

## The Effect Of Imagery Training On The Accuracy Of Free Throws In Basketball Players In Terms Of Concentration

### El efecto del entrenamiento de imágenes en la precisión de los tiros libres en jugadores de baloncesto en términos de concentración

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**Abstract.** This study aims to determine: (1) the difference in the influence between internal imagery and external imagery exercises on the accuracy of free throws; (2) the difference in the influence of players who have high and low concentrations on the accuracy of free throws; and (3) the interaction between internal imagery and external imagery exercises and the concentration on the accuracy of free throws in basketball players. This type of research is an experiment using a 2 x 2 factorial design. The population in this study was 38 basketball SME players from Universitas Islam Indonesia. The sample in this study was 20 people who were taken using purposive sampling techniques, then ordinal pairing was carried out to divide each group. The instrument used is to measure concentration, namely the Grid Concentration Test, while the accuracy of free throw uses a free throw test. The data analysis technique used is a two-way ANOVA. The results showed that: (1) There was a significant difference in influence between internal imagery and external imagery exercises on the accuracy of free throws in basketball players, with an F value of 51.984 and a significance value of  $p < 0.000 < 0.05$ . The internal imagery exercise group was higher (good) compared to the external imagery exercise group with a posttest average difference of 4.00. (2) There is a significant difference in influence between players who have high and low concentrations on the accuracy of a basketball player's free throw, proven by an F value of 38.416 and a p-significance value of  $0.000 < 0.05$ . Players who have a high concentration are higher (good) compared to players who have a low concentration, with a posttest average difference of 4.00. (3) There is a significant interaction between imagery exercises (internal imagery and external imagery) and concentration (high and low) on the accuracy of a basketball player's free throw, with an F value of 4.264 and a significance value of  $p < 0.047 < 0.05$ . There is a significant difference in the influence between internal imagery training methods and external imagery training methods on the accuracy of free throws in basketball players. The internal imagery training method is better than the external imagery exercise on the accuracy of free throws on basketball players. There is a significant difference in the effect of high concentration and low concentration on the accuracy of free throws in basketball players. Players who have high concentration are better than those with a low concentration on the accuracy of free throws in basketball players. There is a significant interaction between both methods of exercise imagery (internal imagery and external imagery) and concentration (high and low) on the accuracy of free throws in basketball players.

**Keywords:** Internal Imagery, External Imagery, Concentration, Accuracy Free throw, Basketball.

**Resumen.** Este estudio tiene como objetivo determinar: (1) la diferencia en la influencia entre las imágenes internas y los ejercicios de imágenes externas en la precisión de los tiros libres; (2) la diferencia en la influencia de los jugadores que tienen concentraciones altas y bajas en la precisión de los tiros libres; y (3) la interacción entre las imágenes internas y los ejercicios de imágenes externas y la concentración en la precisión de los tiros libres en los jugadores de baloncesto. Este tipo de investigación es un experimento que utiliza un diseño factorial 2 x 2. La población en este estudio fue de 38 jugadores de baloncesto PYME de Universitas Islam Indonesia. La muestra en este estudio fue de 20 personas que fueron tomadas utilizando técnicas de muestreo intencional, luego se realizó el emparejamiento ordinal para dividir cada grupo. El instrumento utilizado es para medir la concentración, a saber, la prueba de concentración de cuadrícula, mientras que la precisión del tiro libre utiliza una prueba de tiro libre. La técnica de análisis de datos utilizada es un ANOVA bidireccional. Los resultados mostraron que: (1) Hubo una diferencia significativa en la influencia entre las imágenes internas y los ejercicios de imágenes externas en la precisión de los tiros libres en jugadores de baloncesto, con un valor F de 51.984 y un valor de significancia de  $p < 0.000 < 0.05$ . El grupo de ejercicio de imágenes internas fue mayor (bueno) en comparación con el grupo de ejercicio de imágenes externas con una diferencia promedio posterior a la prueba de 4,00. (2) Existe una diferencia significativa en la influencia entre los jugadores que tienen concentraciones altas y bajas en la precisión del tiro libre de un jugador de baloncesto, probada por un valor F de 38.416 y un valor de significación p de  $0.000 < 0.05$ . Los jugadores que tienen una concentración alta son más altos (buenos) en comparación con los jugadores que tienen una concentración baja, con una diferencia promedio posterior a la prueba de 4.00. (3) Existe una interacción significativa entre los ejercicios de imágenes (imágenes internas e imágenes externas) y la concentración (alta y baja) en la precisión del tiro libre de un jugador de baloncesto, con un valor F de 4.264 y un valor de significación de  $p < 0.047 < 0.05$ . Existe una diferencia significativa en la influencia entre los métodos de entrenamiento de imágenes internas y los métodos de entrenamiento de imágenes externas en la precisión de los tiros libres en jugadores de baloncesto. El método de entrenamiento de imágenes internas es mejor que el ejercicio de imágenes externas sobre la precisión de los tiros libres en jugadores de baloncesto. Hay una diferencia significativa en el efecto de alta concentración y baja concentración en la precisión de los tiros libres en los jugadores de baloncesto. Los jugadores que tienen una alta concentración son mejores que aquellos con una baja concentración en la precisión de los tiros libres en los jugadores de baloncesto. El método de entrenamiento de imágenes internas es mejor que el ejercicio de imágenes externas sobre la precisión de los tiros libres en jugadores de baloncesto. Hay una diferencia significativa en el efecto de alta concentración y baja concentración en la precisión de los tiros libres en los jugadores de baloncesto. Los jugadores que tienen una alta concentración son mejores que aquellos con una baja concentración en la precisión de los tiros libres en los jugadores de baloncesto. Existe una interacción significativa entre ambos métodos de imágenes de ejercicio (imágenes internas e imágenes externas) y concentración (alta y baja) en la precisión de los tiros libres en jugadores de baloncesto.

