\bar{X}_3$ = Average Score III  $\bar{X}_4$ = Average score IV,  $\bar{X}$  total = Average of total score of all items

criteria were the male players of the basketball team, who have attended basketball practice or have been previously active in a basketball club. Besides, the exclusion criteria were the players who were not students of the fourth grade, and who did not come on the first retrieval, and also who have experienced severe injury, illness, and visual impairment. The subjects were given questionnaires that consisted of questions about their identities, injuries, past experiences in basketball, position, and training. An additional questionnaire was given before retrieval, which consisted of questions about their conditions, problems, and other factors that could affect their performance.

Logical stimulus was given through a questionnaire constructed by the researcher based on literatures and discussions with experts, and comprised four optional questions and answers which allowed players to perform when confronted with certain situations. The data were collected four times where players were judged on 17 items, consisting of eight personal items and nine team items related to the cognitive aspects of basketball games. The assessment of each aspect was based on assessment parameters which consisted of indicators and value for each indicator (+ and -) was compiled by researchers from literatures and discussions

**Table 2 Average of Team Item**

Item	Average							
	K1 $\bar{X}_1$	K2 $\bar{X}_1$	K1 $\bar{X}_2$	K2 $\bar{X}_2$	K1 $\bar{X}_3$	K2 $\bar{X}_3$	K1 $\bar{X}_4$	K2 $\bar{X}_4$
Offense	72	69	70	72	68	80	67	84
Defense	71	68	68	70	60	72	57	73
Built up play	71	68	69	71	63	75	60	77
Passing	66	64	63	68	62	72	61	73
Positioning	68	64	66	68	64	72	63	71
Pressing	69	65	66	70	57	71	55	74
Marking	68	65	65	68	56	72	54	74
Self-efficacy and regulated	83	84	83	84	76	85	75	86
Creativity	82	79	81	81	77	82	75	83
$\bar{X}$ total	72.22	69.56	70	72.44	64.78	75.67	63	77.22

Note: K1= Control Group, K2= Exposed Group,  $\bar{X}_1$ = Average score I,  $\bar{X}_2$ = Average score II,  $\bar{X}_3$ = Average Score III  $\bar{X}_4$ = Average score IV,  $\bar{X}$  total = Average of total score of all items

**Table 3 T-paired Test for Personal Items**

Item	Team	$\bar{X}_1 / \bar{X}_2$		$\bar{X}_2 / \bar{X}_3$		$\bar{X}_3 / \bar{X}_4$	
		t	p	t	p	t	p
Passing	K1	4.950	0.001**	4.472	0.002**	5.000	0.001**
	K2	-4.914	0.001**	-6.261	0.000**	-2.066	0.073
Positioning	K1	9.430	0.000**	4.857	0.001**	3.773	0.005**
	K2	-4.914	0.001**	-6.261	0.000**	-2.066	0.073
Decision	K1	6.532	0.000**	3.600	0.007**	1.512	0.169
	K2	-6.402	0.000**	-4.996	0.001**	-3.546	0.008**
Team work	K1	3.092	0.015*	5.429	0.001**	2.309	0.050
	K2	-6.000	0.000**	-6.847	0.000**	-2.726	0.026*
Vision	K1	4.857	0.001**	4.472	0.002**	3.250	0.012*
	K2	-3.043	0.016*	-6.532	0.000**	-3.033	0.016*
Stealing	K1	5.965	0.000**	3.773	0.005**	2.286	0.052
	K2	-4.619	0.002**	-4.243	0.003**	-2.817	0.023*
Blocking	K1	4.097	0.003**	4.274	0.003**	5.488	0.001**
	K2	-4.061	0.004**	-4.642	0.002**	-4.264	0.003**
Fleeing	K1	2.490	0.038*	4.880	0.001**	2.873	0.021*
	K2	-6.934	0.000**	-3.780	0.005**	-6.008	0.000**

Note: K1= Control Group, K2= Exposed Group,  $\bar{X}_1$ = Average score I,  $\bar{X}_2$ = Average score II,  $\bar{X}_3$ = Average Score III  $\bar{X}_4$ = Average score IV, \* = p < 0.05, \*\* = p < 0.01

with experts; the assessment was performed by the assessors every two minutes. This research was conducted in November 2012 for three weeks.

