The effect of mental training (mental visualization and attention focus) on the accuracy and speed of offensive performance in fencing players

El efecto del entrenamiento mental (visualización mental y enfoque de atención) en la precisión y velocidad del rendimiento ofensivo en jugadores de esgrima

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Abstract

Objective: The research aims to investigate the effect of mental training, which includes mental visualization and concentration of attention, on the accuracy and speed of offensive performance in fencing. The importance of the research stems from the pivotal role of psychological variables in achieving higher sporting achievements, and the fact that offensive movements are decisive in resolving fights.
Methodology: The research adopted the experimental approach by designing two groups (experimental and control), and the research community included players of the specialized fencing school. An intended sample of 60 male players was selected, randomly divided into two homogeneous groups. The methodology included applying a mental training program to the experimental group for 9 weeks (27 training units), in addition to its usual technical training, while the control group underwent only traditional training. The accuracy and speed of the compound offensive movements were measured using specific skill tests, validated, and their stability (Cronbach's alpha coefficient exceeded 0.769).
Results: The results showed a significant improvement in the accuracy and speed of the offensive performance of the experimental group in all post-tests compared to the tribal group, as compared to the ratio of ($p < 0.05$), which is as follows: (5.000, 16.168, 22.168, 24.081).
Discussion: These findings are attributed to enhanced mental abilities, improved neuromuscular coordination, and the role of relaxation and repetition exercises in developing motor sensation and decision-making.
Conclusions: The research concludes that mental training is effective in developing accuracy and speed of offensive performance in fencing and recommends incorporating it as an essential part of athletic training programs.

Keywords

Mental training; mental visualization; attention focus; accuracy, offensive skills; fencing.

Resumen

Objetivo: La investigación tiene como objetivo investigar el efecto del entrenamiento mental, que incluye la visualización mental y la concentración de la atención, en la precisión y velocidad del rendimiento ofensivo en esgrima. La importancia de la investigación radica en el papel fundamental de las variables psicológicas en la consecución de mayores logros deportivos, y en el hecho de que los movimientos ofensivos son decisivos en la resolución de las peleas.
Metodología: La investigación adoptó el enfoque experimental diseñando dos grupos (experimental y control), y la comunidad investigadora incluyó a actores de la escuela especializada en esgrima. Se seleccionó una muestra de 60 jugadores masculinos, divididos aleatoriamente en dos grupos homogéneos. La metodología incluyó la aplicación de un programa de entrenamiento mental al grupo experimental durante 9 semanas (27 unidades de entrenamiento), además de su entrenamiento técnico habitual, mientras que el grupo control se sometió solo al entrenamiento tradicional. La precisión y velocidad de los movimientos ofensivos compuestos se midieron mediante pruebas de habilidad específicas, validadas, y su estabilidad (el coeficiente alfa de Cronbach superó 0,769).
Resultados: Los resultados mostraron una mejora significativa en la precisión y velocidad del rendimiento ofensivo del grupo experimental en todas las pruebas posteriores en comparación con el grupo tribal, en comparación con la relación de ($p < 0.05$), que es la siguiente: (5.000, 16.168, 22.168, 24.081).
Discusión: Estos hallazgos se atribuyen al aumento de las habilidades mentales, la mejora de la coordinación neuromuscular y el papel de los ejercicios de relajación y repetición en el desarrollo de la sensibilidad motora y la toma de decisiones.
Conclusiones: La investigación concluye que el entrenamiento mental es efectivo para desarrollar la precisión y la velocidad del rendimiento ofensivo en esgrima, y recomienda incorporarlo como parte esencial de los programas de entrenamiento atlético.

Palabras clave

Entrenamiento mental; visualización mental; enfoque de la atención; precisión, habilidades ofensivas; esgrima.

Introduction

Sports psychology is a vital field of research that is receiving increasing attention from scientists and specialists, due to its pivotal role in understanding and improving athletic performance and acquiring complex motor skills (Weinberg & Gould, 2018). The psychological variable is seen as a crucial element that is no less important than physical fitness, technical skills, and tactical aspects in achieving the highest sporting achievements of athletes. In high-pressure competition environments, such as fencing with a shish weapon, where offensive movements are necessary quick and accurate responses. To resolve fights, focusing on higher mental processes becomes indispensable to enhance the psychological preparation of players.

This study aims to investigate the effect of mental imagery and attentional focus on the accuracy and speed of offensive performance in the sport of shish weaponry. Mental visualization is defined as a cognitive process in which an athlete exercises the performance of a certain skill mentally without actual physical movement (Hall et al., 1998). Research shows that mental visualization contributes to the activation of motor-related neural pathways, which promotes motor learning and contributes to improved physical performance (Driskell et al., 1994). In the context of dueling, mental visualization allows the swordsman to repeat possible attack scenarios, timing his movements, and identifying the opponent's weaknesses, preparing the mind for quick and accurate responses during the actual confrontation. Previous studies have shown that fencing artists who used pre-match mental visualization, imagining themselves as warriors who showed strength, precision, and courage, outperformed their counterparts who did not use this technique, suggesting that mental visualization enhances focus and confidence and directly improves accuracy and speed in fencing (Fortune Fencing, 2025). Studies in martial arts have also confirmed that bio visualization can enhance performance by helping practitioners visualize techniques and scenarios effectively, improving spatial awareness, movement planning, and more accurate implementation of techniques (Parnabas et al., 2015; Cunanan et al., 2018). This enhances not only speed and accuracy but also motor memory and player confidence (Cumming & Williams, 2013).