**Palabras Clave:** Imágenes internas, Imágenes externas, Concentración, Precisión Tiros libres, Baloncesto.

Fecha recepción: 24-06-23. Fecha de aceptación: 10-09-23

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## Introduction

The game of basketball is a team game that is currently very popular abroad and in Indonesia. This is evident from the various kinds of events or competitions in Indonesia. The definition of basketball itself is a sports game that is carried out in groups consisting of two teams of five people

each who compete with each other to score points by putting the ball into the opponent's basket or hoop (Rasulovna, 2022; Sarlis & Tjortjis, 2020). The sport of basketball is favored by various groups ranging from the old, young, men, and women besides that there are several companies, agencies, governments, educational institutions, and universities enthusiastic about this basketball game.

The basketball game is a game that has the purpose of inserting the ball into the basketball target which is above the floor as high as 305 cm, besides that to be able to return the ball well, it is necessary to do movement techniques well so that it can become work efficiency with regular exercise, which can affect the effectiveness of good work as well (Ferioli et al., 2020; O'Grady et al., 2020). In basketball games, there is something called free throwing this one must be mastered by basketball players but, when players make free throws in basketball games, there needs to be good concentration so that the free throw can run well.

Concentration is the ability of the sportsman to maintain the focus of his attention on the relevant match environment (Baker, 2017; Moran, 2016). Chu et al., (2018) posit that concentration is the ability to focus attention on a given task by not being distracted by stimuli that are external or internal. This has an impact when basketball matches in the Papua National Sports Week championship in 2021 saw many basketball players who failed to make free throws during the match and the accuracy level was low, besides that the results were also during training players did not get automation from the correct series of free throw movements. (Moran, 2016; Singh, 2022) suggest that a sportsman's failure in a match is often due to his inability to maintain concentration during the match.

In this case, to minimize free throw technical errors, it is necessary to do various types of exercises, be it exercises in terms of technique or exercises from a mental point of view. But nowadays in giving the portion of exercise between technical exercises and mental exercises is still not balanced, there are still many coaches who emphasize exercises more on the physical and technical aspects only but the mental aspects are not given good exercises (Nanda et al., 2021; Shao et al., 2022). As revealed (Indahwati & Ristanto, 2016; Zach et al., 2018) explains that many feel that the process of good appearance is 70-90% influenced by mental factors. Players who are trained mentally well will certainly be more skilled in overcoming the emotional and mental problems that come to them because the atmosphere and condition of players when competing on the field can change at any time.

(Holmes et al., 2016; Nanay, 2021) Mental imagery training is a technique that is often used by coaches and sports psychologists in helping to improve athlete performance. While according to (Nanay, 2018) that imagery exercises can be applied in sports, for example, the skill making free throws in basketball players, and football players when it comes to taking penalty kicks can essentially be trained with visualization techniques. Imagery is a cognitive process in the brain that is important in the process of carrying out the motion (Di Corrado et al., 2020). In addition, in the implementation of mental exercises, there are various types of exercise methods. According to Wallace et al., (2019) suggest that mental exercise includes imagery, visualization, mental rehearsal, symbolic rehearsal, covert practice, and mental practice.

The mental imagery exercise is a series of mental coaching processes of the player by involving elements of all five senses to improve concentration, directing actions to a goal according to plan, emotional control, and psychophysics. In the process of implementing mental imagery exercises, there is a division of perspectives. The existing imagery perspective is used based on how the player can imagine himself and others while performing a technique. In other words, mental imagery exercises that are used based on the ability of a player present a shadow of a free throw technique in the mind. There are two types of perspectives or views, namely imagery internal perspective and imagery external perspective (Dana & Gozalzadeh, 2017).

