

The influence of imagery training and self-confidence on shooting skills in futsal: A two-way ANOVA design

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Abstract

Problem Statement: Imagery is commonly used to enhance psychological aspects and improve specific skills in sports. However, determining the most effective type of imagery based on varying levels of self-confidence still needs to be explored. **Purpose:** This research aims to analyze the impact of imagery training and self-confidence on shooting skills in futsal. **Methods:** A factorial experiment employing a two-way ANOVA design was used to explore two types of imagery perspectives, internal and external, and two levels of self-confidence, high and low. The study involved 44 male senior high school students randomly selected from classes X and XI participating in futsal extracurricular activities (age: 16.76 ± 0.43 years, weight: 64.80 ± 2.84 kg, and height: 167.64 ± 2.54 cm). Participants were divided into four treatment groups for internal and external imagery training based on their level of self-confidence. The imagery training was implemented for ± 4 weeks with a frequency of 3 weekly meetings. Self-confidence data was obtained from questionnaires and shooting skills from the penalty kick test. Then, two-way ANOVA and Tukey's advanced test were used to analyze it (Sig. < 0.05). **Result:** External imagery training is better than internal imagery for shooting skills in futsal (Sig. < 0.05), where the average is A2 (28.68) > A1 (27.68). A significant interaction between imagery training and self-confidence was also found (Sig. < 0.05). The results of shooting skills in futsal that apply external imagery training are better than internal imagery for participants who have a high level of self-confidence (Sig. < 0.05), where the average is A2B1 (30.45) > A1B1 (28.00). Then, participants who had a low level of self-confidence showed that there was no significant difference between the two imagery exercises applied (Sig. > 0.05). However, the results of shooting skills in futsal will be better if internal imagery training is applied for participants with low levels of self-confidence, where the average is A1B2 (27.36) > A2B2 (26.91). **Conclusions:** External imagery exercises are more appropriate for participants with high self-confidence, and both imagery exercises can be applied for participants with low self-confidence. However, the results will be better for internal imagery.

Keywords: training, imagery, self-confidence, shooting, futsal

Introduction

Futsal is a high-intensity sport with intermittent action, where each player must be fast and precise in every action (Castagna et al., 2009; Iedynak et al., 2019a; Iedynak et al., 2019b). This includes making decisions based on the situation and conditions of teammates and opponents during the match (Corre`a et al., 2014). Studies have shown that elite athletes perform better in decision-making than young athletes (not elite) (Kinrade et al., 2015; Lopes et al., 2016). This is because young athletes are still developing various body systems, especially during adolescence (such as perception, attention, anticipation, and working memory) (Araújo et al., 2015).

Futsal is different from football, the main differences include game rules, technical and tactical actions (Agras et al., 2016; Aquino et al., 2017; Rago et al., 2017). Players must master these components to adapt and regulate every game action (Müller et al., 2016). Meanwhile, the similarity with football is the basic idea of the game, namely winning by scoring more goals than the opposing team, and shooting is the skill most often used

by players to achieve this goal (Agustiyanta et al., 2023; Gioldasis, 2018). Hard shooting can be done with the back foot, making it difficult for the opposing goalkeeper to anticipate it perfectly. Therefore, mastering shooting skills correctly and accurately is very important for players (Agustiyanta et al., 2023), so they must be trained correctly.

Regarding cognitive mechanisms in decision-making, researchers have suggested that imagery is a popular exercise for developing psychological aspects (Bedir & Erhan, 2021; Brick et al., 2015; Guillot et al., 2015). The application of imagery is related to the mind through the ability to imagine to achieve desired goals (Battaglia et al., 2014). The simulation can increase the effectiveness of training (Després, 2022), reduces movement errors, improves feedback, and improves sports performance (Cumming & Williams, 2012). The main advantage of this exercise is that it saves time, energy or physique, and there is no risk of injury (Weinberg & Gould, 2015). Researchers have also investigated and reported that imagery training has positive effects on reducing anxiety in competition (Fortes et al., 2016), basketball skills (Lu et al., 2020), gymnastics (Battaglia et al., 2014; Marshall & Gibson, 2017), golf (Smith et al., 2008), fin swimmer (Lin et al., 2021), passing in volleyball (Fortes et al., 2020), futsal (Frank et al., 2018; Khongrassame et al., 2024; Rozi et al., 2023), serve performance in tennis (Dana & Gozalzadeh, 2017; Guillot et al., 2015), curling, bowling and archery (Bedir & Erhan, 2021).