Attention concentration refers to an athlete's ability to direct their cognitive resources toward important information relevant to the task, while ignoring internal and external distractions that may impede performance (Nideffer, 1976). In a dynamic and changing sport like a shish weapon, where quick decisions are required and plans are constantly adapted, the ability to maintain attention and focus is vital. Attention concentration training can help a fencer maintain his awareness of the opponent, the timing of his attacks, and reduce errors caused by mental distractions or Competitive stress (Williams & Andersen, 1998). Previous studies have confirmed the importance of attention and focus in achieving faster reaction times and better performance in sports that require quick responses, such as fencing. In a study that examined the effect of attention levels and concentration on reaction time in fencing, it was confirmed that these cognitive factors are necessary to achieve rapid and effective reactions in the context of competition (Examining the effects of attention and concentration levels on reaction time in fencing, 2024). This training enables the player to isolate himself from noise, audience, and even feelings of fatigue or frustration, ensuring more effective, accurate, and rapid responses in competitive situations.

From this point of view, the importance of research is evident in the role played by mental training and mental visualization as an important part of educational and training programs, which would raise the levels of players through good psychological preparation. Especially in the sport of fencing, which requires perception and good mental training, helps the learner to recall the information stored in the brain quickly and accurately. In addition, this sport requires making decisions effectively, quickly, and with high accuracy, as there is not enough time to think and recall information. Therefore, it is necessary to rely on such psychological programs that contribute to expanding the knowledge base of learners and creating alternatives, which constitute cognitive packages and motor programs in the brain ready for implementation through frequent repetitions during training.

Search problem

The accelerated scientific progress and the development of modern learning and training methods are no longer sufficient to develop the level of players and reach their performance to the best levels without paying attention to the mental aspects of mental perception and concentration of attention and other

mental processes that must be armed by players, which are an integral part of modern sports learning and training programs, and that fencing sports depends heavily on mental training and perception in the process of recalling information and implementing motor programs quickly and accurately. This means that players need mental programs through which mental exercise is employed, which is outrageous to solve the problems that guide the players, so this research seeks to investigate the qualitative and quantitative impact of mental visualization exercises and focus attention on the two targets.

Research Objectives

1. Identify the effect of mental visualization exercises on the accuracy of some offensive movements in the shish weapon.

2. Identify the effect of attention concentration exercises on response speed in offensive performance.

Method

Study Design

An experimental design was used to evaluate the causal relationship between variables(Mohammed Hammood et al., 2025; Omar et al., 2025). The design includes two groups:

Experimental group: You will receive a mental training program (mental visualization and attention focus) in addition to your usual fencing training.

Control group: You will receive their usual fencing training only, without any interference with systematic mental training.

Pre-test and post-test measurements will be made for both groups to assess changes in the accuracy and speed of offensive performance.

Participants

Study population: All players of the specialized school in fencing in Iraq.

Study sample: Intentionally selected from male class fencing players. The sample size consists of 60 players, and they will be randomly divided into two homogeneous groups (30 players per group): experimental and control.

The homogeneity of the sample members in the basic variables (age, weight, height) was verified using the torsion coefficient. The results indicated that the sample is homogeneous, as the values of the torsion coefficient were limited to (+1, -1) for all variables, which ensures that the differences that may appear after the intervention can be attributed to the effect of the independent variable (mental training) and not to initial differences between groups. Table (1) below shows the details of the homogeneity of the research sample with the torsion coefficient in the variables of age, weight, and height:

Table 1. Shows the homogeneity of the study sample with the torsion coefficient in the variables of height, age, and weight

Variables	Unit of measurement	Arithmetic middle	Standard deviation	Broker	Torsion coefficient
lifetime	year	16.87	1.12	17	0.847
Weight	kg	58.87	4.54	58.5	0.668
Length	poison	168.12	1.45	168	0.786

To ensure the statistical strength of the results, the sample size was selected in proportion to similar experimental studies (Faul et al., 2007).

Procedure

Study variables

• Independent variable: mental training (a program that integrates mental visualization and attention concentration).

• Dependent variables:

- Attack Performance Accuracy: Measured by how close the attack touch is to the target area (such as the chest area of a shish weapon) or the number of correct touches of total attempts.

- Speed of offensive performance: Measured by the reaction time and movement time required to carry out an attack after a certain signal or movement of an opponent.