It was further explained that in its implementation both types of exercises require assistance. Related to the external perspective imagery model requires an external stimulus in the form of a video or image that aims to help players concentrate on a free throw technique. The hope is that there will be mental training through the imagery internal perspective and imagery external perspective methods. states many sports figures both coaches and athletes and coaches do not understand the benefits of mental training. Mental exercises that serve to improve performance from a psychological point of view are not given (Nanda et al., 2021; Shao et al., 2022). The execution of techniques, especially the free throw technique, is strongly influenced by the psychological aspect of concentration. When players can make a Free throw movement and how the players can make a decision that is in the basketball game, of course, at such a time the player does not avoid the mental influence of the player himself. Gould et al., (2014) state that the performance at the peak of an athlete is 80% influenced by mental aspects and only 20% by other aspects therefore mental aspects must be managed systematically and planned. This happens because the player's level of attention and concentration decreases or is disturbed when there are several excitatory that appear together (Kahrović et al., 2014).

Kaufman et al., (2018) say that visualization is one of the most powerful mental training strategies for athlete performance. Mental imagery training in basketball can be done by players by presenting an image of themselves doing a movement technique in their brain, for example in doing basketball techniques such as free throw movements, players can imagine themselves doing free throw movements properly and correctly so that the ball can enter the basketball hoop.

Based on the results of observations with basketball coaches at the Islamic University of Indonesia in January 2023, it was revealed that the factors that caused the low level of accuracy of free throws and failure in executing free throws were players executing movements seemingly hasty, wrong initial attitudes, a series of movements that were not rhythmic, the introduction of hands to the ball was not right, concentration was difficult, Performing free throw techniques that are not on target, low accuracy levels, and lack of consistency in the results obtained besides that, in

this case, the mental imagery exercise method with the free throw technique is still not familiar.

The coaches prefer to use the method of playing. The impact on the implementation of the free throw method of playing or the game is seen in that players only repeat movements without optimizing the concentration aspect, this will certainly be carried away when competing. We recommend that mental imagery exercises be given as a form of exercise variation (Nanay, 2018). Inconsistencies in the success rate and low accuracy of free throws by players during training and competing (Tan et al., 2020). Identifying that the player's concentration at the time of performing the free throw technique has not yet formed and has not stabilized.

Even based on the quality of the technique, each player can master the free throw technique well. Mental exercises that serve to improve player performance from a psychological point of view are not given by a coach and the mental aspects of players are also not paid special attention to by the coach such as when players practice free throws do not concentrate properly on the series of movements and goals of free throws, players do not maximize the time to practice free throws to train concentration and aim at the target. Based on the problems previously stated, the purpose of this study is to determine the effect of imagery training and concentration on the accuracy of free throws in basketball players."

## Research Methods

### Research Design

This research is an experimental method using a 2x2 factorial design, therefore this method is validation, namely testing the influence of one or more variables on other variables. Ledyard, (2020) Reporting a factorial experiment is a design that can share the treatment/manipulation of 2 or more variables at the same time to see the impact of each variable freely, separately and coinciding with the bound variables and the effects that are intertwined due to the presence of multiple variable interactions. This experimental research used 2 groups that received different treatments, namely the provision of internal imagery exercise methods, and external imagery exercise methods.

### Research Procedure

The data collection method in this study is test and measurement. Before pretest and posttest measurements are taken, the sample is first measured in concentration, to find out the high and low concentrations. To measure the concentration in this study is to use the Grid Concentration Test of 0.89, and the reliability value of 0.803 (Greenlees et al., 2006). The instrument to measure the accuracy of free throws is to use a free throw test which has a validity value of 0.79 and a reliability of 0.92 Coves et al., (2020). Treatment or treatment is carried out with 6 meetings where in one week 3 meetings are carried out, It is based on theory (Slimani et al., 2016) he said that the imagery training aims to improve the psychological ability of athletes carried out as many as 6 meetings. And then ended with

taking the final test or post-test. To measure the accuracy of free throws using a basketball to recognize the comparison of free throw accuracy scores after the treatment/treatment.

### Research Participants

The population in this study was 38 people, and the sample in this study was 20 people. The sampling method uses the purposive sampling method. This research has received approval from all samples that have filled out a statement of ability to become a research sample and have met the requirements of the research code of ethics.

