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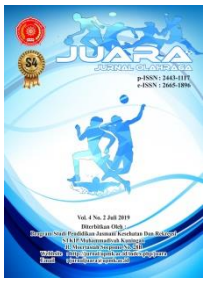

Shooting Athlete Mental Training

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Abstract

This study aims to determine the effect of meditation practice and internal imagery on the concentration and shooting accuracy of the 10-meter category in the Perbakin Bantul branch. The research method was experimental with a two-group pretest-posttests design. The population investigated 16 athletes using the purposive sampling technique so that the sample became 12 athletes. The research instrument used the Grid Concentration Exercise to measure concentration and measurement of firing accuracy using ISSF standard target targets. The data analysis technique used was paired t-test and independent t-test. The results showed an effect of training between autogenic meditation and internal images on concentration and shooting accuracy. When viewed from the percentage increase, the meditation practice method showed better results than internal imagery, while internal imagery training showed better results in increasing concentration.

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INTRODUCTION

The sport of shooting, starting to be favored by young and old alike in Indonesia, consists of several contested numbers. The International Shooting Sport Federation has recorded 20 acclaimed events in rifles, pistols, and shotguns. The rifle category that is often contested is the 10-meter air rifle category (ISSF, 2020). Apart from being practical in the rifle's operation, the shooting sport of the PCP 10-range rifle does not take much place in its competition.

Air rifles, in general, are weapons that use a pneumatic principle that fires bullets using air power or a specific type of compressed gas. Air rifles are usually used for sports and hunting small animals such as rabbits, birds, squirrels, and wild boar. The

size of the bullets used is typically the size of the caliber. 177 or 4.5 mm and 5.5 mm and made of tin (Kosasih et al., 2017).

The PCP air gun itself stands for Pre-Charged Pneumatic, which can store gas and be fired several times in one gas filling. The 10-meter PCP rifle number itself uses a target in the form of a paper target that has been assigned numbers that will be immediately visible on the subject. The state of the weapon is stable, and the shooter's posture affects the accuracy of the shot (Kayihan et al., 2013). Sharp eyesight also significantly affects the level of accuracy in shooting (Jamara et al., 2008). The closer to the center of the target in the form of paper, the better the value of the shot will be. So, in this type of sport, it is essential if someone has a good concentration mentality.

The term that describes mental training for athletes in competitions or competitions includes visualization, mental rehearsal, imagery, meditation, and mental practice, which are in principle the same (Komarudin, 2013). In principle, these mental exercises can affect the athlete's mental condition to become stronger (M. Singh, 2017). In an individual approach, such as cognitive training, it is helpful in more profound intervening abilities for a shooter to make adequate target accuracy even better (Calmeiro & Tenenbaum, 2007). Shooting sport itself requires a high mental state during shooting competitions which will affect the gaze in aligning the rifle to the target, which is related to shooting accuracy (Laaksonen et al., 2011).

Researchers' observations during training for shooting athletes at the shooting range of the Perbakin Bantul Branch Management (Pengcab), located in Sumuran Village, Palbapang District, Bantul Regency, showed that the trainer did not maximize training through psychological (mental) studies. The trainer only provides training in technique, tactics, and physicality to shooting athletes so that the activity is monotonous. Even though it is clear, shooting athletes need high concentration in aiming at the target so that the shot is right on target. It would be nice if the coach maximizes psychological training to optimize their performance in competition.

A similar previous study was a study from (Candau et al., 2003), which demonstrated a significantly improved shooting performance in biathlon. Biathlon itself is a mixed sport between ice skiing and shooting, which is different from this research which focuses on shooting skills only. Meanwhile, another similar study, conducted by (Wibowo & Rahayu, 2016), examines imagery's mental training on the results of rifle shots, which shows that the exercise will affect shooting performance. This study has one independent variable with one simple dependent variable with the one group pretest-posttest method only.

This study aimed to determine the effect of mental training on the concentration

and shooting accuracy of the 10-meter athletes in the Perbakin Bantul branch.

The importance of this research is that there are very few researchers who research the sport of shooting in Indonesia. So as an excellent first step for the sport of shooting, researchers will examine how efforts to increase the accuracy of shooting results cannot be separated from the athletes' concentration. Efforts to investigate mental training on concentration and shooting accuracy are using autogenic cognitive meditation training with internal imagery.