Data collection tools

To ensure the validity and reliability of the data collection tools, the researchers prepared a special questionnaire for the proposed research tests in the fencing game. This questionnaire was organized and presented to a group of experts and specialists in the field of fencing and sports psychology to obtain their opinions and observations. Appropriate tests with a minimum approval rate of 80% were selected to accept the tests to be studied.

Field performance tests

1- Accuracy tests in compound offensive movements: (Ali Abdul Khaqani, 1998)

- Test forward by step and perform the stabbing movement.

- Test the backward step and then step forward and perform the stabbing movement.

- Test the categorical attack with the installed weapon and perform the stabbing movement.

- Test the attack by changing direction with the installed weapon and performing the stabbing movement.

2- Tests of response speed in complex offensive movements: (Ali Abdul Khaqani, 1998)

-Test forward by step and perform the stabbing movement.

-Test the regression step and then step forward and perform the stabbing movement.

-Test the categorical attack with the installed weapon and perform the stabbing movement.

-Test the attack by changing direction with the installed weapon and performing the stabbing movement.

An electronic meter, such as a phototimer, was used to measure response time and movement time for these specific attacks. As described in Appendix 1.

Scientific foundations of the tests

To ensure the reliability and validity of the results from the tests, the scientific foundations of these tests have been verified as follows:

Validity

In order to identify the validity of the tests, the researchers verified the authenticity of the content (Face Validity) and Criterion Validity. This was done at the beginning of the research procedures after the tests were determined, where they were presented to a group of experts and specialists in the field of fencing and sports psychology in order to verify their validity and ability to measure what they were developed to measure accurately. This procedure ensures that the tests cover the basic aspects of the targeted skills and reflect the nature of the performance in the Fencing (Thomas & Nelson, 2001).

Reliability

To ensure the consistency and reliability of the test results, the researchers used Cronbach's Alpha Coefficient method, the most common measure of stability. The test scores of the 60-player exploration research sample were relied upon to calculate this coefficient. The Cronbach alpha coefficient indicates the internal consistency of the test, and higher values (usually above 0.70) are an indicator of good test stability (Cronbach, 1951. Table 2 shows the values of the Cronbach alpha stability coefficient for the search tests used:

Table 2. Scientific foundations of tests

Variables	Alfakronbach Laboratories
Moving forward one step and performing the stabbing movement	0.928
the stabbing motion Step back, step forward, and perform	0.805
Perform a categorical attack with the installed weapon and perform the stabbing movement	0.927
Perform an attack by changing direction with the stabilized weapon and performing the stabbing movement	0.779
forward by one step and performing the stabbing movement and performing the stabbing The speed of moving movement	0.877
The speed of retreatisand perform the stabbing movement ,and then step forward ,back by step	0.816
weapon and performing the stabbing movement Speed of making a decisive attack with the installed	0.864
The speed of an attackis achievedby changing direction with the stabilized weapon and performing the stabbing movement	0.769

Analysis of the results of the stability of research tests (Cronbach's alpha coefficient)

Table 2 presents the values of the Cronbach alpha coefficient for research tests used to measure the accuracy and speed of offensive performance in fencing. Cronbach alpha values are an indicator of the internal consistency of the test, which reflects the extent to which the test paragraphs are interrelated to each other to measure the same concept (Cronbach, 1951). In general, values above 0.70 indicate a good level of stability, while values above 0.80 or 0.90 are excellent (Hair et al., 2010).

Analysis of the results:

High stability for most tests: The majority of tests show very high Cronbach alpha coefficient values, ranging from 0.769 to 0.928. These values indicate that the tests used have a high level of internal consistency and reliability. This means that if these tests are applied repeatedly to the same individuals under the same conditions, the results are likely to be consistent and similar.

Accuracy tests

- Step forward and perform the stabbing movement: the stability coefficient is 0.928, which is a very excellent value.

- Step back and step forward and perform stabbing movement: stability coefficient 0.805, which is a very good value.

- Perform a categorical attack with the stabilizer weapon and perform the stabbing movement: the stability coefficient is 0.927, which is a very excellent value.

- Making an attack by changing direction with the stabilized weapon and performing the stabbing movement: the stability coefficient is 0.779, which is a good and acceptable value.

Speed tests

- The speed of moving forward by a step and performing the stabbing movement: the stability coefficient is 0.877, which is a very good value.

- The speed of retreating one step back and then one step forward, and the performance of the stabbing movement: the stability coefficient is 0.816, which is a very good value.

- The speed of a categorical attack with the stabilized weapon and the performance of the stabbing movement: the stability coefficient is 0.864, which is a very good value.

- The speed of an attack by changing direction with the stabilizer and the performance of the stabbing movement: the stability coefficient is 0.769, which is a good and acceptable value.

These results confirm that all skill tests used in this research, whether related to accuracy or speed in complex offensive movements, have a high level of stability. This enhances confidence in the data to be collected using these tests and ensures that any perceived differences in performance between pre- and post-measurements or between groups can be attributed more confidently to the effect of the intervention (mental training program) rather than to inconsistency in measurement tools. These high levels of consistency are essential to ensure the quality of research and the accuracy of the final results.