### Data Analysis

The information analysis method used in this study using SPSS 22 is to use a 2-way ANOVA (two-way ANOVA) at the significance level  $\alpha = 0.05$ . Next to compare the average treatment companions used the Tukey test (Coves et al., 2020). When before arriving at the use of ANOVA 2 roads (ANOVA two-way) requires testing prerequisites that include: (1) a normality test and (2) a variant homogeneity test and hypothesis test.

## Result

The research results and discussion section will be discussed sequentially, including (1) research data, (2) analysis prerequisite tests, and (3) hypothesis tests. For the hypothesis test, it will be presented in order, including (a) Differences in the influence of internal imagery exercise methods and external imagery exercise methods on the accuracy of basketball players' Free Throws; (b) The difference in the effect of high concentration and low concentration on the accuracy of free throw in basketball players and (c) The interaction between the two methods of exercise and concentration on the accuracy of free throw in basketball players. In full it will be presented as follows:

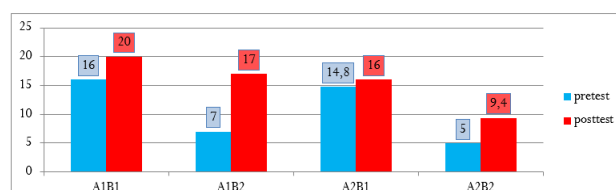


Figure 1. Pretest and Posttest Bar Chart Accuracy Free throw

### Information:

A1B1: Groups of players who have a high concentration are trained with internal imagery training methods

A2B1: A group of players who have a high concentration is trained with the external imagery training methods

A1B2: Groups of players with low concentrations are trained with internal imagery training methods

A2B2: Groups of players who have low concentrations are trained with external imagery training methods

Sourced from the bar chart image above, showing that the accuracy of the free throw of the A1B1 group averaged 16 and faced an increase in the post-test period of 20, the

A2B1 group averaged the pretest of 14.8 and faced an increase in the post-test period of 16, the A1B2 group averaged a pretest of 7 and faced an increase in the posttest period of 17, the A2B2 group averaged 5 pretests and faced an increase in the posttest period of 9.4.

### Prerequisite Test Results

#### Normality Test

Test the normality of the data in this study using the Shapiro-Wilk method. The results of the data normality test conducted in each analysis group were carried out with the SPSS version 22.0 for windows software program with a significance level of 5% or 0.05. The full result is in the appendix. A summary of the data is in Table 1 as follows.

Based on the statistical analysis of the normality test that has been carried out using the Shapiro-Wilk test, all pretest and posttest data on the accuracy of the free throw were obtained from the normality test results of the data significance value  $p > 0.05$ , which means that the data is normally distributed.

Table 1.  
Normality Test

Data	P	Significance	Information
PretestA1B1	0,959	> 0,05	Usual
PosttestA1B1	0,746		Usual
PretestA2B1	0,805		Usual
PosttestA2B1	0,759		Usual
PretestA1B2	0,759		Usual
PosttestA1B2	0,979		Usual
PretestA2B2	0,759		Usual
PosttestA2B2	0,577		Usual

#### Homogeneity Test

Uji homogenitas dilakukan untuk menguji persamaan beberapa sampel yaitu homogen atau tidak. Uji homogenitas dimaksudkan menguji kesamaan varian antara pretest dan posttest. Uji homogenitas pada penelitian ini adalah uji Levene Test. Hasil uji homogenitas ada pada Tabel 2 sebagai berikut.

Table 2.  
Homogeneity Test

Group	Levene Statistic	df1	df2	Sig.	Information
Pretest	0.254	1	18	0,621	Homogeneous
Posttest	3.521	1	18	0,053	Homogeneous

Table 4.  
ANOVA Results Difference between High Concentration and Low Concentration to Free throw Accuracy

Source	Type III Sum of Squares	Df	Mean Square	F	Sig
Concentration	120.050	1	120.050	38.416	0,000

Based on a statistical analysis of homogeneity tests that have been carried out using the Levene Test. In the pretest, significance values of  $0.621 \geq 0.05$  were obtained. This means that the data group has homogeneous variants. Likewise, the calculation results in the posttest obtained significance values of  $0.053 \geq 0.05$ . This means that the data group has homogeneous variants. Thus the existence of populations has common variants or homogeneities.

### Hypothesis Testing

Hypothesis testing in this study can be carried out based on the results of data analysis and interpretation of two-way ANOVA analysis. The sequence of the results of hypothesis testing adjusted to the hypothesis formulated as follows.