In addition, imagery training can stimulate areas of the brain related to actual experiences, thereby helping athletes improve their psychological quality and performance (Wakefield & Smith, 2009). According to Sheard and Golby (2006), imagery training also improves mental skills, reduces anxiety, and increases self-confidence. In this case, athletes' self-confidence and anxiety are essential to achieve optimal performance. Not surprisingly, self-confidence is often reported as an important aspect for elite athletes that influence their performance during the competition (Hanton et al., 2004).

Imagery simulation training is an effective way for athletes to understand and learn about the difficulties they have previously faced, such as using images or videos to design and organize a simulation program with help and explanations from the coach (Lin et al., 2021). Recent experimental studies show that the effectiveness of imagery can be influenced by various factors, including ability and use of imagery (Gregg et al., 2005), imagery perspective (Callow & Hardy, 2004), and attentional focus during imagery (Caliari, 2008). The modality and perspective of imagery are the most investigated aspects. Imagery perspective is the viewpoint a person takes during imagery rather than the sensory modalities involved (Cumming & Williams, 2012). This is differentiated into internal and external perspectives (Callow et al., 2019). The internal perspective is related to the entire process of kinesthetic imagery or from a first-person perspective. Meanwhile, the external perspective relates to the entire imagery process from an outsider's visual perspective or a third-person perspective (Lu et al., 2020). However, studies related to PETTLEP (Physical, Environment, Task, Time, Learning, Emotion, and Perspective) rarely compare the impact of internal and external imagery perspectives (Lu et al., 2020).

About futsal, several studies have investigated the application of imagery. For example, studies from Khongrassame et al. (2024), evaluated PETTLEP imagery training as associated with improved futsal skills and anxiety. The PETTLEP imagery intervention was carried out for eight weeks and three times each week with a combination of physical training. A study from Rozi et al. (2023) analyzed the effect of imagery and agility training on the reaction abilities of goalkeepers in futsal players with high school student participants. A two-way factorial experimental design was used to divide imagery training into audiovisual and visual, while agility was divided into high and low (Rozi et al., 2023). Then, a study investigated the impact of a 4-week team action imagery intervention on futsal players' mental representations regarding team tactics. Skilled futsal players were assigned to two groups, namely with and without imagery training (Frank et al., 2018). Unfortunately, applying imagery training (internal and external) based on levels of self-confidence (high and low) is rarely done. Moreover, studies related to futsal still need to be improved compared to studies investigating football skills.

This research aims to analyze the influence of imagery training and self-confidence on shooting skills in futsal. The imagery exercises applied in this study were internal and external, while self-confidence was categorized as high and low. In more detail, the objectives of this research are: (a) to analyze the differences in the influence of internal and external imagery training on shooting skills in futsal, (b) to analyze whether there is an interaction between imagery training and self-confidence on shooting skills in futsal, (c) to analyze is there a difference in the influence of internal and external imagery training based on a high level of self-confidence on shooting skills in futsal, and (d) analyzing the difference in the influence of internal and external imagery training based on a low level of self-confidence on shooting skills in futsal. Analyzing the differences between each treatment group will likely provide benefits in implementing imagery training based on the level of self-confidence, of coaches, athletes and futsal practitioners.

