Journal of Humanities and Social Sciences Researches (JHSSR)

ISSN: 2958-3160 (Online)

The effect of creative thinking exercises on direction perception and memory (visual-motor) in handball players under the age of 12

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Received: 19/12/2025 Accepted: 19/01/2026

Abstract

This study aims to identify the effect of creative thinking exercises on the development of directional perception and memory in handball players under the age of twelve. The researcher used an experimental approach with a control group and an experimental group. The research sample included several players who were deliberately selected from handball players. The experimental group underwent a training program that included creative thinking exercises designed to suit their age group. Meanwhile, the control group continued with the traditional training program. Tests of direction perception and memorisation were applied before and after the implementation of the training program. Statistical methods were used to process the results, and the results showed significant differences in favour of the experimental group in the variables of perception of direction and recall. This indicates the effectiveness of creative thinking exercises in the development of cognitive and cognitive abilities of handball players. The researcher concluded that the introduction of creative thinking exercises within the training programs contributes positively to improving spatial perception and memory, which is reflected in the skill performance of young players. The research recommends the adoption of these exercises in training young age groups and conducting similar studies on other psychological and skill variables, and in various sports games, and the need to pay attention to activating the role of creative thinking exercises in improving motor skills in general, and contributes to improving mental skills in particular.

Keywords: Creative thinking; direction; perception; memory (visual-motor); handball players.

DOI:https://doi.org/10.33687/jhssr.005.01.0535

1. Introduction

The contemporary sports field is witnessing a remarkable development in training methods that are no longer limited to physical and skill aspects only, but have extended to include mental, cognitive, and psychological aspects. Because of its active role in the development of players' abilities, especially in team games that require speed of thinking, accuracy in perceiving the direction and a high ability to remember and make the appropriate decision in various playing situations. Handball is considered to be a team sport that is dependent on the integration of these aspects, especially for young age groups.

The budding stage under the age of twelve is one of the main stages in the player's development. "This stage is characterized by a high susceptibility to learning and the development of mental and cognitive processes such as the perception of spatial and temporal direction and remembering, which are important pillars in the performance of skills and plans. The weakness of these abilities leads to a slow response and many errors during the game, which negatively affects the overall performance of the team " (Kamal Abdul Hamid Darwish, Mohammed Sabri Amer 2009,P.68).

Hence, the importance of introducing creative thinking exercises into training programs has emerged because of their positive impact on activating mental processes. As well as stimulating flexible thinking and increasing the ability to connect different situations, as well as improving spatial perception and remembering. These exercises contribute to making the player more aware of the directions and movements inside the court and more able to retrieve information and previous experiences and employ them in changing playing situations. Despite the importance of these aspects, many of the training programs applied to the AL baraem category focus on teaching basic skills with a clear omission of the mental and creative aspects. Which calls for conducting scientific studies highlighting the impact of creative thinking exercises on the development of perception of direction and memory among handball players in this age group?

1.1 the research problem

By observation and following up the educational and Training Unit Program for handball players under the age of twelve. It was found that they had impaired perception of directions inside the playground, as well as the speed and accuracy of motor memorization. Despite the importance of mental abilities, traditional training programs often focus on physical and skill aspects, neglecting creative thinking exercises and their role in the development of cognitive processes.

1.2 Research Objectives

1-Identify the impact of creative thinking exercises on the perception of direction in handball buds

2-Identify the effects of creative thinking exercises on remembering (visual-motor)

3-Comparison of the results of the experimental group with the control after the application of the program

1.3 Research Hypotheses

1. The results obtained from the pre-tests and the post-tests show significant discrepancies of the control and experimental groups in the perception of direction, in favor of the post-test.

2. A significant disparity was observed between the pre- and post-tests of the control and experimental groups in terms of memory performance, with the post-test demonstrating superior performance.

3. There are substantial disparity between the control and experimental groups in telemetry, and in favor of the experimental group.

1.4 Research Areas

1-Human field: handball players (buds) aged under 12 years

2-time domain: trial period 20-1-2025 until 20-2-2025

3-spatial field: Al-Musayyib Youth Center handball courts.

DOI:https://doi.org/10.33687/jhssr.005.01.0535

1-5 definition of terminology

1-creative thinking: defined by Torrance (Torrance) 1973 "the process of sensing problems and changes in information, forming ideas and hypotheses, then selecting these hypotheses and modifying them until results are reached" P. 1301.

2-perception of direction: "it is a mental process through which an individual learns about his external environment by receiving external stimuli with his senses and then interpreting and interpreting them according to subjective directions"(Zeidan Hamdan 1986) P. 100.

3-remembering: "a mental function depends on memorizing and retrieving previous experiences that have been stored in memory" (Mohammed Abdullah 2003), p. 40.

