

## The impact of specific exercises employing the Cogni Plus system on the development of some mental factors in Diwaniyah basketball referees

Assist. Prof. Dr. Saba Shaker Farhan<sup>\*1</sup>, Raafat Abdul Hadi Al-Karwi<sup>1</sup>

<sup>1</sup> College of Physical Education and Sport Sciences, Al-Qadisiyah University, Iraq.

\* Corresponding author, Email: [Saba.shakeer@qu.edu.iq](mailto:Saba.shakeer@qu.edu.iq)

Received: 18/01/2023

Accepted: 09/04/2023

### Abstract

The research included an introduction and a discussion of the value of training in the field of physical education in general and basketball in particular. The research aim was to discover the ability of workouts utilizing the Cogni Plus system to increase basketball referees' mental alertness, divided attention, and working memory. The study's aim is to apply exercises from the Cogni Plus system to improve basketball referees' mental alertness, split attention, and working memory. The research assumption is that there are statistically significant changes in favour of the group that does Cogni Plus activities. The research topics were as follows:

- 1- Diwaniyah's the human field/basketball referees
- 2- The temporal field (October 24, 2022 - January 25, 2023).
- 3- Sports Psychology Laboratory at the Faculty of Physical Education and Sports Sciences.

It also contained the study methodology and field procedures, as the researchers employed an experimental approach and dealt with the research sample, who were basketball referees in Diwaniyah, as well as the equipment used in the research, the test used, and statistical methodologies. The research findings were then presented and discussed, as the results were given in the form of tables and then discussed.

The research also contained conclusions and recommendations, the most important of which were:

- 1- There is improvement in both the control and experimental groups' post-tests.
- 2- The experimental group benefits from statistically significant differences.

Recommendations: The following are the researcher's recommendations:

- 1- Using exercises from the Cogni Plus system to train football referees.
- 2- Similar to previous tasks, conduct research.

**Keywords:** Cogni Plus exercises, divided attention, mindfulness, working memory

## 1- Introduction

It is important not to ignore that basketball refereeing requires a high level of skill. The game became faster as the participants' physical and tactical levels increased. As a result, basketball officials must be particularly careful when dealing with arbitration cases and player movements at the same time. Performance should be faster, and decisions should be made as promptly as possible, particularly when there is little vacancy. As a consequence, the significance of the study in using Cogni Plus exercises to develop some mental variables for basketball referees cannot be overstated.

### 2- Study objectives:

The study's purpose is to use exercises within the Cogni Plus system to improve basketball referees' mental alertness, divided attention, and working memory.

### 3- Procedures and methods:

#### 3-1 Sample:

Basketball referees from Diwanayah and participants in the first-division league totalled (12) referees in the research group. The complete research community was chosen and split into two control and experimental groups, with (6) referees for each group, and the percentage of the sample was for the original community. In the variables under study, there was complete homogeneity and equivalence between individuals and groups of the sample.

Table (1) Shows the preparation of a population and a research sample

Sample Type	society	Sample		Percentage of the sample to the population
		Experimental Group	Control Group	
Basketball Referees	12	6	6	100 %

#### 3-2 Design of the study:

In order to adjust for the character of the issue examined, the researchers used the experimental technique of two equal groups.

#### 3-3 Variables studied:

A component was included in the research.

#### Mindfulness as a concept:

Throughout the last three decades, the concept of mindfulness has evolved. This concept has been effectively incorporated into the framework of psychology and mental health in general and specifically in the context of dealing with the challenges of psychological stress. Due to mental alertness is a strong predictor of mental skills; the better a person's mental abilities (attention, awareness), the better his or her mental alertness. In addition that mental awareness is the state or behaviour that occurs in the present instant. This provides him with a wealth of knowledge and expertise, allowing him to advance to higher stages (10-121).

#### The concept of divided attention.

For several centuries, it was thought that humans could only pay attention to one stimulus at the expense of others. If we attempt to understand many messages at the same time, especially

if they are of the same type, we may forfeit accuracy. For instance, we may be able to drive while paying attention to the road and listening to the radio at the same time.

However, it is difficult to pay attention to more than one of the same sorts of stimulation, such as auditory or visual stimulation, at the same time. (194-4).

### **The concept of working memory:**

The phrase (working memory) first developed some decades ago, with early impressions dating back to the end of the 1950s. When Brown, Peterson (1958), Peterson and Peterson (1959) said that a tiny quantity of knowledge would be forgotten in seconds unless the subject is permitted to retain it through active and effective repetition. A short memory is defined as transient, with knowledge fading after a few seconds.