Materials & Methods

Study design

A factorial experiment with a two-way ANOVA design was used in this study (Table 1), where imagery training consisted of internal and external imagery. At the same time, self-confidence was categorized into two

levels, namely high and low. The design in this study consisted of four treatment groups, namely: (a) internal imagery training for participants with high self-confidence (A1B1), (b) internal imagery training for participants with low self-confidence (A1B2), (c) external imagery training for participants with high self-confidence (A2B1), and (d) external imagery training for participants with low self-confidence (A2B2).

Table 1. Two-way factorial experimental design

Self-confidence (B)	Imagery training (A)	
	Internal imagery (A1)	External Imagery (A2)
High self-confidence (B1)	A1B1	A2B1
Low self-confidence (B2)	A1B2	A2B2

Note: A1 is the internal imagery training group, A2 is the external imagery training group, B1 is the high self-confidence group, B2 is the low self-confidence group, A1B1 is the internal imagery training group with high self-confidence, A1B2 is the internal imagery training group with low self-confidence, A2B1 is the external imagery training group with high self-confidence, and A2B2 is the external imagery training group with low self-confidence.

Participant

A total of 44 male senior high school students participated voluntarily in this study, and were recruited randomly. Participants came from four different schools in one province in Indonesia. Participants are classes X and XI who take part in futsal extracurricular activities (age: 16.76 ± 0.43 years, weight: 64.80 ± 2.84 kg, and height: 167.64 ± 2.54 cm).

Division of treatment groups

Self-confidence test data is the initial stage for dividing groups into factorial experimental designs. The self-confidence test results are ranked from maximum to minimum score, and divided into two parts (top and bottom data). The top part ($n=22$) is categorized as having a high level of self-confidence, and the bottom part ($n=22$) is categorized as having a low level of self-confidence. The next step was to divide them into four treatment groups for internal and external imagery training, with 11 participants each. This is done by ordinal pairing based on the level of self-confidence so that the mean data for each group is not significantly different (see Figure 1).

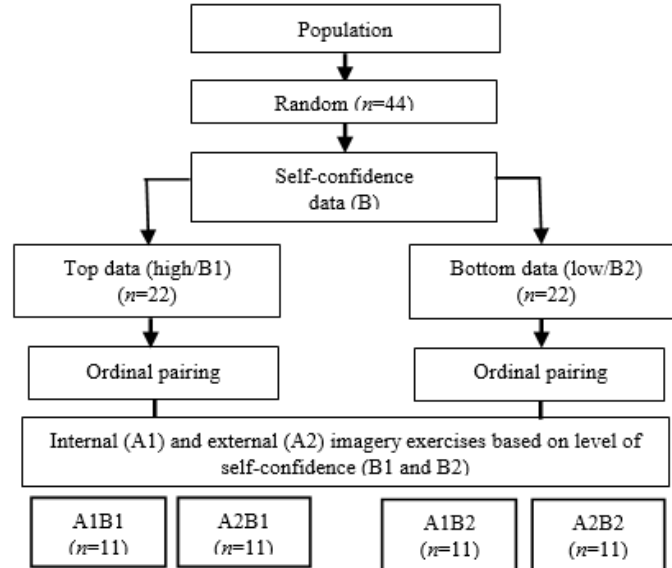


Figure 1. Procedure for dividing treatment groups for internal and external imagery training based on level of self-confidence

Treatment

The treatments applied were internal and external imagery exercises (see Table 2). Both exercises aim to improve shooting skills in futsal. Implementation of internal imagery training, where participants imagine themselves when carrying out shooting technique movements. Meanwhile, external imagery training requires external stimuli through videos or pictures related to shooting movements. This aims to help participants concentrate more on the movements to be trained. The implementation of these two exercises was carried out for ± 4 weeks with a frequency of three meetings per week, which included an introduction of ± 10 minutes, core exercises of ± 40 minutes and a closing of ± 10 minutes.