#### Differences The effect of internal imagery exercise methods and external imagery exercise methods on the accuracy of free throws

The first hypothesis reads "There is a significant difference in the influence between the internal exercise method of imagery and the practice method of external imagery on the accuracy of free throws in basketball players". If the results of the analysis show a significant influence, then the training method influences the accuracy of free throws basketball players. Based on the results of the analysis obtained by the data in Table 3 are as follows

Table 3.  
ANOVA Results of Experimental Groups Using Internal Imagery and External Imagery Training Methods

Source	Type III Sum of Squares	df	Mean Square	F	Sig
Exercise Methods	162.450	1	162.450	51.984	0,000

From the results of the ANOVA Test Table 3 above, it can be seen that the significance value of p is 0.000. Since the significance value of p is  $0.000 < 0.05$ , it means that  $H_0$  is rejected. Thus there is a significant difference in influence between the internal imagery training method and the external imagery training method on the accuracy of free throws in basketball players. Based on the results of the analysis, it turned out that the internal imagery exercise method was higher (good) with an average posttest value of 20.00 compared to the external imagery exercise method with an average posttest value of 16.00. This means that the research hypothesis that states that there is a significant difference in the influence of internal imagery exercise methods and external imagery exercise methods on the accuracy of free throws in Basketball players has been proven.

#### The difference in the effect of high concentration and low concentration on the accuracy of free throw

The second hypothesis reads "There is a significant difference in the influence of players who have high concentration and low concentration on the accuracy of free throws in Basketball players". If the results of the analysis show a significant difference, then there is a difference in the effect of high concentration and low concentration on the accuracy of free throws in basketball players. The calculation results are presented in Table 4 as follow

From the ANOVA test results in table 4 above, it can be seen that the significance value of p is 0.000. Since the significance value of p is  $0.000 < 0.05$ , it means that  $H_0$  is rejected. Based on this, it means that there is a significant difference in the influence of players who have high concentration and low concentration on the accuracy of free throws in basketball players. Based on the results of the

basketball analysis of Universitas Islam Indonesia, it turns out that players who have a higher concentration (good) with an average posttest score of 20.00 compared to players who have a low concentration with an average posttest score of 16.00. This means that the hypothesis of research stating that there is a significant difference in the influence of players who have high concentration and low concentration on the accuracy of free throws in basketball players has been proven.

#### **Interaction between imagery exercise methods and concentration on free throw accuracy**

The third hypothesis reads "There is a significant interaction between the exercise method of imagery (internal imagery and the exercise method of external imagery) and concentration (high and low) of the accuracy of free throws in basketball players". If the results of the analysis show that there is interaction, it means that the training method (imagery internal perspective and imagery external perspective) has an interaction with concentration (high and low) to the accuracy of free throws in basketball players. The results of the calculations are in Table 5 as follows.

From the ANOVA test results in Table 5 above, it can be seen that there is a significant value of  $p$  of 0.000. Therefore the significance value of  $p$  of  $0.047 < 0.05$ , means that  $H_0$  is rejected. Based on this, it means that the hypothesis that states a significant interaction between the imagery exercise method (internal imagery and the external imagery training method) and the concentration (high and low) of the accuracy of free throws in basketball players has been proven.

Table 5.  
ANOVA Results Interaction between Training Method (Imagery Internal Perspective and Imagery External Perspective) with Concentration (High and Low).

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Exercise Method *	14.450	1	14.450	4.624	0,047
Concentration					

Table 6.  
Post Hoc Test Results Summary

Group	Interaction	Mean Difference	Std. Error	Sig.
A1B1	A1B2	3.200*	1.118	.050
	A2B1	4.000*	1.118	.012
	A2B2	10.600*	1.118	.000
A2B2	A1B1	-3.200*	1.118	.050
	A2B1	.800	1.118	.889
	A2B2	7.400*	1.118	.000
A2B1	A1B1	-4.000*	1.118	.012
	A1B2	-.800	1.118	.889
	A2B2	6.600*	1.118	.000
A2B2	A1B1	-10.600*	1.118	.000
	A1B2	-7.400*	1.118	.000
	A2B1	-6.600*	1.118	.000

After being tested, there is an interaction between the imagery training method (internal imagery and the external imagery training method) and the concentration (high and low) on the accuracy of free throws in basketball players, therefore it is necessary to carry out further tests using the Tukey test. Further test results can be seen in Table 6 below

The results of the analysis of paired variance with

Tukey's advanced test showed that there were 9 significantly different pairs, namely: pairs (1) A1B1-A2B1, (2) A1B1-A2B2, (3) A1B2-A2B2, (4) A2B1-A1B1, (5) A2B1-A1B1, (6) A2B1-A2B2, (7) A2B2-A1B1, (8) A2B2-A1B2, (9) A2B2-A2B1, and, while the other pairs were declared no difference, namely: pairs (1) A1B1-A1B2, (2) A1B2-A1B1 and (3) A1B2-A1B2.