On the other hand, long memory preserves information and has a huge and continuous storage capacity. Findings have continued to establish the presence of two memory systems, with Sheffern and Atkinson's findings being the most notable in this subject (6: 26).

### **3-4 Used tests**

#### **1- Mental alertness test**

##### **• Test format:**

The response time in wakefulness is measured under two conditions:

**The first step** is to assess inherent alertness. (Maintaining the response for the longest possible period of time). A geometric figure shows on the screen at a fixed point that varies randomly over brief time periods. The subject's task is to engage with the altered form as rapidly as possible by pushing the keyboard button.

**The second:** to evaluate phased alertness (the phasic focus of attention), a geometric object appears on the screen at a fixed point, and before it changes at a random interval, you hear an audio signal warning.

##### **• Test implementation and duration**

The test begins with a notice that shows on the screen if the reaction is early, that is, before the shape appears and is randomly modified, and the exercise stage does not conclude unless the reactions are right in all of the exercises tries.

- Experiment without any auditory stimulation.
- Experiment with an audio cue.
- Experiment with an audio cue.
- Experiment without any auditory stimulation.

The respondent's response time is tested in the first part of the test by clicking once a full square appears on the screen.

In the second stage, the response time for the identical visual stimuli is assessed while hearing the signal sound before the square appears, and the subject is only required to click when the filled square appears rather than waiting until a square appears on the screen to click. As well as, he is not required to respond to the auditory signal, and in each try, two types of stimuli are flashed on the screen.

When the (10) stimuli show on the screen, the reactions in each attempt will be to them. If the reactions are wrong, (5) stimuli or more will be added, resulting in a total of (20) stimuli in each attempt (without a sound signal) and (20).) (With an audible signal) by (10) stimuli in each of the (4) attempts, with more than (5) added if the reaction is incorrect, as demonstrated in the following equation:  $2 + 10 + (5?) = 17$ .

- Number (17) to the number of correct reactions,
- The number (10) refers to the number of alarms in each of the (4) stages, with (20) alarms with audio signals and (20) non-sound alarms.
- The number (2) is the doubling of audio and non-audio stimuli.

- The number (5?) with a question mark refers to the stimuli that increase in the event of a wrong reaction.

- **Duration of the test:**

The test takes a maximum of (6) minutes without the exercise phase.

**GEAT DIVIDED ATTENTION:**

As it was constructed with a high degree of honesty, this test simulates the process of accurately divided attention, in which the participant must respond to auditory and visual stimuli in tandem, as indicated by tasks:

**2- VISUAL TASK:**

A square with 5 circles appears on the screen in this section of the activities, each having a hole on one of the surrounding edges. The openings' locations may vary, but the circles do not, and the subject must click and react on the keyboard when one of the five circles is displayed closed within the square.

**AUDITIVE TASK:** The subject hears two simultaneous sounds, high and low, with the appearance of circles, and he must react as soon as possible, just hearing the sound in the form of a tone that is repeated twice in a row.

**Application and length of the test:**

The examination starts with an exercise, and in order to pass it, the examinee must engage with the required aural and visual stimuli, following which the main test begins.

The subject should also take note of the screen's shape, which consists of five circles with apertures that change locations as the circle is closed.

Clicking the agree button at the same time alternately shows the high and low audio signals, and when the same tone is given twice in a row, only answer with a reaction by clicking on (Agree).

**Test duration:**

The test takes a period of (3) minutes, except for the exercise phase.

**3- Working Memory Test (6:36)**

- **Test name: working memory test.**

**PURPOSE:** To assess the application strategy for working memory.

In this test, a blue square is presented on the screen, within which is a set of individual white dots arranged in the shape of a closed circle, the individual dots gradually becoming red and eventually disappearing.

The first sequence consists of two random points chosen at random from among (10) points in a certain order, and after seeing the sequence, the examinee must choose the points in the same order as displayed, and each in a new sequence.

These are sequences that cannot be repeated with the preceding sequence. If the examinee successfully selects a succession of dots, the color of the dot will change to green. It intensifies at various times throughout the exam, and the subject must recall the bright points after they have vanished. The working memory test is adaptive in that it assesses the amount of difficulty in the subject's performance and, if required, lessens it. The examination is over after 7 minutes if the examinee duplicates the lit dots incorrectly twice in a row.