Table 2. Internal and external imagery exercises

Internal imagery	External imagery	Activity
<ul style="list-style-type: none"> - Trainers and participants carry out prayer activities according to their religions and beliefs. - Participants warm up before core training. - A brief explanation regarding imagery 	<ul style="list-style-type: none"> - Trainers and participants carry out prayer activities according to their religions and beliefs. - Participants warm up before core training. - A brief explanation regarding imagery 	Introduction (± 10 minutes)
<ul style="list-style-type: none"> - Position your body as comfortably as possible and close your eyes. - Use the five senses in the visualization process. - Instruct based on a series of correct shooting techniques. - Take as deep a breath as possible, exhale slowly, and start focusing. An image of the implementation of shooting techniques appears in my mind. - Imagine yourself getting ready to shoot. Feel the wind blowing around you and listen to the sound of the wind. - Position your body in a ready position by holding the ball, and feel the smooth skin of the ball when held using the palm of your hand. - Look at the wide-open futsal goal with the futsal ball at your feet. - Place the ball in front, and look at the goal with focus on shooting. - Starting position, stand a few steps behind the ball with your feet shoulder-width apart and your body straight. - Feel when running shooting on the back of the foot. - Direct the ball in the expected direction. - Listen to the screams of the audience who feel happy and open their eyes to end the imagery exercise. - Each participant did shooting practice for 15 minutes. 	<ul style="list-style-type: none"> - The trainer instructs participants to position themselves as comfortably and relaxed as possible. - The trainer presents videos related to shooting techniques in futsal. - Participants pay attention to the video in focus. - During the video playback, if a participant is not focused, the trainer will replay it. - The trainer explained to the participants the movements shown in the video. - The trainer's role is to direct the participants to have a correct picture of the shooting sequence. - Each participant did shooting practice for 15 minutes. 	Core training (± 40 minutes)
<ul style="list-style-type: none"> - Participants cool down and evaluate. 	<ul style="list-style-type: none"> - Participants cool down and evaluate. 	Closing (± 10 minutes)

Instrument

Self-confidence

Self-confidence data was obtained through a questionnaire adopted from Bandura, consisting of three dimensions: strength, generalization and level (Bandura, 2012) (Table 3). The questionnaire uses a Likert scale with five alternative answers, namely very sure (score 5), sure (score 4), sure enough (score 3), not sure (score 2), and very unsure (score 1). This questionnaire has been validated with a validity coefficient (Sig. < 0.05) and reliability is 0.776.

Table 3. Self-confidence questionnaire

Variable	Indicators	Dimensions	Items
Self-confidence	Ensure that individuals can successfully achieve each level of assigned tasks.	Strength	1-9
	Individuals believe that they are capable of demonstrating successful performance.	Generality	10-21
	Individuals can carry out difficult tasks optimally.	Levels	22-27

Shooting skills

Shooting skill data was obtained through a penalty kick test (Maulana, 2009), which aims to measure skills and accuracy of shooting results in futsal. This test has a validity of 0.820 and a reliability of 0.936. The equipment used is a futsal field, futsal goal, futsal knitting, futsal ball, rope and numbers for scoring. The implementation of the shooting test is: (a) participants do it basic shooting techniques using the back of the foot, (b) shooting is done using one of the best feet, (c) shooting is done at the second penalty point at a distance of 10 m from the goal, (d) the ball is kicked towards the target (futsal goal) with a height 2 m and 3 m wide, and (e) the goal is divided into 9 parts, and each part measures 66.66 cm high and 100 cm wide (Figure 2).

The scoring of this test is: (a) score 1 for target A, score 2 for target B, score 3 for target C, score 4 for target D, and score 5 for target E, (b) shooting that hits the post or crossbar does not will get a score and cannot be repeated, (c) each player takes 10 shots with two executions, and (d) the highest score from two executions is the result of the participant's shooting skills.