Autogenic meditation is a superior mental training method that trainers often apply for mental endurance, which will affect body functions such as heart rate, blood pressure, breathing (Singh et al., 2018) (Yagi & Sakairi, 2009) (Siswantoyo et al. ., 2008). Meditation is a serious effort to concentrate concentration on an object (Prayitno, 2014). Meditation can also be a relaxation for stress reduction, mood disorders, anxiety, and depression (Sack, 2003). Separately, meditation affects conditions and moods (Zeidan et al., 2010).

Autogenic meditation practice is quite simple, but what needs to be emphasized is to feel the body's state that will control the body's functions such as heart rate, blood pressure, respiration, and others.

Internal imagery also has an advantage, namely, in the process, it is a type of complete relaxation, which means that it involves sight and touch, balance, taste, and smell (Nurjanah et al., 2018). The main emphasis in imagery training, athletes, and understanding of skills and how and how the movement patterns will be carried out in fundamental skills (Risti Nurfadila, 2016). Imagery can also increase concentration (Weinberg & Gould, 2011) (Haghkhah et al., 2014).

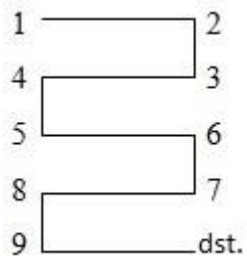
The way to train it is pretty simple, namely the athlete imagines about the field's conditions, about the shooting technique from the start to the moment of pulling the trigger, then the impact so that it hits the target successfully.

METHODS

This type of research is experimental research. The method used in this research is the two-group pretest and posttest design methods (Ramadan & Juniarti, 2020). The subjects in this study were shooting athletes who took part in the training at the Bantul branch (Pengcab) category of 10 meters PCP rifles with 16 athletes.

Sampling in this study used purposive sampling technique with the consideration of being willing to take part in the treatment session, aged 16 years and over, participating in active training for at least six months, so that the sample became 12 athletes who were then divided into two groups using Ordinal Pairing, each group consisting of 6 athletes namely Group A (Autogenic) and Group B (Imagery).

Gambar 1. Teknik *Ordinal Pairing*



Both groups were given treatment four times a week with a duration of ten minutes during the training session with a total number of sixteen treatments. In group A (autogenic), the material provided includes relaxation in a sitting position, focusing on breathing, being aware of heartbeats, feeling warm and cold in the limbs. Group B (Imagery) includes: imagining the field's situation, imagining the rifle being held, imagining aiming at the target, pulling the trigger, hitting the target.

The research instrument to measure the concentration of shooting athletes uses the instrument method or measuring instrument of the Grid Concentration Exercise module, a measuring tool to determine the level of attention using numbers according to Harris & Harris (Komarudin, 2013).

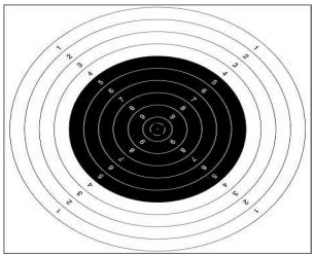
The Grid Concentration Exercise is a measuring tool that is considered adequate, efficient, and economical in measuring shooters' concentration. This measurement can also train reaction speed because the Grid Concentration Exercise requires filling out the sheet in a limited time.

The target assessment criteria use a paper target board with a standard of 10 meters (ISSF, 2013) at several shooting positions.

Figure 2. Grid Concentration Exercise

84	27	51	97	78	13	100	85	55	59
33	52	04	60	92	61	31	57	28	29
18	49	70	86	89	77	39	65	96	32
63	03	12	73	19	25	21	23	37	16
81	88	46	01	95	98	71	87	97	76
24	09	50	83	64	08	38	30	36	45
40	20	66	41	15	26	75	99	68	06
34	48	62	82	42	89	47	35	17	10
56	69	94	72	07	43	93	11	67	44
53	79	05	22	74	54	58	14	02	91

Figure 3. Target Target Shoot



Equipment/facilities: ISSF standard target drawing sheet, PCP rifle complete with 4.5 mm caliber bullets, pens, notepaper, 10 meters and 5 meters shooting distance for athletes.