Search Procedure

The main experiment procedures included the application of pre-tests, then the implementation of the exercises used in the main section of the training unit on the research sample, followed by the post-tests for this sample.

Pre-test

Pre-tests for the study sample:

The pre-tests of the study sample were conducted from 10/11/2024 to 13/11/2024 in the hall of the Iraqi Fencing Federation. All skill tests for the offensive movements specified in the "Data Collection Tools" section were applied to the experimental group and the control group. The results were accurately recorded according to the conditions and specifications of each test in the data dump forms designated for this.

Intervention Period

Main search experience: The exercises used in the main section of the module are designed after presenting them to a group of experts and specialists. These exercises focus on concentration of attention and mental perception, as well as relaxation exercises (Appendix 2).

The main experiment started on 20-11-2024 and lasted for 9 weeks until 29-1-2025. The experiment included 27 training units, 3 units per week, where each unit included a number of exercises of 3-4 exercises, which is in line with the recommendations of the Clay Zinc (Sharkey, 1997) that the number of weekly units should range between 2-3 and a period of not less than six weeks to ensure the appearance of development in performance.

The exercises were conducted under the supervision of the researcher to prevent any interference from the control group and to inform them of the nature of the exercises assigned to the experimental group. Attention, Focus, and Mental Visualization training modules were provided immediately after the warm-up, within the main section of the 100-minute module (according to the team curriculum), and lasted only 30 minutes.

Application exercises

Unit One (First Week): Dedicated to theoretical lectures and detailed explanation of the concept of relaxation (mental and muscular) and its benefits in sports competitions, with the aim of helping players achieve the best psychological level. This module also included a definition of concentration of attention and mental visualization, with simple practical exercises that explain their connection to physical skills and how to overcome problems, while emphasizing the importance of relaxation before starting concentration and visualization exercises.

The following units: Each unit began by allocating 10 minutes to relaxation exercises, which are applied after the general warm-up period of the team, to prepare the players psychologically. This is followed by the application of training modules for concentration exercises, attention, concentration, and mental visualization.

Attention concentration exercises: It relied on exercises such as focusing the eye on a specific object and performing skill movements with concentration to increase attention during competition. These exercises included training in quiet places, as well as exposing players to lights that simulate the atmosphere of the competition to get them used to it.

Mental visualization exercises: focused on the player's perception of all routine skill situations, as well as difficult situations that he may face with opponents, with the aim of enhancing focus and perception, and creating psychological compatibility during training that is reflected in the performance of the match. Mental visualization training included both internal and external types.

Gradient difficulty: Apply the principle of graduation, starting with simple exercises to focus attention and mental visualization, to the stage of compatibility, and then moving on to more difficult exercises. The difficulty of the exercises increased by increasing the intensity of the exercises and reducing the breaks between repetitions of one exercise.

Rest periods: The duration of rest between exercises ranged from 60 seconds, which is consistent with what he pointed out (Brittenham: 1994), where rest should be sufficient to restore strength. Rest between repetitions of one exercise also included five deep breaths, which is sufficient to restore psychological and physical strength.

Structure of weekly units

Week 1 (3 units): Concentration of attention and internal mental perception with the weapon.

Week 2 (3 units): Concentration of attention and external mental perception with the weapon and standing in front of a mirror.

Week 3 (3 units): Concentration of attention and mental visualization (internal and external) with weapon and mirror, as well as training on the fencing court.

Remaining weeks: Included mixed exercises from previous weeks, with training modules on sign and movement (progress, retreat, basic defensive positions), and an increase in intensity and types of exercises to enhance player development.

Mental visualization duration: Mental visualization exercises (internal and external) were applied for no more than one minute, with a break given after each mental exercise to achieve the best results.

Post-tests

The post-tests of the study sample were conducted from 2/2/2025 to 4/2/2025 at the Iraqi Fencing Federation Hall. These tests came after completing the period of application of the exercises used, which lasted for a period of (9) weeks. The researchers were keen to provide the same conditions and conditions that existed during the pre-tests to ensure an accurate and reliable comparison of the results..

Data analysis

Researchers used statistical methods using the Statistical Package for Social Sciences (SPSS)(Ali et al., 2022, 2024)(Hussein Fayyad et al., 2025). The laws used were as follows:

Percentage: Used to describe the relative portion of data that possesses a particular trait.

Arithmetic mean: Used to give a central value representing the average values in the dataset.

Broker: Use to extract the media for the ages of players.

Standard deviation: Measures how dispersed the values are around the arithmetic mean.

Torsion coefficient: to measure the extent to which the distribution deviates from the normal distribution (bell distribution).

Evidentiary Procedures

Cronbach's alpha equation: Used to measure the internal consistency of a set of questions in a scale or resolution.

Median difference: Used to compare two averages of two different groups or the same group at two different times.

Calculated t-value: Used in testing hypotheses about the difference between two averages(Hammood et al., 2024; Khalaf et al., 2025).