#### **Discussion**

The discussion of the results of this study provides a further interpretation of the results of the data analysis that has been put forward. The discussion of the results of the analysis can be further explained as follows.

#### **Effect of Internal Imagery and External Imagery Training Methods on Free Throw Accuracy**

Based on hypothesis testing, it is known that the internal imagery exercise method and the external imagery exercise method have a significant difference in the effect on the accuracy of free throws in basketball players. This difference in influence is obtained from the results of the use of internal imagery training methods and external imagery training methods on the accuracy of free throws in basketball players. The internal imagery exercise method has proven to be more effective in improving the concentration and accuracy of free throws in basketball players.

Based on the measurement results of the initial free throw skill test and the final test in the internal imagery training group and the external image group, shows a significant difference in the skills and confidence of basketball participants at Universitas Islam Indonesia as well as a significant difference in the influence of internal imagery and external imagery exercises on free throw skills. The results of the imagery study conducted by (Novriansyah et al., 2019; Post et al., 2010), that imagery will have an impact on the stimulus unit and the unit of an athlete's response to skill. This stimulus gives information relative to the content of the skill, while the response gives information about the individual's response to the situation experienced by the athlete. For example, participants have imagined a skill or performance in a practice or match, the athlete's stimulus unit seems to be looking at itself and seeing others and can feel the crowd of spectators, while the athlete's response unit has an impact on the increasing pulse, sweating, and feelings of nausea.

Similarly, the results of the review of the research conducted by Heydari et al., (2018) regarding the effect of the practice of psychological skills in particular on the improvement of sports performance and the confidence of athletes. The psychological skills reviewed consist of imagery and goal-setting skills, motivating strategies, focused attention and concentration, managing tension and anxiety, as well as a combination of psychological skills. Research on goal-setting exercises and reviewed imagery consists of the effect of imagery exercises after service exercises on tennis service accuracy (Fortes et al.,

2019), The Effect of Imagery Exercises on Weight Lifting Performance (Ruhl et al., 2016) The Effect of Imagery Exercises on Short-Distance Swimming Performance (Yadolahzadeh, 2020). This is to the research conducted by (Post & Wrisberg, 2012) which states that there is a significant difference in the application of imagery methods to gymnastics skills.

#### ***Effect of High Concentration and Low Concentration on Free Throw Accuracy***

The results of the analysis show that players with high concentration ability are more (good) than players who have low concentration ability to the accuracy of free throws in basketball players. Concentration in this case has an important role in influencing a technique performed or the outcome of a sports match. Attention and concentration are often interpreted the same even though they have different definitions.

Monsma et al., (2017) Attention is a process of direct awareness of the information (excitatory) received to decide on an action (response). While concentration is the ability of a person to focus attention on the selected excitatory (one object) in a given time. According to (Baker, 2017) that concentration is very important for a player in displaying performance on the field. The main component of concentration is the ability to focus attention on a certain thing and not be distracted by an internal stimulus as well as an irrelevant external stimulus. This is to the research conducted by (Irawan, 2019) which states that there is a significant difference between the level of concentration and the accuracy of petanque sports shooting.

#### ***Interaction between Training Method (Imagery Internal Perspective and Imagery External Perspective) with Concentration (High and Low)***

Imagery ability is the ability to conceptualize motor performance. Imagery states it is more effective if the individual has higher imagery capabilities. Based on the results that have been stated in the results of this study, there is a significant difference between the exercise method (internal imagery and the external imagery training method) and the concentration (high and low) of the accuracy of free throws in basketball players.

From the results of the form of interaction, it appears that the main factors of the study in the form of two factors show significant interaction. In the results of this study, internal and external methods there are significant differences. Basketball players who have high concentration and low concentration will get better results than players trained with external imagery training methods. This can happen because based on theory in its implementation, internal imagery training will increase player concentration so that it will be more effective when applied to players who have high concentration.

Players who have high concentration will be more effective using the internal imagery training method because it will be easier to focus on the target to be aimed

at when making free throws. From this statement, it is concluded that the effects applied to increase the accuracy of free throws is influenced by the high and low concentration that players have. Thus, in applying the exercise, it must be adjusted to the player's abilities and character so that it can achieve optimal results.

#### **Conclusions**

Based on the results of the research and the results of the data analysis that has been carried out, the following conclusions were obtained: 1) There is a significant difference in the influence between the internal imagery exercise method and the external imagery training method on the accuracy of free throw in basketball players. The internal imagery training method is better than the external imagery exercise on the accuracy of free throws on basketball players. 2) There is a significant difference in the effect of high concentration and low concentration on the accuracy of free throws in basketball players. Players who have a high concentration are better than those with a low concentration on the accuracy of free throws in basketball players. 3) There is a significant interaction between both imagery training methods (internal imagery and external imagery) and concentration (high and low) on the accuracy of free throws in basketball players.