- **Period of execution and testing**

The exam begins with an exercise, which is the aim of accurately reproducing a series of two points, and when the exercise is completed, the test is administered. The examination begins, and the examinee is required to memorize the positions and sequences of the colored flashing spots. The first sequence consists of two bright spots, which the examinee must accurately recreate. The number of spots that light up rises when the sequence is expanded. The sequence is extended when two successive sequences of the same range are copied without

failure. If a copying error occurs, fewer points are displayed and the length of the point sequence is decreased.

- **Period of execution and testing**

The check ends in two cases: if two consecutive sequences are copied incorrectly - if the task is working continuously without incorrectly reproducing two consecutive sequences - if the task is working continuously without incorrectly reproducing two consecutive sequences - the task ends after 7 minutes.

Instruments and tools used:

Duration of the Rehacom cognitive system

- **Duration test**

The exam lasts between 2 and 7 minutes.

### 3-5 pre-test

The two researchers conducted the pre-test on the research sample on 10/30/2022 for both the experimental and control groups at exactly nine o'clock in the morning.

### 3-6 Used exercises

The two researchers applied the exercises for the Cogni Plus device on (Sunday), corresponding to 11/6/2022 at (9:00) am, on the research sample, for a period of (9) weeks, at the rate of (3) units per week, and thus the number of units has reached training (27).

**Table (2). The use of exercises to develop mindfulness, divided attention, and working memory**

Week	Variable	Exercise name	Exercise Image	Level	Time/min
<b>First</b>	<b>Mindfulness</b>	<b>VIG</b>	<b>S1</b>	<b>2</b>	<b>30</b>
	<b>Divided attention</b>	<b>DIVID</b>	<b>S1</b>	<b>2</b>	<b>15</b>
	<b>Working memory</b>	<b>VISP</b>	<b>S1</b>	<b>2</b>	<b>15</b>
<b>Second</b>	<b>Mindfulness</b>	<b>VIG</b>	<b>S1</b>	<b>4</b>	<b>30</b>
	<b>Divided attention</b>	<b>DIVID</b>	<b>S1</b>	<b>4</b>	<b>15</b>
	<b>Working memory</b>	<b>VISP</b>	<b>S1</b>	<b>4</b>	<b>15</b>
<b>Third</b>	<b>Mindfulness</b>	<b>VIG</b>	<b>S1</b>	<b>6</b>	<b>30</b>
	<b>Divided attention</b>	<b>DIVID</b>	<b>S1</b>	<b>6</b>	<b>15</b>
	<b>Working memory</b>	<b>VISP</b>	<b>S1</b>	<b>6</b>	<b>15</b>
<b>Fourth</b>	<b>Mindfulness</b>	<b>ALERT</b>	<b>S1</b>	<b>8</b>	<b>10</b>
	<b>Divided attention</b>	<b>DIVID</b>	<b>S1</b>	<b>8</b>	<b>10</b>

	<b>Working memory</b>	<b>VISP</b>	<b>S1</b>	<b>8</b>	<b>10</b>
<b>Fifth</b>	<b>Mindfulness</b>	<b>ALERT</b>	<b>S1</b>	<b>10</b>	<b>10</b>
	<b>Divided attention</b>	<b>DIVID</b>	<b>S1</b>	<b>10</b>	<b>10</b>
	<b>Working memory</b>	<b>VISP</b>	<b>S1</b>	<b>12</b>	<b>10</b>
<b>Sixth</b>	<b>Mindfulness</b>	<b>ALERT</b>	<b>S1</b>	<b>12</b>	<b>10</b>
	<b>Divided attention</b>	<b>DIVID</b>	<b>S1</b>	<b>12</b>	<b>10</b>
	<b>Working memory</b>	<b>VISP</b>	<b>S1</b>	<b>12</b>	<b>10</b>
<b>Seventh</b>	<b>Mindfulness</b>	<b>ALERT</b>	<b>S2</b>	<b>14</b>	<b>5</b>
	<b>Divided attention</b>	<b>DIVID</b>	<b>S1</b>	<b>14</b>	<b>5</b>
	<b>Working memory</b>	<b>DATEUP</b>	<b>S1</b>	<b>14</b>	<b>5</b>
<b>Eighth</b>	<b>Mindfulness</b>	<b>ALERT</b>	<b>S2</b>	<b>16</b>	<b>5</b>
	<b>Divided attention</b>	<b>DIVID</b>	<b>S1</b>	<b>16</b>	<b>5</b>
	<b>Working memory</b>	<b>DATEUP</b>	<b>S1</b>	<b>14</b>	<b>5</b>
<b>Ninth</b>	<b>Mindfulness</b>	<b>ALERT</b>	<b>S2</b>	<b>18</b>	<b>5</b>
	<b>Divided attention</b>	<b>DIVID</b>	<b>S1</b>	<b>18</b>	<b>5</b>
	<b>Working memory</b>	<b>DATEUP</b>	<b>S1</b>	<b>14</b>	<b>5</b>

### 3-7 Post-test

The researchers conducted the post-test on the research sample on 11/1/2023 for both the experimental and control groups at exactly nine o'clock in the morning.