Results

Analysis of the results

Table (3) shows a clear and significant improvement in the accuracy of the offensive performance of all complex movements tested after the application of the mental training program. These results can be explained in detail as follows:

Moving forward one step and performing the stabbing movement:

- The average performance accuracy increased from 3.980 in the pre-test to 4.831 in the post-test, with a median difference of 0.851.

- The calculated value of "T" was 14.060, which is much higher than the tabular value of "T" (1.895) at a significance level of 0.05.

Conclusion: This indicates that there are statistically significant and significant differences in the accuracy of the performance of this movement after the application of mental training, which indicates a significant improvement.

Step back and step forward and perform the stabbing movement:

- The average performance accuracy increased from 4.55 in the pre-test to 5.335 in the post-test, with a median difference of 0.781.

- The calculated value of "T" was 12.713, which is much higher than the tabular value.

Conclusion: This indicates a significant and statistically significant improvement in the accuracy of the performance of this movement after mental training.

Make a categorical attack with the installed weapon and perform the stabbing move:

- The average performance accuracy increased from 3.871 in the pre-test to 4.557 in the post-test, with a median difference of 0.686.

- The calculated "T" value was 7.695, which is significantly higher than the tabular value.

Conclusion: This indicates a significant and statistically significant improvement in the accuracy of the performance of this complex attack.

Perform an attack by changing direction with the installed weapon and performing the stabbing move:

- The average performance accuracy increased from 3.870 in the pre-test to 4.815 in the post-test, with a median difference of 0.945.

- The calculated T value was 15.611, the highest of all tests and far above the tabular value.

Conclusion: This improvement is the most significant and confirms the positive and moral impact of mental training on the accuracy of the performance of attacks that require a change of direction.

All the results of the tests mentioned in Table (3) show a statistically significant and significant improvement in the accuracy of the offensive performance of compound movements in fencing after the application of the mental training program. This clearly indicates that mental visualization and attention concentration training have effectively contributed to enhancing the ability of players to carry out offensive movements with higher accuracy. This supports the hypothesis that mental skills play a crucial role in improving technical and skill performance in sports that require high accuracy and complex responses.

Table 3. Presents the results of the comparison between the arithmetic mean and standard deviations of the pre- and post-tests, in addition to the calculated "T" value and the level of significance, in order to assess the effect of mental training on the accuracy of complex offensive movements in fencing.

Variable	Unit of measurement	Pre-test		Post-Test		Teams of circles	Calculated value (t)	Significance
		M	SD	M	SD			
Moving forward one step and performing the stabbing movement	Degree	3.980	0.207	4.831	0.117	0.851	14.060	Moral
Step back, step forward, and perform the stabbing movement.	Degree	4.55	0.441	5.335	0.4881	0.781	12.713	Moral
Perform a categorical attack with the installed weapon and perform the stabbing movement	Degree	3.871	0.099	4.557	0.346	0.686	7.695	Moral
Carry out an attack by changing direction with the installed weapon and performing the stabbing movement	Degree	3.870	0.229	4.815	0.107	0.945	15.611	Moral

Table (4) shows a clear and significant improvement in the speed of offensive performance for all complex movements tested after the application of the mental training program. Since the values in this table represent time (in seconds), a lower arithmetic mean in the post-test compared to the pre-test indicates an increase in speed. These results can be explained in detail as follows:

Speed forward by step forward and performance of the stabbing movement:

- The average performance time decreased from 0.878 seconds in the pre-test to 0.716 seconds in the post-test, a decrease of 0.162 seconds (representing an increase in speed).

- The calculated value of "T" was 24.081, which is much higher than the tabular value of "T" (1.895) at a significance level of 0.05.

Conclusion: This indicates that there are statistically significant and significant differences in the speed of performance of this movement after the application of mental training, which indicates a significant improvement in speed.

Speed of retreat back by step and step forward, and perform the stabbing movement:

- The average performance time decreased from 1.533 seconds in the pre-test to 1.163 seconds in the post-test, a decrease of 0.370 seconds.

- The calculated value of T was 22.168, which is much higher than the tabular value.

Conclusion: This indicates a significant and statistically significant improvement in the speed of performance of this movement after mental training.

Speed of making a categorical attack with the installed weapon and performing the stabbing movement:

- The average performance time decreased from 0.755 seconds in the pre-test to 0.683 seconds in the post-test, a decrease of 0.072 seconds.

- The calculated value of "T" was 16.168, which is significantly higher than the tabular value.

Conclusion: This indicates a significant and statistically significant improvement in the speed of performance of this complex attack.

Speed of an attack by changing direction with the installed weapon and performing the stabbing move:

- The average performance time decreased from 0.950 seconds in the pre-test to 0.800 seconds in the post-test, a decrease of 0.150 seconds.

- The calculated value of "T" was 5.000, which is higher than the tabular value.

Conclusion: This improvement is also statistically significant and confirms the positive and significant impact of mental training on the speed of performance of attacks that require a change of direction, although the value of "T" is lower compared to some other tests, but it is still statistically significant.