#### **Acknowledgment**

This research article can be carried out well thanks to the help of various parties, therefore the researchers express their deepest gratitude to all levels of lecturers at the faculty of sports science, Yogyakarta State University.

#### **References**

- Baker, L. B. (2017). Sweating rate and sweat sodium concentration in athletes: a review of methodology and intra/interindividual variability. *Sports Medicine*, *47*, 111–128. <https://doi.org/10.1007/s40279-017-0691-5>
- Chu, A., Holdaway, C., Varma, T., Petocz, P., & Samman, S. (2018). Lower serum zinc concentration despite higher dietary zinc intake in athletes: a systematic review and meta-analysis. *Sports Medicine*, *48*, 327–336. <https://doi.org/10.1007/s40279-017-0818-8>
- Coves, A., Caballero, C., & Moreno, F. J. (2020). Relationship between kinematic variability and performance in basketball free-throw. *International Journal of Performance Analysis in Sport*, *20*(6), 931–941. <https://doi.org/10.1080/24748668.2020.1820172>
- Dana, A., & Gozalzadeh, E. (2017). Internal and external imagery effects on tennis skills among novices. *Perceptual and Motor Skills*, *124*(5), 1022–1043. <https://doi.org/10.1177/0031512517719611>
- Di Corrado, D., Guarnera, M., Guerrero, C. S., Maldonado, N. M., Di Nuovo, S., Castellano, S., & Coco, M. (2020). Mental imagery skills in competitive young athletes and non-athletes. *Frontiers in Psychology*, *11*, 633. <https://doi.org/10.3389/fpsyg.2020.00633>