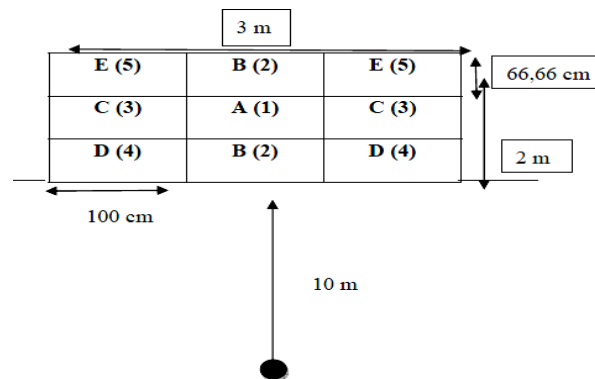


Figure 2. Goals and scoring for the shooting skills test in futsal

Statistical analysis

Statistical analysis was carried out with the help of SPSS version 26 software. The characteristics of each treatment group data were analyzed using descriptive statistics (mean, standard deviation, maximum to minimum scores). Standard residual values are used to test data normality and Levene's to test data homogeneity. Then, the hypotheses were analyzed using two-way factorial ANOVA. The Tukey test is also used if an interaction is found between imagery training and the level of self-confidence regarding shooting skills in futsal. This aims to analyze which treatment group significantly influence shooting skills in futsal.

Results

Descriptive analysis

Data on shooting skills in futsal shows that the average of group A2 (28.68) > A1 (27.68), group B1 (29.23) > B2 (27.14), group A2B1 (30.45) > A1B1 (28.00), group A1B2 (27.36) > A2B2 (26.91). In other words, the overall mean of the A2B1 group (30.45) was higher than the other groups (Table 5 and Figure 3).

Table 4. Descriptive statistics

Imagery (A)	Confidence (B)	Source	N	Max	Min	Mean	Std. Deviation
Internal imagery (A1)	High self-confidence (B1)	A1B1	11	30.00	25.00	28.00	1.342
	Low self-confidence (B2)	A1B2	11	30.00	24.00	27.36	2.111
	Total	A1	22	30.00	24.00	27.68	1.756
External imagery (A2)	High self-confidence (B1)	A2B1	11	32.00	28.00	30.45	1.214
	Low self-confidence (B2)	A2B2	11	29.00	25.00	26.91	1.300
	Total	A2	22	32.00	25.00	28.68	2.191
Total	High self-confidence (B1)	B1	22	32.00	25.00	29.23	1.771
	Low self-confidence (B2)	B2	22	30.00	24.00	27.14	1.726
	Total	B1B2	44	32.00	24.00	28.18	2.026

Dependent variable: shooting skills

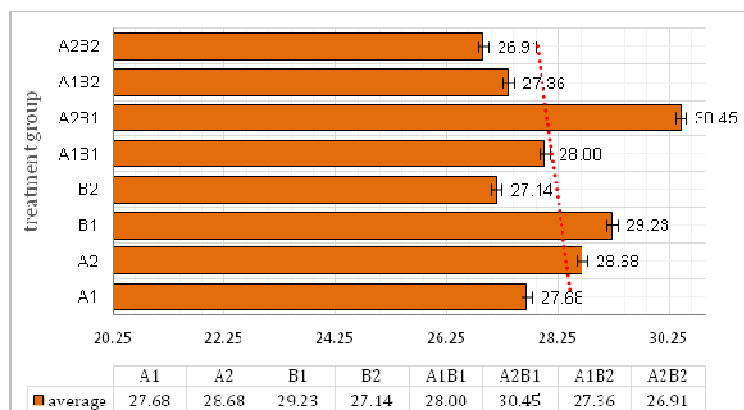


Figure 3. Average shooting skill data for each group

Analysis requirements

The data are normally distributed and homogeneous (Sig. > 0.05), as presented in Tables 5 and 6. Figure 4 also shows this.

Table 5. Summary of data normality

Source	Kolmogorov-Smirnov ^a			Shapiro-Wilk		
	Statistic	Df	Sig.	Statistic	Df	Sig.
Standardized Residual for Shooting	0.114	44	0.186	0.973	44	0.389

a. Lilliefors Significance Correction
Data is normal (Sig. > 0.05).