All the results of the tests mentioned in Table (4) show a statistically significant and significant improvement in the speed of offensive performance of compound movements in fencing after the application of the mental training program. This clearly indicates that mental visualization and attention concentration training have effectively contributed to enhancing the ability of players to carry out offensive moves more quickly. This supports the hypothesis that mental skills play a crucial role in improving temporal performance and rapid responses in competitive sports such as fencing.

Table 4. Presents the results of the comparison between the arithmetic averages and standard deviations of the pre- and post-tests, in addition to the calculated "T" value and the level of significance, in order to evaluate the effect of mental training on the speed of complex offensive movements in fencing. (Note that lower values in performance mean faster speed.)

Variable	Unit of measurement	Pre-test		Post-Test		Teams of circles	Calculated value (t)	Significance
		M	SD	M	SD			
The speed of moving forward by step and performing the stabbing movement	Second	0.878	0.014	0.716	0.007	0.162	24.081	Moral
The speed of retreat is back by step, then step forward, and perform the stabbing movement	Second	1.533	0.392	1.163	0.003	0.370	22.168	Moral

The speed of making a categorical attack with the installed weapon and performing the stabbing movement	Second	0.755	0.014	0.683	0.007	0.072	16.168	Moral
The speed of carrying out an attack by changing direction with the installed weapon and performing the stabbing movement	Second	0.950	0.414	0.800	0.075	0.150	5.000	Moral

Discussion

The results of the study, as shown in Table (3) in the analysis section, show a clear and statistically significant improvement in the accuracy of the offensive performance of all compound movements of fencing players after the application of the mental training program. This improvement included: taking a step forward and performing the stabbing movement, taking a step back and then taking a step forward and performing the stabbing movement, performing a categorical attack with the stabilized weapon and performing the stabbing movement, and performing an attack by changing direction with the stabilized weapon and performing the stabbing movement. The significance of the differences between the pre- and post-measurements, and the calculated "T" values that significantly exceeded the tabular value in all tests, confirms the positive and moral impact of mental training on the accuracy of technical performance in fencing.

The researchers attribute this remarkable improvement to the direct and effective effect of the exercises used in mental visualization and attention concentration. These exercises reflected a clear picture of the players' advanced ability to execute movements with higher accuracy in post-tests, which is due to the continuous training and repetition practiced by the players. Concentration and attention are central to athletic performance, as they help to control voluntary movements to achieve the goal accurately when performing complex offensive movements. Operations The mindset, in turn, shapes the mental image necessary for optimal performance and the selection of the most appropriate moment for implementation (Boobie, Blocker, & Acamplete, 1981).

In addition, the exercises used in the research included relaxation exercises, which are known to improve performance quantitatively and qualitatively. These exercises reduced errors and improved skill by helping players recognize the difference between stress and muscle and mental relaxation. This awareness has enhanced their ability to activate mental visualization functions related to skill performance. Mental visualization exercises helped the player to correct and change the incorrect situations in his mind, which reflected positively on improving the performance style, bringing out the skill in its final form, and identifying the basic points of this skill. Taken together, these cognitive processes have contributed to increasing the accuracy of players' performance by broadening the perception of movement and effectively linking mental and motor aspects.

The findings of the study confirm the urgent need for the player when performing complex motor skills, especially offensive stabbing movements that require high accuracy, and linking them to multiple motor skills. This underscores the importance of the strong correlation between mental and physical aspects when performing offensive motor skills and accuracy in the stabbing movement of fencing players. These results are evidence of the good physical and mental adjustments players have after training, which are essential for accurate performance in offensive motor skills.

These results are particularly important in the context of the fencing game, which is a decisive game characterized by surprise and surprise. In a few moments, a player goes from defender to attacker, requiring a high ability to concentrate and constant vigilance to make quick decisions and overcome the opponent. These findings support Isaas (1992), stating that "individuals with better performance images are able to achieve better," emphasizing the pivotal role of mental perception in improving actual performance on the Pitch or fencing arena.

Overall, these findings are consistent with previous literature in sports psychology asserting that mental training, including mental visualization and attention focus, enhances motor performance and accuracy in complex sports (Weinberg & Gould, 2018; Williams & Andersen, 1998). The marked improvement in the accuracy of fencing players' offensive performance highlights the practical benefits of integrating systematic mental training programs into regular physical and technical training plans.

Based on the results shown in Table (4), which shows statistically significant differences between the pre- and post-tests of the skill speed variables, we note that the calculated values of (T) were greater than the tabular value of (T) (1.895) in all variables. This confirms a significant moral improvement in the speed of the players' offensive performance in favor of the post-tests, which indicates the positive impact of the mental training program applied.

The researchers attribute this improvement to the development in the players' mental abilities, and in particular, the improvement of mental visualization skills and attention concentration. These skills contributed to mastering and improving the level of skill performance, especially with regard to speed of response. Speed in the execution of movements is a direct reflection of the integration and harmony of the functions of the central nervous system (CNS). Thus, improving the functional compatibility of the nervous system is a crucial basis for achieving fast and effective movements. Motor performance is the embodiment and expression of the complex processes that take place within the body, representing the speed at which nerve centers are connected to muscle work (Schmidt & Lee, 2011).