3. Research Methodology and Field Procedures

3.1 Method and Sample:

The experimental method with experimental design was used for the control and experimental groups to suit the nature of the research.

3-2 community and research sample:

the research community was identified as handball players under the age of 12, numbering (60) players ranging in age from 9 to 12 years, as for the research sample to which the program was applied, (28) players with 14 players per group were randomly selected and divided into two experimental and control groups, and about the parity of the two groups, tribal tests were applied in perception of direction and remembering, and Table No. 1 shows the data for tribal tests of the control and experimental groups using the law (T) for non-similar samples, it appeared to us that there were no differences between the two groups, which indicates the parity and homogeneity of the sample.

Table (1) The equivalence and homogeneity of the control and experimental groups in the pre-tests under study.

Tests	Experimental Group		Control Group		Homogeneity		Parity		Significance of the differences
	S	A	S	A	Value T	sig	Value T	sig	
Remembering	10.286	4.953	10.714	3.268	0.270	0.789	3.291	0.081	Moral
Perception of Direction	0.964	0.499	0.929	0.475	0.194	0.848	0.083	0.776	Moral

Through Table (1), we can observe the homogeneity of the sample, because their ages, heights and weights are close, so they were considered homogeneous, but as for the parity of the sample, the data of the tribal tests were used in the test of remembering and perception of direction, and through the use of the law (T) for dissimilar samples, it appeared to us that there were no differences between the control and experimental groups, and this indicates the parity of the sample.

3.1. Devices and Tools used in Research

3.2.1 Tools used in research

For the purpose of achieving field research procedures, the following auxiliary devices, tools, and Means were used: the internet, Arab and foreign sources, chalk, picture cards, boxes, plastic balls, ropes, collars, figures, and a whistle.

3.3 Exploratory Experience

An exploratory experiment is a "preliminary study" conducted by a researcher on a small sample before conducting the researcher's study to choose research methods and tools (Dictionary of psychology and pedagogy,1999, p.79).

To identify enough factors and obstacles that the researcher may encounter when conducting the main experiment. The exploration experiment aims to identify the scientific weight of the candidate tests.

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The extent to which the tests achieve the natural tendency. As well as for organizational and administrative purposes (Mohamed Sobhi Hassanein, 1997, p. 155)
The researcher conducted an exploration experiment on ten players, which was conducted on 15 /1 / 2025, the purpose of this experiment was:
1-the accuracy and safety of the devices and tools used have been verified.
2-the time taken for each test was equivalent (30 to 60 Minutes).
3-the scientific transactions of the tests were found to be truthful, consistent, and objective.
4-the tests are suitable for this sample of children and for these ages.

3.4 Tests Used in Research
A test battery was used (Samir Ziani and Qorari Ben Ali, 2018)
1-Direction perception test
Purpose of the test: measuring the perception of direction
Tools: chalk, collar
Performance specifications: the player stands inside the middle of the circle, and the parameter determines the direction forward, backward, right or left and asks the player to stay inside the center of the circle and when hearing the direction, the player advances 3 steps and stands inside the small circle drawn around the center of the circle, and gives 4 attempts to the player.
Scoring: half a score is awarded for each correct attempt, and total points (2 scores).

2. Memory test (visual-motor)
Purpose of the test: measurement of visual-motor recollection
Tools: a board with drawn shapes or paths
Performance specifications: the examinee is shown a shape or a movement path for (5-10) seconds, and then hides the shape and asks the examinee to redraw the shape or perform the movement as he saw it, and gives him three attempts.
Registration: Registration is done in the following way
First attempt: looking for 15 seconds and given three points for each correct answer, and zero for the wrong answer.
The second attempt: looking for 10 seconds and given two points for the correct answer and zero for the wrong answer, "Ziani Samir and Qorari Ben Ali 2018."
Third attempt: look for 5 seconds, and one score is given for the correct answer.

3.5. The main trial procedures included pre-tests
3.5.1. Pre-test procedures
The researcher conducted pre-tests of the experimental and control groups of the serendipitous 16-1-2025. The tests were conducted at the handball court in the Musayyib district at ten o'clock in the morning, and the tests were conducted for the experimental group first and then the control group.
3-6-Applying creative thinking exercises to the experimental group
The researcher performed creative thinking exercises on the experimental group, and the total number of exercises that were applied to the players was 4 , and the time taken to perform the exercises was 30 minutes, and the exercises are:
1- Obstacle game: tools, wooden or plastic boxes, football
Time: 10 minutes, number of players: 14 children, each team: 7 players
How to play:
- The boxes are placed zig-zag in front of the mini football goal, and the distance between the boxes is one meter.