## Results

The subject consisted of 24 players: 11 for the exposed group and 13 for the control group. When conducting the retrieval process, two subjects in the exposed group and one subject in the control group were not present; therefore, the data were incomplete. In the processing of statistics, the numbers of both groups were equated with random selection of the control group.

Table 1 and 2 show a reduction of average in the control group score in all items, meanwhile, in the exposed group all of the scores were improving.

Table 3 shows the personal score of the

control group reduced indicating significantly (p<0.05), except for decision and stealing in the third and fourth data did not reduced significantly (0.169 and 0.052). In addition, the personal score for exposed group has increased significantly (p<0.05), except for both positioning and teamwork in the third and fourth data did not have significant reduction (0.073 and 0.05).

Table 4 shows the exposed group significantly experienced improvement in all team items in comparison with the control group (t=-4.837 and p=0.00).

## Discussion

The statistics test showed that giving stimulus through logic game before a match could increase and develop the strategy of a basketball game significantly. This was found on an average of 17 out of 8 aspects of personal

**Table 4 T-paired Test for Team Items**

	$\bar{X}_1 - \bar{X}_2$	sd	t	sig (2 tailed)
Team 1/Team 2	-5.889	7.305	-4.837	0.000**

Note:  $\bar{X}_1$  = average of total score of control group,  $\bar{X}_2$  = average of total score of exposed group, \*\* = p < 0.01

assessment and 9 aspects of team assessment.

The average of the exposed group was higher than the control group. The T-paired test showed that the score for the treatment group was significantly higher with  $p < 0.05$ . This supports the previous theories stating that giving cognitive stimulus could increase the athletes' performance. There was an insignificant increase in the positioning aspect,  $p = 0.073$ , however, this aspect increased significantly at the previous scoring. This is assumed based on the research conducted by Marois and Ivanoff<sup>4</sup>, revealing that the players given logic stimulus could reach cognitive threshold towards the aspect stimulated, and then an insignificant increase would occur. This threshold is influenced by some factors affecting their cognitive processes such as cognitive resource, potential cognitive, attention, memory, cognitive inhibition, and executive function.<sup>5</sup>

The cognitive resource influences the speed and its capacity in processing and storing the information received, and makes it as an experience which will be a base for the following problem.<sup>6</sup> While attention is a process to identify the received information at the time of being able to catch the meaning of that information, whether it is simple or complex information.<sup>5</sup> This factor helps an individual to pay attention at simple and implicit things in order to catch the whole meaning of the information given.<sup>7</sup> In addition, potential cognitive has the function to solve problems quickly and to be responsive. It is due to the fact that this factor identifies the quality of individual cognitive function to recall all background experiences from the previous knowledge and theories.<sup>8</sup> Furthermore, cognitive inhibition is a factor that organizes the affectivity and flexibility of the function of human brain by controlling all attention processes, reducing the disturbance thoughts, controlling motorist actions, and helping in changing and choosing important thoughts.<sup>9</sup> Moreover, the executive function plays a role in taking decision and thinking critically and creatively.<sup>10,11</sup>

There is another assumption of the result. Five out of 9 players in the exposed group wrote in their questionnaire during the fourth data collection that they were tired, so they did not actively take position during the game. This was also supported by the note on the evaluation sheet stating that 4 out of 9 players were not active during the game. While the decreasing of the control group was assumed that they were under pressure because there was an

increase of performance of the treatment group. Glaze<sup>12</sup> confirmed this by stating the causes such as the failure in formulating team's play, loss of focus towards the purpose, inability to use the available resources, failure to maximize the ability and activities, loss of intrinsic motivation and failure to perform well. Another assumption is that the players would have difficulty in performing maximally due to a difficult situation that they hardly solved even though they have tried by using their ability. The ability to solve the problem needs more responses which need to be trained.<sup>13,14</sup>

There were two limitations of this study. The first was the limitation for developing the questionnaire toward the other items related to the cognitive function for basketball game. The second was the limitation for developing the assessment parameters for each item in this study. More indicators for parameter and value categories were needed for item scoring.

After four times data collection, it was found that the average of the treatment group has increased compared to the control group. Also, a significant increase was found in all evaluation aspects from the first until the third retrieval of data collection.

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