The mental exercises used in the research have contributed to the development of responsiveness and accuracy in offensive skills through repetition and guided practice. For example, the speed and accuracy of the stab enables the swordsman to reach his goal with minimal effort, a key offensive movement that puts the player in a position close to the opponent to take the touch and then quickly return to standby mode (Obaidi, 2005). It is the good functioning of mental processes that leads to the good performance of motor skills. The success of response speed depends not only on the element of speed and fitness, but also largely on cognitive mental processes such as attention, perception, remembering, and others (Hussein & Nassef, 1987).

The correct timing of performing these movements shows the importance of accuracy in decision-making for performance, which has been effectively emphasized and used in research exercises. These exercises have contributed to enhancing the spatial and temporal motor sense of the players by deepening the focus of their attention and developing their mental visualization abilities. The mental visualization of these skills has a direct positive impact on the level of responsiveness when applying offensive skills, as it allows players to simulate difficult situations and develop their mental responses before actual physical execution, which shortens reaction time and increases movement efficiency (Vealey & Chase, 2016). This reflects that players with better mental images of performance are able to achieve better and faster achievement (Isaas, 1992).

The mental processes such as visualization, attention concentration and other processes are one of the most important essential things that help fencing players develop their motor skills, especially since this sport requires speed and accuracy in calling motor programs stored in the brain and making appropriate quick decisions, in addition to the high ability to predict the movements of the competitor and promotes good performance and reduces errors during fights, this all depends on the mental preparations of the players, it is an indispensable requirement to reach the upper levels.

Conclusions

Based on the analysis and discussion of the statistical results, which dealt with the effect of the mental training program (mental visualization and attention concentration) on the accuracy and speed of offensive performance of fencing players with a shish weapon, the following conclusions can be drawn and recommendations:

- The mental training program showed a positive, statistically significant effect in improving the accuracy of all tested compound offensive movements (forward advancement, backwards, categorical attack, direction change attack) in fencing players. This suggests that the integration of mental visualization and concentration of attention enhances the ability to implement technical skills with higher accuracy.

-The results proved that the mental training program led to a statistically significant improvement in the speed of offensive performance of the tested compound movements. This shows that mental skills contribute to shortening the response time and movement time required to carry out attacks, which increases the effectiveness of performance in competitive situations.

-The study confirmed the pivotal role of mental abilities, including mental perception and attention focus, in enhancing motor skill performance, both in terms of accuracy and speed. The functional compatibility of the nervous system and the ability to consciously control mental movement reflect positively on physical performance.

- Relaxation exercises within the mental program contributed to improved performance by helping players manage stress and promote physical and mental awareness, resulting in fewer errors and improved performance quality.

- The results confirm that mental training is an effective and necessary tool to improve performance in fencing, which is characterized by its dynamism and demands quick decisions and accurate and sudden responses.

Recommendations

- It is recommended that mental training programs (mental visualization and attention focus) should be systematically and regularly integrated as an essential part of the daily training curriculum for fencing players in all age groups and competitive levels.

-A specific part of the module (as suggested in this paper) should be devoted to focusing on mental skills after warm-up and before the main section of technical and physical training.

- It is recommended to qualify and train fencing coaches on the foundations of sports psychology and how to apply mental visualization, attention concentration, and relaxation exercises, to ensure an effective and continuous application of these programs.

- It is proposed to make use of the measurement tools used in this research and to develop more field tests and psychological measures dedicated to fencing to assess mental aspects more accurately and specifically.

Future Studies

- Conduct future studies that address the impact of mental training on other aspects of fencing performance, such as decision-making ability, tactics, competitive stress management, and mental endurance.

- Expand the search to include different age groups (e.g., juniors) or higher competitive levels (e.g., elite players) to generalize results.

- Compare the effectiveness of different types of mental training (such as visual versus physical perception) on performance in fencing.

- Use more sophisticated objective measurement techniques (such as eye tracking or brain activity measurements) to identify the neural mechanisms underlying improved performance as a result of mental training.

- Design longitudinal studies to assess the long-term impact of mental training programs on the development of players' performance and athletic careers.

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Appendix 1: Response Speed Meter

Components of the device: The device is a small rectangular box made of aluminum, on which the following components are installed:

Left side:

- On/off switch: Located at the bottom and controls the on/off of the device.
- Power indicator: A red light located above the on/off switch indicates that the power is connected to the device.
- Test button: A hidden screw protruding at the push of a switch by the tester to start measuring the player's response speed.

Right side:

- Player Response Button: A spiral stop button that the player uses to press with his thumb when responding to a stimulus during a test. (Note: This button was not used in the current search.)
- Response Lamp: A white lamp located above the player's response button, used as a visual alarm for the player during the response speed test, and is required for research.
- Midway (between the power button and the test button):
- Pattern switch: A two-way switch used to switch between types of response speed tests (visual, audio, and haptic).
- Time display: A counter located above the mode switch, showing the time taken for the player to respond to the stimulus with an accuracy of 0.1 seconds.