Implementation: The athlete shoots the target board with a distance of 10 m which is shot using an air rifle in a standing firing position and is allowed to fire five bullets.

The pre-test was carried out to determine the initial data from the research subjects regarding the accuracy of shooting and each sample's concentration level. The final test (post-test) is carried out the same as the initial test, namely with each athlete's sample's concentration level and shooting accuracy. The purpose of the final examination (post-test) is to determine the difference in the concentration level score and the shooting accuracy of the athletes.

Data analysis techniques in testing this study's hypothesis using IBM SPSS 22 with descriptive analysis, normality test, homogeneity test, and hypothesis testing using Paired T-Test and Independent t-test.

FINDINGS AND DISCUSSION

Findings

This study provides results in the form of data which is an overview of each variable in the study. The following are the results of the pretest and posttest which are packaged in summary statistics.

Table 1. Statistical Description

Statistik	Concentration			
	Otogenik (A)		*Imagery* (B)	
	Pretest	*Posttest*	*Pretest*	*Posttest*
Mean	13,33	15,17	21,17	25,50
Std. Deviasi	3,559	2,994	5,981	5,958
Maks	20	21	28	32
Min	10	13	11	15

Statistik	Shoot Accuracy			
	Otogenik (A)		*Imagery* (B)	
	Pretest	*Posttest*	*Pretest*	*Posttest*
Mean	22,67	26,50	13,33	15,50
Std. Deviasi	7,763	7,503	4,676	4,593
Maks	37	41	22	24
Min	14	20	9	12

The results of statistical descriptions show that the measurement of concentration which has a sample of 6 in group A (autogenic), has a mean pretest of 13.33 and post-test of 15.17, the standard deviation of pretest 3.559 and post-test 2.994, maximum pretest value of 20 and maximum post-test value of 21, minimum value pretest 10 and post-test 13. Then in group B (Imagery) has a mean pretest of 21.17, and post-test has a mean of 25.50, a standard deviation of the pretest is 5.981 and post-test is 5.958, a maximum value of pretest is 28, and the maximum value is post-test 32, a minimum value of pretest is 11 and post-test 15.

Measurement of shooting accuracy points which has a sample of 6 in group A (autogenic), has a mean pretest of 22.67 and post-test of 26.50, a standard deviation of pretest and post-test 7.503, a maximum value of pretest 37, and a maximum value of post-test 41, minimum pretest value of 14 and post-test 20. Then in group B (Imagery) has a mean pretest of 13.33 and post-test having a mean of 15.50, standard deviation pretest 4.676 and post-test 4.593, maximum pretest score 22 and maximum post-test 24, minimum pretest score 9 and post-test 12.

The normality test results use the Kolmogorov-Smirnov test to determine whether the data is normally distributed or not. The data is said to be normal if the Sig. (2-tailed) is greater than 0.05 or (Sig.> 0.05). While the data that is not normally distributed is if the value is Sig. (2-tailed) is smaller than 0.05 or (Sig. <0.05). The data from this study indicate that this study is normally distributed because it shows the Sig. (2-tailed) is greater than 0.05 or (Sig.> 0.05).

Table 2. Homogeneity Test

Data	Sig. (2-tailed)	Sig	Ket.
Concentration	0,241	0,05	Homogen
Shoot Accuracy	0,500	0,05	Homogen

The results of the homogeneity test were carried out to determine whether the data in the study were homogeneous or not. The data is homogeneous, that is if the Sig. (2-tailed) is greater than 0.05 or (Sig.> 0.05). Meanwhile, the data is not homogeneous, that is if the Sig. (2-tailed) is smaller than 0.05 or (Sig. <0.05). The data from this study indicate that this study is homogeneous because it shows the Sig. (2-tailed) is greater than 0.05 or (Sig.> 0.05).

Table 3. Paired T-Test

Data	Kelompok	SD	Mean	Sig. (2-tailed)
Concentration	A	0,753	1,833	0,00
	B	1,033	4,333	0,00
Shoot Accuracy	A	1,329	3,833	0,00
	B	0,753	2,167	0,00

The hypothesis testing results indicate that the first hypothesis in this study is that there are differences in the effect of autogenic and imagery meditation exercises on concentration. The second hypothesis in this study is that there is no difference in the impact of autogenic meditation practice and imagery on engagement.