### 4- Results and discussion

Results are shown in Tables 3 to 6.

**Table (3). The arithmetic mean, standard deviations, and t-value for the pre-tests of the control and experimental groups**

<b>Variables</b>		<b>Control Group</b>		<b>Experimental</b>		<b>T value</b>	<b>Significance</b>
		<b>middle</b>	<b>deviation</b>	<b>middle</b>	<b>deviation</b>		
<b>Mindfulness</b>	With reference	0.79	0.64	0.79	0.66	0.96	Random
	No signal	0.90	0.75	0.86	0.60	0.87	Random
<b>Divided attention</b>	Reaction speed	0.79	0.38	0.77	0.41	1.07	Random

	Reaction Control	1.20	0.44	1.77	0.56	0.93	Random
<b>Working memory</b>		1.8	1.0602	1.91	1.1827	1.256	

**Table (4). The arithmetic mean, standard deviations, and t-value for the pre and post-test of the control group**

Variables		Tribal		Post		T value	Significance
		middle	deviation	middle	deviation		
<b>Mindfulness</b>	With reference	0.79	0.64	1.01	0.66	2.33	Moral
	No signal	0.90	0.75	1.01	0.71	1.11	Random
<b>Divided attention</b>	Reaction speed	0.79	0.38	0.69	0.16	1.13	Random
	Reaction Control	1.20	0.44	1.86	0.76	2.33	Moral
<b>Working memory</b>		1.8	1.0602	2.92	0.862979	6.845	Moral

**Table (4). The arithmetic mean, standard deviations, and t-value for the pre-and post-test of the experimental group**

Variables		Tribal		Post		T value	Significance
		middle	deviation	middle	deviation		
<b>Mindfulness</b>	With reference	0.79	0.66	1.02	0.65	15.31	Moral
	No signal	0.86	0.60	0.98	0.68	11.51	Moral
<b>Divided attention</b>	Reaction speed	0.77	0.41	0.47	0.39	5.32	Moral
	Reaction Control	1.77	0.56	0.81	0.44	5.20	Moral
<b>Working memory</b>		1.91	1.1827	3.625	0.827	10.03	Moral

**Table (5). The arithmetic means, standard deviations, and the t-value of the post-tests for the control and experimental groups**

Variables		Control Group		Experimental		T value	Significance
		middle	deviation	middle	deviation		
<b>Mindfulness</b>	With reference	1.01	0.66	1.02	0.65	4.54	Moral
	No signal	1.01	0.71	0.98	0.68	4.76	Moral
<b>Divided attention</b>	Reaction speed	0.79	0.38	0.47	0.39	12.80	Moral
	Reaction Control	1.20	0.44	0.81	0.44	13.67	Moral
<b>Working memory</b>		2.92	0.863	3.625	0.827	4.093	Moral

Table (2) shows that the computed value of (t) for the pre-tests of the experimental and control groups for the mental alertness variable is (0.96) with (0.87) without a sign, and for the divided attention variable is (1.07) response speed and (0.93) with reaction time. Consequently (1.256) for the working memory variable, which is less than the tabular value of (1.812).

Consequently, there are no significant differences between the two tests, indicating that the two groups started from the same point of departure and that the sample members are equally capable of divided attention.

Table (3) shows that the value of (t) estimated for the control group's pre and post tests for mental alertness with (2.33) and without (1.11). It scored (1.13) for response speed and (2.33) for reaction control for split attention. Working memory achieved (6.845), which is higher than the tabular amount of (1.812). This shows that the control group has improved in mentality with reference and reaction control in split attention and working memory, which performs the regular trainer exercises. The findings of the mental variables without reference and reaction speed in split attention were random, with no development.

In Table (4), we find that the value of (t) calculated for the pre and post tests of the experimental group amounted to mental alertness with (15.31) and without (11.51) signs. As for divided attention, it reached (5.32) for reaction speed, and (5.20) for reaction control. As for working memory, it reached (10.03). It is thus greater than the tabular value of (1.812), and this indicates that there is a development in the experimental group, which performs the exercises used within the Cogni Plus system.