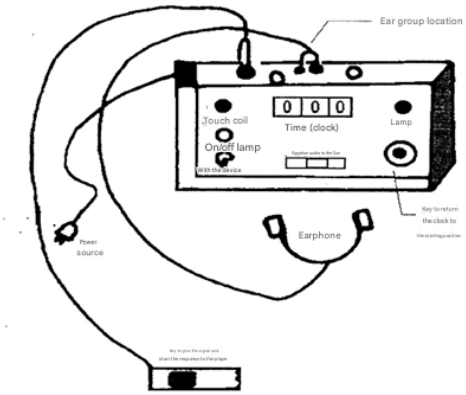
Manufacturing & Connections:

- The physicist Qusai Ismail Al-Fardi made this device.
- Top surface: contains all the above components.
- Left side surface: An electrical cord comes out of it to connect the device to the main power supply.

Back Surface:

- Earphone input: A place to install the earphone cord (not used in this paper), intended for measuring the speed of the auditory reaction.
- Taplical stimulus wire input: Another place to install an electrical wire with one end connected to the device and the other end in the laboratory's hand, ending with a button used by the tester to release the tactile stimulus (also not used in this paper).

Figure 1. illustrates the response time measurement device.



Appendix No. 2 Training Unit Form

Eighth week **Date: 5/11/2024**
Third Training Module **Time: (30 minutes)**

Main section

Objective: Training in self-relaxation exercises, concentration of attention exercises, internal mental perception on the weapon, and sign of movement (mixed)

EXERCISES	*TIME*	*COMFORT*	*OBSERVATIONS*
- Explain the purpose of training exercises. Start with relaxation exercises. (deep breathing) so that it is from the abdomen and not the chest, taking into account that the breath (inhale) is taken from the nose and exhaled from the mouth. Repetition 5 times Self-relaxation: - Take a comfortable position lying on the back so that the arms are on the side and the body is in an upright position and both thighs and knees are close and the arms are extended sideways and the palms of the hands are facing up, relax in all parts of the body, feel the spread of relaxation in all parts of the body, breathe easily and slowly. - Feel the feet, move the combs a little, relax with the combs, think of the leg muscles in complete relaxation, think of the quadriceps, feel that the quadriceps are in a relaxed state, think of the muscles of the legs in a state of complete relaxation, relaxation of the muscles of the seat. - Focus attention in the muscles of the lower back, feel relaxed in these muscles, feel that relaxation spreads to the upper back muscles. - Focus attention on the fingers, feel a slight tingling in the fingers, think about the warmth of the hands, forearms, arms, and shoulders. - I feel complete relaxation in these muscles. - Relaxation of the neck muscles. - Relaxation of the jaw muscles, feel that your head is completely relaxed. - I contract all muscle groups in the body while retaining this contraction, and then complete relaxation in these muscle groups. All parts of your body are in a state of complete relaxation. I enjoy this full state of relaxation for several minutes.	2min 10min		* Choose a place away from the source of noise and that it is quiet. * Getting rid of everything that hinders the feeling of relaxation, such as watches and mobile devices. * Taking into account the distances between players. * Confirmation of body position. * Emphasis on not thinking, clarity of mind, and calm during performance.
- The player stands in front of the sign (the legal target of the shish weapon) from the standby position and focuses their eye on a point in the middle of the legal target, and then advances by 3 steps to the sign and then stabilizes.	1min	2min	* Focus on deep breathing between exercises. * Observe proper timing in exercises.
- The player stands in front of the signer from the position of readiness and cohesion with the opponent's weapon blade (installed on the sign) in the middle section of the weapon blade and control it steadily with the eye focused on a point in the middle of the goal and be 3 steps to the sign and then stability.	1min	2min	* The player stands in front of the sign in the standby position in all exercises, according to the distance. * Note the following forms (12, 16, 17, 19).
- The player stands in front of the sign from the position of readiness and cohesion with the opponent's weapon blade (installed on the sign) in the strong section of the weapon blade and control it steadily with the eye focused on a point in the middle of the goal and be 3 steps to the sign and then stability.	1min	2min	
- Imagine a player you admire and consider a role model for you, try to remember his actions while entering the competition, and how to behave while winning.	1min	2min	*Sit in a comfortable position. * Close your eyes until you reach a high degree of relaxation. *Instructions are suitable for timing and given in a quiet and clear voice by the laboratory.
- Visualize yourself on the field and in front of the opponent and remember how the movements made by the opponent were and try to see what happened.	1min	2min	

- Visualize yourself in front of the competitor and take a step forward, then a step back, and then perform the stabbing movement with success.	1min	2 min	* Emphasis on players following up on laboratory instructions in order to reach the visualization goal. * Emphasis on the feeling of focusing on breathing movements and maintaining calm during visualization in order to reach the ideal performance of the model