Table 6. Summary of data homogeneity

Source	Levene Statistic	df1	df2	Sig.
Shooting in futsal Based on Mean	2.647	3	40	0.062
Based on Median	1.727	3	40	0.177
Based on the Median and with adjusted df	1.727	3	35.042	0.179
Based on trimmed mean	2.595	3	40	0.066

Data is homogeneous (Sig. > 0.05).

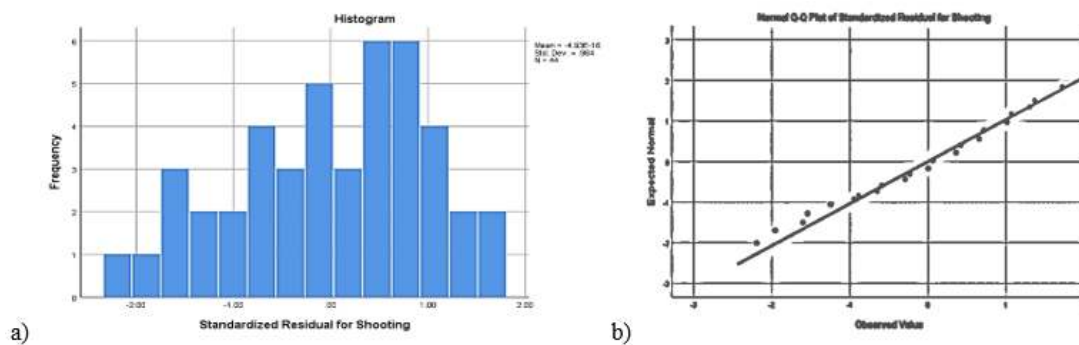


Figure 4. (a) histogram normal plot, and (b) normal graph plot

Two-way ANOVA

Significant differences were found in groups A1 and A2 regarding shooting skills in futsal (Sig. < 0.05), where the average A2 (28.68) > A1 (27.68). Significant differences were also found in groups B1 and B2 regarding shooting skills in futsal (Sig. < 0.05), where the average B1 (29.23) > B2 (27.14). Apart from that, groups A and B also found a significant interaction (Sig. < 0.05) (Table 7).

Table 7. Summary of two-way ANOVA

Source	Type III Sum of Squares	Df	Mean Square	F	Sig.
Corrected Model	82.364 ^a	3	27.455	11.660	0.000
Intercept	34945.455	1	34945.455	14841.699	0.000
A	11.000	1	11.000	4.672	0.037
B	48.091	1	48.091	20.425	0.000
A*B	23.273	1	23.273	9.884	0.003
Error	94.182	40	2.355		
Total	35122.000	44			
Corrected Total	176.545	43			

a. R Squared = 0.467 (Adjusted R Squared = 0.427)

Dependent variable: shooting skills

There is a significant difference (Sig. < 0.05)

A = imagery training, and B = self-confidence

A*B = interaction between imagery training and self-confidence

Tukey's further test

Based on the two-way ANOVA test results, there is an interaction between groups A and B, so further tests are needed to determine which group significantly influences shooting skills in futsal. From Table 8, the A2B1 group is better than the A1B1 group regarding shooting skills in futsal (Sig. < 0.05), where the average A2B1 (30.45) > A1B1 (28.00). Then, groups A1B2 and A2B2 showed no significant difference in shooting skills in futsal (Sig. > 0.05), where the average A1B2 (27.36) > A2B2 (26.91).

Table 8. Summary of analysis Tukey HSD

(I) Post Hoc	(J) Post Hoc	Mean Difference (I-J)	Std. Error	Sig.	95% CI	
					LB	UB
A1B1	A1B2	0.64	0.654	0.766	-1.12	2.39
	A2B1	-2.45*	0.654	0.003	-4.21	-0.70
	A2B2	1.09	0.654	0.354	-0.66	2.84
A1B2	A1B1	-0.64	0.654	0.766	-2.39	1.12
	A2B1	-3.09*	0.654	0.000	-4.84	-1.34
	A2B2	0.45	0.654	0.899	-1.30	2.21
A2B1	A1B1	2.45*	0.654	0.003	0.70	4.21
	A1B2	3.09*	0.654	0.000	1.34	4.84
	A2B2	3.55*	0.654	0.000	1.79	5.30
A2B2	A1B1	-1.09	0.654	0.354	-2.84	0.66
	A1B2	-0.45	0.654	0.899	-2.21	1.30
	A2B1	-3.55*	0.654	0.000	-5.30	-1.79

Based on observed means.