Based on the results of statistical testing, it was found that the Sig. (2-tailed) 0.00 <0.05, which means that there are differences in the effect of training on concentration.

The third hypothesis in this study is that there are differences in the effect of autogenic and imagery meditation training on shooting accuracy. The fourth hypothesis in this study is that there is no difference in the impact of autogenic meditation training and imagery on shooting accuracy.

Based on the results of statistical testing, it was found that the Sig. (2-tailed) 0.00 <0.05, which means that there are differences in the effect of training on shooting accuracy

Table 4. Independent t-test

Independent Samples T-test		
		Sig. (2-tailed)
Concentration Results	Posttest	0,04
Shoot Accuracy Results	Posttest	0,12

The results of the Independent t-test reveal that the Sig. (2-tailed) at a concentration of 0.04, there is a significant difference in autogenic and imagery meditation exercises because it is 0.04 <0.05. Meanwhile, the shooting accuracy has a Sig value. (2-tailed) 0.12, which means autogenic meditation practice and imagery, there is no significant difference because 0.12> 0.05.

The mean increase in each treatment to the concentration, namely group A (autogenic), was 13.8%, while group B (Imagery) was 20.45%. Likewise, for group A (autogenic) for shooting accuracy, it was 16.89%, while group B (Imagery) was 16.28%.

Discussion

This study's discussion provides a further interpretation of the results of the analysis that have been stated. Based on the testing of the hypothesis, it resulted in six groups of analysis conclusions, namely:

Effect of Autogenic Meditation Exercises on Concentration. The findings from the results of the study's statistical analysis suggest that with autogenic meditation training, shooting athletes who took part in training at the Bantul Branch Management (Pengcab) category of 10 meters PCP rifles with a total of 12 athletes had an average concentration increased by 13.8%.

This finding is in line with research that reveals that autogenic exercise can reduce anxiety so that the experimental group still feels focused on what is being done (Istianah & Hendarsih, 2016). Meanwhile, meditation practice will have the maximum chosen

concentration effect (Lutz et al., 2008). Other studies have also shown that autogenic meditation practice will improve concentration's cognitive aspects (Wagener, 2013).

This study's findings have a good impact in concentrating the concentration of athletes shooting 10-meter air rifles at the Bantul Branch Management (Pengcab). Although the effect is not as significant as for the Imagery (B) group, it is also possible to add references to variations of mental training types by shooting trainers.

The Effect of Internal Imagery Exercise on Concentration. The findings from the study's statistical analysis suggest that with internal imagery training, shooting athletes who took part in training at the Bantul Branch Management (Pengcab) category of 10 meters PCP rifles with a total of 12 athletes had an average concentration increased by 20.45%.

This finding is in line with research that reveals that Imagery exercise affects improving mental conditions (Weinberg, 2008). Imagery is a good application that will also enhance memory conditions to focus on goals (Herholz et al., 2012). Case studies on imagery reveal that imagery can foster new insights into mental disorders (Ganis, 2012).

The findings in this study can corroborate various kinds of conclusions from other studies apart from sports science. The imagery contained in this study is included in the internal imagery, which in the end has a more significant impact than the autogenic meditation group (A) on the concentration of athletes shooting a 10-meter air rifle at the Bantul Branch Management (Pengcab).

Effect of Autogenic Meditation Exercises on Shooting Accuracy. The findings from the results of the statistical analysis of the study revealed that with autogenic meditation training, shooting athletes who took part in training at the Bantul Branch Management (Pengcab) category of 10 meters PCP rifles with a total of 12 athletes had an average shooting accuracy which increased by 16.89%.

This study's findings are also in line with the results of a survey that revealed that autogenic relaxation exercises significantly increased the ability to shoot (Candau et al., 2003). Autogenic meditation exercises can also help athletes concentrate on growing their respective sports accuracy (Kerkez et al., 2012). Research from another sport, namely arrow sports, concluded that meditation could improve relaxation, focus, and optimal feedback levels in elite training (Lee, 2009).