DOI:https://doi.org/10.33687/jhssr.005.01.0535

- When the whistle is heard, the player starts passing the ball between the boxes, provided that the boxes are not touched, then scoring in the goal. Each goal counts as a point for the team, and when seven players finish, the second team starts, and so on. Points are calculated for each team.
- The winning team is the one who collects the most points.
2. Box ball game: volleyball, rope, two columns, box.
Time: two runs every 5 minutes
team
- The winning team is the one who collects the most points
2. box ball game: tools: volleyball, rope, two columns, box
Time: two runs every 5 minutes
How to play: two columns fix five meters between them and the height of half a meter, and fix the rope at the tip of each of them.
- A wooden or cardboard box is placed at two meters from the rope
- Each team consists of 7 players, each player from each team shoots the ball into the box
- A point is given for each successful shot and the winning team is the one who collects the most points
3-numbers game: the tools are cards with numbers from 1 to 14, adhesive
- Time: 5 minutes
- How to play: the numbers are attached to the back of each child and when the number is heard, the players run to the owner of the number and touch it
- Points are calculated for each player who can touch the number holder, and he is given one score
4-ball picking game: volleyball gizmos, chalk
- Time: 5 minutes
- How to play: a circle with a diameter of three meters is drawn, one of the players stands in the center of the circle with a volleyball and the rest of the players are outside the circle
- When the whistle is heard, the ball is thrown up by the player who is inside the circle and calls the player's number, and the latter picks up the ball and a score is calculated for him when picking it up before it falls to the ground.

3.7. Dimensional tests of the experimental group

The researcher conducted dimensional tests for the experimental and control groups on 21-2-2025. the tests were conducted at the handball court in the Musayyib District of Babylon governorate at ten o'clock in the morning. the tests were conducted for the experimental group first and then the control group, taking into account the tests were conducted under the same conditions as the tribal tests of the research sample.

3-8-Statistical methods: have been used

- Arithmetic means.
- Standard deviation.
- The T-value of two independent samples.

4. Presentation and discussion of results

4.1. Presentation of results

4.1.1 Presentation of the results of the pre-and post-tests and the calculated t-value for the control and experimental groups

After completing the application of the four exercises for the control and experimental groups and conducting dimensional tests, the researcher conducted statistical manipulations to reach the research results.

DOI:https://doi.org/10.33687/jhssr.005.01.0535

Table (3) The arithmetic mean, standard deviation, and t-value of the pre- and post-tests of the control group.

Testing	Pre-test		Post-test		Value T	sig	Significance
	S	A	S	A			
Remembering	10.286	4.953	10.071	4.178	0.118	0.908	Insignificant
Perception of Direction	0.929	0.499	0.857	0.234	0.898	0.385	Insignificant

Table (3) illustrates the data of the control group for the tribal and dimensional tests , where the arithmetic mean of the tribal memory test was 10.286, a standard deviation of 4.953, the dimensional arithmetic mean was 10.071, the standard deviation was 4.178, the calculated value (T) was 0.118, Sig (0.908), the arithmetic mean of the test, the perception of the tribal direction was 0.929, the standard deviation was 0.499, either the dimensional test averaged 0.857, the standard deviation was 0.857, the value (V) was 0.898, and the Sig value was 0.385.

Table (4) The meaning of the arithmetic, the standard deviation, and the value of (t) for the pre- and post-tests of the experimental group

Testing	Pre-test		Post-test		Value T	sig	Significance
	S	A	S	A			
Remembering	10.714	3.268	19.500	3.858	5.894	0.000	Moral
Perception of Direction	0.929	0.475	1.429	0.385	3.606	0.003	Moral

Table (4) demonstrates the data of the control group for the tribal and dimensional tests, where the arithmetic mean of the tribal memory test was 10.714 and a standard deviation of 3.268, the arithmetic mean of the dimensional memory test was 19.500, the standard deviation was 3.858, the calculated value (T) was 5.894, the arithmetic mean of the test was 0.929, the standard deviation was 0.475, the dimensional test averaged 1.429 the standard deviation is 0.358, the calculated value (V) is 3.606 and the Sig value is 0.003.

Table (5) The arithmetic mean, standard deviation, and (t) value of the post-tests of the control and experimental groups.

Testing	Experimental Group		Control Group		Value T	sig	Significance
	S	A	S	A			
Remembering	19.500	3.858	10.071	4.178	6.203	0.000	Moral
Perception of Direction	1.429	0.385	0.857	0.234	4.742	0.000	Moral

Table (5) shows the data of the control and experimental group for dimensional tests, where the arithmetic mean of the dimensional memory test of the experimental group was 19.500 and a standard deviation of 3.858. For the same test for the control group, the arithmetic mean was 10.071, the standard deviation was 4.178, the calculated value (T) was 6.203, and the Sig value was 0.000. As for the dimensional trend perception test of the experimental group, the arithmetic mean was 1.429 and the standard deviation was 0.385. The meaning of the control group was 0.857, the standard deviation was 0.234, the value (V) was 4.742, and the Sig value was 0.000.