- Feroli, D., Schelling, X., Bosio, A., La Torre, A., Rucco, D., & Rampinini, E. (2020). Match activities in basketball games: comparison between different competitive levels. *The Journal of Strength & Conditioning Research*, 34(1), 172–182. <https://doi.org/10.1519/JSC.0000000000003039>
- Fortes, L. de S., Almeida, S. S., Nascimento Junior, J. R. A. do, Vieira, L. F., Lima-Júnior, D., & Ferreira, M. E. C. (2019). Effect of motor imagery training on tennis service performance in young tennis athletes. *Revista de Psicología Del Deporte*, 28(1), 157–168.
- Gould, D., Voelker, D. K., Damarjian, N., & Greenleaf, C. (2014). *Imagery training for peak performance*. <https://doi.org/10.1037/14251-004>
- Greenlees, I., Thelwell, R., & Holder, T. (2006). Examining the efficacy of the concentration grid exercise as a concentration enhancement exercise. *Psychology of Sport and Exercise*, 7(1), 29–39. <https://doi.org/10.1016/j.psychsport.2005.02.001>
- Heydari, A., Soltani, H., & Mohammadi-Nezhad, M. (2018). The effect of Psychological skills training (goal setting, positive selftalk and Imagery) on self-confidence of adolescent volleyball players. *Pedagogs, Psychology, Medical-Biological Problems of Physical Training and Sports*, 4, 189–194.
- Holmes, E. A., Blackwell, S. E., Burnett Heyes, S., Renner, F., & Raes, F. (2016). Mental imagery in depression: Phenomenology, potential mechanisms, and treatment implications. *Annual Review of Clinical Psychology*, 12, 249–280. <https://doi.org/10.1146/annurev-clinpsy-021815-092925>
- Indahwati, N., & Ristanto, K. (2016). The application of pettlep imagery exercise to competitive anxiety and concentration in Surabaya archery athletes. *International Journal of Educational Science and Research (IJESR)*, 6(3).
- Irawan, F. A. (2019). Biomechanical analysis of concentration and coordination on the accuracy in petanque shooting. *ACTIVE: Journal of Physical Education, Sport, Health and Recreation*, 8(2), 96–100. <https://doi.org/10.15294/active.v8i2.30467>
- Jones, D. K., Hammond, J. I., & Relyea, R. A. (2010). Roundup® and amphibians: the importance of concentration, application time, and stratification. *Environmental Toxicology and Chemistry*, 29(9), 2016–2025. <https://doi.org/10.1002/etc.240>
- Kahrović, I., Radenković, O., Mavrić, F., & Murić, B. (2014). Effects of self-talk strategy in mental training of athletes. *Facta Universitatis, Series: Physical Education and Sport*, 12(1), 51–58.
- Kaufman, K. A., Glass, C. R., & Pineau, T. R. (2018). *Mindful sport performance enhancement: Mental training for athletes and coaches*. American Psychological Association.
- Ledyard, J. O. (2020). of Experimental Research. *The Handbook of Experimental Economics*, 111.
- Monsma, E., Perreault, M., & Doan, R. (2017). Focus! Keys to developing concentration skills in open-skill sports. *Journal of Physical Education, Recreation & Dance*, 88(7), 51–55. <https://doi.org/org/10.1080/07303084.2017.1340207>
- Moran, A. P. (2016). *The psychology of concentration in sport performers: A cognitive analysis*. Psychology Press.
- Nanay, B. (2018). Multimodal mental imagery. *Cortex*, 105, 125–134. <https://doi.org/10.1016/j.cortex.2017.07.006>
- Nanay, B. (2021). Unconscious mental imagery. *Philosophical Transactions of the Royal Society B*, 376(1817), 20190689. <https://doi.org/10.1098/rstb.2019.0689>
- Nanda, F. A., Novriansyah, N., Nugroho, M. D., Fajaruddin, S., Utama, M. B. R., Burhaein, E., & Phytanza, D. T. P. (2021). Psychological skills of basketball athletes by perspektive gender: study Indonesian athletes in Asian Games XVIII. *Sport Science*, 15(1), 158–167.
- Novriansyah, N., Irianto, D. P., Rahmat, Y. N., & Nanda, F. A. (2019). Effect of imagery on free-throw shooting in basketball extracurricular. *Jurnal Keolahragaan*, 7(2), 155–161. <https://doi.org/10.21831/jk.v7i2.29319>
- O'Grady, C. J., Fox, J. L., Dalbo, V. J., & Scanlan, A. T. (2020). A systematic review of the external and internal workloads experienced during games-based drills in basketball players. *International Journal of Sports Physiology and Performance*, 15(5), 603–616. <https://doi.org/10.1123/ijsp.2019-0785>
- Post, P. G., & Wrisberg, C. A. (2012). A phenomenological investigation of gymnasts' lived experience of imagery. *The Sport Psychologist*, 26(1), 98–121. <https://doi.org/10.1123/tsp.26.1.98>
- Post, P. G., Wrisberg, C. A., & Mullins, S. (2010). A field test of the influence of pre-game imagery on basketball free throw shooting. *Journal of Imagery Research in Sport and Physical Activity*, 5(1). <https://doi.org/10.2202/1932-0191.1042>
- Rasulovna, S. N. (2022). The Mechanism of Improving the Primary Training Methods of Basketball Sports, Training Skilled Basketball Players. *Web of Scientist: International Scientific Research Journal*, 3(02), 1085–1091. <https://doi.org/10.17605/OSF.IO/YMRTH>
- Ruhl, L., Lubert, A., & Missirlian, B. (2016). *Exercise Imagery Use in Recreational Weightlifters*.
- Sarlis, V., & Tjortjis, C. (2020). Sports analytics—Evaluation of basketball players and team performance. *Information Systems*, 93, 101562. <https://doi.org/10.1016/j.is.2020.101562>
- Shao, Z., Bezmylov, M. M., & Shynkaruk, O. A. (2022). Individual characteristics of physical and mental development and their connection with regular physical exercises when playing basketball. *Current Psychology*. <https://doi.org/10.1007/s12144-022-03692-w>
- Singh, R. (2022). *Sports psychology*. KK Publications.
- Slimani, M., Tod, D., Chaabene, H., Miarka, B., & Chamari, K. (2016). Effects of mental imagery on muscular strength in healthy and patient participants: A systematic review. *Journal of Sports Science and Medicine*, 15(3), 434–450.
- Tan, Z. S., Burns, S. F., Pan, J. W., & Kong, P. W. (2020). Effect of caffeine ingestion on free-throw performance in college basketball players. *Journal of Exercise Science and Fitness*, 18(2), 62–67. <https://doi.org/10.1016/j.jesf.2019.12.002>
- Wallace, A. F. X., Blom, L. C., & Gretton, T. W. (2019). Mental imagery and strength training: Student athletes' perceptions, desires, and the impact of psychoeducation. *Journal of Imagery Research in Sport and Physical Activity*, 14(1). <https://doi.org/10.1515/jirspa-2019-0011>
- Yadolahzadeh, A. (2020). The role of mental imagery and stress management training in the performance of female swimmers. *Atena Journal of Sports Sciences*, 3, 1.
- Zach, S., Dobersek, U., Inglis, V., & Tenenbaum, G. (2018). A meta-analysis of mental imagery effects on post-injury functional mobility, perceived pain, and self-efficacy. *Psychology of Sport and Exercise*, 34, 79–87. <https://doi.org/10.1016/j.psychsport.2017.09.011>