The error term is Mean Square (Error) = 2.355.

*. The mean difference is significant at the 0.05 level.

Dependent variable: shooting skills.

Discussion

These findings report that external imagery training is better than internal imagery for shooting skills in futsal (Sig. < 0.05), where the average is A2 (28.68) > A1 (27.68). The application of external imagery uses tools in the form of video media, so that athletes can directly correct how to perform the correct movement, and replay the video if there are still errors in the movement. Meanwhile, the application of internal imagery depends on the individual's concentration and imagination, where each person has a different level of concentration (Weinberg & Gould, 2015). External imagery is applied using visual tools, where players look with focus at each display or illustration which is directly visualized by the coach and assistant staff. Several previous studies have reported that skills in sports have been associated with increased use of an internal imagery perspective (Hall et al., 1966; Mahoney et al., 1987). However, at a higher level of competition applying the imagery perspective was the same (Hall et al., 1966), and applying an external perspective was used more frequently (Ungerleider & Golding, 1991). This finding to previous studies, that if the purpose of applying imagery is to learn and master specific motor tasks, then external imagery is better than internal imagery (Hardy & Callow, 1999); this is included in mastering shooting skills in futsal.

A Study by Dana and Gozalzadeh (2017), reported an associated increase in tennis stroke accuracy of the three groups compared. Serve accuracy in the internal imagery group, and forehand accuracy in the external imagery group showed better improvement, while backhand accuracy also experienced the same increase in the three groups. For those who focus on imagining effectively, imagery training positively impacts mastering sports skills (Rhodes et al., 2024). Apart from that, the exercises implemented must be programmed and well organized in order to get a positive effect (Alnedral et al., 2023; Antara et al., 2023; Firdaus et al., 2023; Handayani et al., 2023; Irawan et al., 2024; Komaini et al., 2023; Mario et al., 2022; Rifki et al., 2022; Umar et al., 2023; Welis et al., 2024). The imagery training in this research was carried out for ± 4 weeks with a frequency of 3 meetings per week. This is by previous studies, which included imagery training for 3 to 7 weeks (Jose & Joseph, 2018), with a frequency of 1 time a day or 2 times a week (Afrouzeh et al., 2015), has a positive impact on cognition and motivation (Cumming & Williams, 2012), and improve athlete performance (Saby et al., 2020).

A significant interaction between imagery training and self-confidence in shooting skills in futsal was also found in this study (Sig. < 0.05). This finding is based on previous studies, namely self-confidence, which is an essential aspect of psychology to support optimal sports performance (Hanton et al., 2004), so this needs to be considered and included as an attribute variable in this study. Fundamental aspects, such as technical, physical and psychological qualities, influence the success of an athlete or team. Meanwhile, an athlete's mental skills are crucial to victory (Simonsmeier & Buecker, 2017). A Study by Khongrassame et al. (2024), reported that applying PETTLEP imagery for 8 weeks significantly improved futsal skills, anxiety, and self-confidence. Another study reported that imagery and agility training significantly affected goalkeeper reaction time in futsal (Rozi et al., 2023). Strengthening psychological capacity and reducing anxiety is necessary to increase optimal performance (Jose & Joseph, 2018). Meanwhile, the benefits of imagery training can improve athlete performance with positive results. Thus, implementing imagery training based on the level of self-confidence is something that needs to be considered to get better results.