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4.2. Discussion of the Results

Through the presented results of the tribal and dimensional tests of the control group and the results of the value (t) calculated in Table 3, and comparing them with a value that showed no differences between the tribal and dimensional tests of preschool children when compared.

The control group applied the programs used by the kindergarten. In addition to the adoption of repetitive approaches that are far from suspense and creativity, therefore, no development has appeared in memorisation and the process of perception of direction.

As for the results of the pre-and post-tests of the experimental group in Table 4, an evolution of the experimental group appeared, where significant differences appeared between the pre-and post-tests to evaluate memory and perception of direction after applying the exercises. Which included a set of physical and mental exercises that contributed to the development, as well as the application of the program.

There were (9) educational modules, in addition to containing colors, tools, various shapes, group and individual play, and the spirit of competition contributed to the emergence of differences between tribal and dimensional tests.

This is confirmed by Khadija Benflis, 2010, that cognitive training in all its forms has an impact on the development of skills of receiving information and delivering it to the sensory recorder and translating this information into fine motor actions.

The appearance of a development in the dimensional tests of the experimental group, which underwent an educational program through various exercises, is shown in Table 5. Where he used the spirit of competition with colorful images, shapes and tools and investing in their love for movement, work and play led to the emergence of a development in the test of memory and perception of direction.

Where (Taqi Hassan El-rizouk 2014) pointed out that the diversity in the use of body parts, in addition to the diversity in tools, shapes and images, led to urging the players to think and prepare their minds for perception and learning, unlike the control group that remained subject to the kindergarten curriculum, which relied on old curricula without audio or visual effects and non-influential tools.

He stressed (Qius Wedad Salem Saleh 2021) that the old traditional methods have proven to be a failure at the present time and no longer keep up with the growing needs of children of interaction, encouragement, exploration, and creativity that help develop their skills.

The research results indicate that creative thinking exercises had an active role in the development of direction perception in handball buds. This is due to the fact that the improvement in the perception of direction is because the creative exercises included changing game situations that require the player to move in multiple directions and constantly change his position. The nature of these exercises, which depend on the diversity in directions and the constant change in training attitudes, which stimulated the central nervous system to process spatial information better, contributes to the development of spatial perception.

The improvement of memory in the experimental group is due to the dependence of creative exercises on the connection between thinking and movement. The repetition of atypical situations contributed to the fixation of information in long-term memory, and this is consistent with what has been indicated by sports psychology studies that emphasize exploration-based learning and problem solving.

It promotes memory and deep understanding "modern motor learning principles confirm that learning based on Discovery and active participation leads to deeper and more stable learning, especially among young age groups (Saleh Mohammed Abu Jado,2000, 45).

The researcher believes that the superiority of the experimental group over the control is since the traditional method focuses on the automatic repetition of movements. While creative thinking exercises encourage players to analyze, make decisions, and imagine while performing, which increases the effectiveness of learning.

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Also, the age stage under consideration is a golden stage for the development of mental and cognitive abilities, as the player is more receptive to modern training methods, which explains the size of the marked improvement in the after-school results.

The results of this research are consistent with many previous studies that have confirmed that training programs that integrate the cognitive side with the motor side lead to a comprehensive improvement in sports performance, especially in team games such as handball, which require high spatial awareness and quick memorization of situations.

5. Conclusions and Recommendations

5.1. Conclusions

1-the results showed a clear positive effect of creative thinking exercises on the development of perception of direction in handball buds under the age of 12 years compared to the traditional training method.

2-creative thinking exercises contributed to improving the level of memory (visual-motor) among the individuals of the research sample as a result of involving more than one sense during the performance.

3-the superiority of the experimental group over the control group was observed in the dimensional tests of perception of direction and memorization, which indicates the effectiveness of the proposed training program.

4-creative exercises helped to increase the attention and concentration of the players, which reflected positively on the speed of response and accuracy of performance.

5-the integration of creative thinking in sports training contributes to the improvement of cognitive processes associated with skill performance in handball.

5.2. Recommendations

Considering the research results, the researcher provides a set of recommendations that can contribute to the adoption of results.

The search comes into actual application, can be displayed as follows:

1-the need to adopt creative thinking exercises within the training programs for handball buds because of their positive impact on the development of perception of direction and memory.

2-encouraging trainers to use modern methods based on problem solving and divergent thinking instead of relying on the traditional method only.

3-It is recommended that analogous studies be conducted on participants of differing age groups, as well as on participants engaging in other team games.

4-design training modules that include variable and atypical game situations to develop spatial perception and speed of memory among players

5-holding training courses and workshops for trainers on the importance of creative thinking in team games and methods of applying them in the field.

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DOI:https://doi.org/10.33687/jhssr.005.01.0535