Table (5) reveals that the post-test (t) values for the experimental and control groups were for mental alertness with (4.54) and without (4.76) symptoms. It achieved (12.8) for response speed and (13.67) for reaction control for split attention. Working memory achieved (4.093), which is higher than the tabular quantity of (1.812).

Consequently, there are significant differences in favor of the experimental group, indicating that development in the experimental group is greater than development in the control group, and this gives preference to Cogni Plus exercises in the process of developing mental alertness, divided attention, and working memory for basketball referees. The researchers believe that the Cogni Plus exercises, by nature, depend on presenting situations based on the sense of sight, which requires the laboratory to make a quick reaction that corresponds to the situation in which it is exposed, and that repetition of these exercises resulted in the development of the process of receiving and processing information and quickly providing the correct results. This is what basketball referees require in the arbitration process, as light travels quicker than sound. As a result, when the input is visual, the response is faster than when it is audible, and some studies have determined reaction times for various sensory stimuli. In addition, the sight was at the forefront, with reaction times ranging from 150 to 225 milliseconds (1: 369).

Therefore, because motor work is inextricably related to mental work, mental work growth has a direct influence on physical work. Work has used mental and cognitive systems to make these systems more usable and to make the natural transition to mental work more comfortable for humans, but in exchange, these mental actions, in addition to the high speed at which audio information enters the human brain, make the person feel mentally efficient and muscular. In this, we will recognize the importance of preserving hearing and its capacity to train and gain knowledge of the skills we require, which provide us with high capabilities, and we will design a system appropriate with our requirements to get cognitive and auditory talents. Which is accomplished by engaging in mental and vocal exercises that allow us to select any type of training" (7:3149). Referees with strong abilities (mental alertness, split attention, and working memory) can handle matches more easily and make right and timely choices. Those

with a strong capacity to split their attention on more than one stimuli and accomplish a variety of tasks at the same time have great desire and self-confidence, and they strive for superior performance and precision in executing activities. In addition, there is a propensity to pay attention to nuances and small particles in the performance." (9-147)

"The brain absorbs information from its environment, either by seeing and gathering visual information or by hearing and turning this suggestive and descriptive information into a picture that enters the brain and is better processed." (3-79)

Because the brain receives visual stimuli directly through the eye and without the use of media, the visual sensory system provides complete information about the surrounding environment and assists the athlete in distinguishing the interconnected materials present in the place, the distance between the ball and the goal, the direction, the speed of the ball, and the movement of the opponent." (8: 23118).

## 5- Conclusions

The researcher concluded the following:

- 1- There is a development in the post-tests for both the control and experimental groups.
- 2- There are statistically significant differences in favour of the experimental group.

## References

1. Mohamed Sobhi Hassanein: Measurement and Evaluation in Physical Education and Sports, 4th Edition, Dar Al-Fikr Al-Arabi, Cairo, 2001.
2. Torment N. A, Hussein and R, Ali A. A comparative study of sword fencing motion stabbing according to technical programming in a class B wheelchair fencing game. Indian Journal of public health research and Development. 2019; 10:1344-7.
3. 3 - Muhammad Al-Arabi Shamoun: Mental Training in the Mathematical Field and Psychological Measurement, Dar Al-Fikr Al-Arabi, Cairo, 1995, p. 79.
4. 4 - Sulso: Cognitive Psychology, translated by Muhammad Naguib Al-Sabwa, Anglo-Egyptian Bookshop, Cairo, 2000, p. 194
5. 5- Majed Nafie Al-Kinani; Building an educational system for the development of sensory perception in the subject of perspective, unpublished doctoral thesis, the University of Baghdad, College of Arts, 1998, p. 65.
6. 6 - Huda Jamil Abdul-Ghani: Al-Rihacom Knowledge System, 1st Edition, Baghdad, Dar Al-Sadiq Cultural Foundation, 2019.
7. Asaad Ali Safih, Raafat Abdulhadi Kadhim, Saba Shaker Farhan. Audio Skills and Their Impact on the Development of Response Speed for Handball Goalkeepers 2019;10 ( 5): 3149.
8. Kadhim RA, Al-Lami H, Shakir K (2020): The effect of exercises using the Cogni plus device on developing perception of handball referees, Ann Trop Med & Public Health; 23(S11): SP23118.
9. Kahenman .D: Attention and Effort, New Jersey, 1973,p.147
10. Langer and Molldeveana, the construct of mindfulness, journal of social issues,2000, p212.