The results of shooting skills in futsal that apply external imagery training are better than internal imagery for participants who have a high level of self-confidence (Sig. < 0.05), where the average is A2B1 (30.45) > A1B1 (28.00). Then, participants who had a low level of self-confidence showed that there was no significant difference between the two imagery exercises applied (Sig. > 0.05). However, the results of shooting skills in futsal will be better if internal imagery training is Implemented for participants with low levels of self-

confidence. This is proven by the average A1B2 (27.36) > A2B2 (26.91). A Study by Norouzi et al. (2019), randomly recruited 45 novice soccer players and divided them into PETTLEP external imagery, PETTLEP internal imagery, and control groups. The results showed that PETTLEP external and PETTLEP internal imagery performed better than the control group. However, PETTLEP external imagery has better passing ability than other groups (Norouzi et al., 2019). In external imagery, using video as a tool has a dynamic nature. It allows it to be repeated or slowed down, so that the player can carefully observe even very complex movements. Meanwhile, for amateur athletes, internal imagery still requires direction from the coach so that they can create images of movements in their memory or imagination. According to studies from Dana and Gozalzadeh (2017), internal imagery requires an approximation of real life phenomenology so that they imagine being in their body and experiencing sensations as if in an actual situation. Players are given suggestions to imagine making shooting movements in their minds so that these movements are stored in their minds and improve their shooting skills to be better. Meanwhile, external imagery means a person positions himself as an observer based on the media or tools used (Dana & Gozalzadeh, 2017).

The self-confidence that each individual has is not the same as other individuals, so it affects shooting skills. Players with high self-confidence will find it easier to control their negative emotions than players with low self-confidence. Several studies have also reported significant benefits of athletes' self-confidence in improving sports performance (Hassmen et al., 2004). Self-confidence has intuitive appeal as a contributor to successful sports performance, so researchers in sports psychology have frequently reported a positive relationship between the two (Craft et al., 2003; Woodman & Hardy, 2003). Players with low self-confidence will experience difficulty in shooting accurately and will not be optimal at the tasks given.

On the other hand, players with high self-confidence perform optimally on the tasks given and achieve better results (Simonsmeier & Buecker, 2017). Thus, players who have high self-confidence are more appropriate for external imagery training. Meanwhile, players with low self-confidence can apply both imagery exercises, but the results are better for internal imagery. This is because they still need guidance and direction from the coach in carrying out movement tasks for correct and accurate shooting skills.

This study has limitations that need to be reported. The participants in were 44 male senior high school students who participated in futsal extracurricular activities. In this regard, the division of groups into levels of self-confidence at the bottom (high self-confidence data) and the top (low self-confidence data) scores may not differ significantly. Therefore, a wider participant size is needed for future research, so that the group division categories for high and low levels of self-confidence can be differentiated significantly.

Conclusions

This research concludes that external imagery training is better than internal imagery for shooting skills in futsal (Sig. < 0.05). A significant interaction between imagery training and self-confidence in shooting skills in futsal was also found in this study (Sig. < 0.05). The results of shooting skills in futsal that apply external imagery training are better than internal imagery for participants with a high self-confidence level (Sig. < 0.05). Then, participants who had a low level of self-confidence showed that there was no significant difference between the two imagery exercises applied (Sig. > 0.05). However, the results of shooting skills in futsal will be better if internal imagery training is applied for participants with a low self-confidence level. This is proven by the average A1B2 (27.36) > A2B2 (26.91). The application of external imagery uses tools in the form of video media, so that participants can correct directly how to carry out the correct movement, and replay the video if there are still errors in the movement. Meanwhile, the application of internal imagery depends on the individual's concentration and imagination, where each person has a different concentration level. Apart from that, internal imagery for amateur athletes still requires direction and assistance from coaches in order to be able to create images of movements that exist in their memory or imagination. Finally, the analysis of the differences between each treatment group is expected to provide benefits in implementing appropriate imagery training based on the level of self-confidence, of coaches, athletes and futsal practitioners. Future research is needed with a wider number of participants.

Conflict of interest- The authors declare no potential conflicts of interest.

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