The findings in this study can corroborate findings from other studies. Autogenic meditation in this study, in the end, has a more significant impact than the imagery group (B) on the concentration of athletes shooting 10-meter air rifles at the Bantul Branch Management (Pengcab), although not too far away.

The Effect of Internal Imagery Training on Shooting Accuracy. The findings from the results of the statistical analysis of the study suggest that with internal imagery training, shooting athletes who took part in training at

the Bantul Branch Management (Pengcab) category of 10 meters PCP rifles with a total of 12 athletes had an average shooting accuracy that increased by 16.28%.

This is in line with research on the effect of imagery on shooting accuracy, which increases athletes' shooting accuracy (Wibowo & Rahayu, 2016). The imagery itself is a reference for some sportsmen in improving their performance (Omar-Fauzee et al., 2009). Imagery in archery research, which is similar to shooting, has a role in causing significant technical skill changes (Tursi & Napolitano, 2014).

These are the findings of researchers that corroborate the results of previous studies on their effect on accuracy, although, in this study, the impact of imagery is less likely than the autogenic group (A) on the concentration of athletes shooting a 10-meter air rifle at the Branch Management (Pengcab) Bantul.

The Difference of the Effect of Otogenic and Internal Imagery Meditation on Concentration. The findings from the Independent t-test are Sig. (2. Tailed) autogenic meditation practice and internal imagery on the concentration of 0.04. These results prove that both groups have a Sig value. <0.05, which means a significant difference between autogenic meditation practice and internal imagery on the concentration of athletes shooting 10-meter air rifles at the Bantul Branch Management (Pengcab).

This is reasonable because the two exercises have different objectives towards the concentration of athletes shooting 10 meters air rifles at the Bantul Branch Management (Pengcab). For autogenic meditation, it focuses more on the body's physiological state, while internal imagery focuses more on the competition, which is more focused. The difference in the mean difference between the two treatments is that autogenic meditation treatment gets pretest = 13.33 and posttest = 15.17, while the internal imagery treatment gets a mean pretest = 21.17 and posttest = 25.50 results.

Based on these results, it can be compared the difference in influence in another way, namely the difference between the increase in the two treatments, the mean difference of autogenic meditation treatment pretest = 13.33 and posttest = 15.17 is 1.84 with a percentage increase of 13.8%, while in The mean difference of pretest Imagery treatment = 21.17 and posttest = 25.50 is 4.33 with a percentage of 20.45%. This study proves that internal imagery training has a more significant increase than autogenic meditation in increasing athletes' concentration of shooting 10-meter air rifles at the Bantul Branch Management (Pengcab).

The Difference of the Effect of Otogenic and Internal Imagery Meditation on Shooting Accuracy. The findings from the Independent t-test are Sig. (2. Tailed) autogenic meditation exercise and internal imagery on shooting accuracy, namely 0.12. These results prove that both groups have a Sig value. > 0.05, and it means that there is no significant difference between autogenic

meditation exercises and internal imagery on the shooting accuracy of the athletes shooting the 10-meter air rifle at the Bantul Branch Management (Pengcab).

This is quite reasonable, too, because the two exercises have the same characteristics in influencing the athlete's body's physiological state, shooting the 10-meter air rifle at the Bantul Branch Management (Pengcab). For autogenic meditation, the advantage is that it focuses attention on the body's physiological state so that this treatment will minimize the vibrations in the body caused by blood vessels and breathing so that the eye is straight towards the target gun is not disturbed. Meanwhile, internal imagery can be better prepared to face the surrounding environment and mature techniques because it has been recorded in memory. However, there is a difference in the mean difference between the two treatments, namely autogenic meditation treatment gets pretest = 22.67 and posttest = 26.50, while internal imagery treatment gets a mean pretest = 13.33 and posttest = 15.50.

Based on these results, can be compared the difference in influence in another way. The difference between the increase in the two treatments, the mean difference between the pretest autogenic meditation treatment = 22.67 and posttest = 26.50, namely 3.83 with a percentage increase of 16.89%, while in The mean difference of pretest Imagery treatment = 13.33 and posttest = 15.50 is 2.17 with a percentage of 16.28%. So this study proves that autogenic meditation exercises have a more significant increase than internal imagery in increasing the shooting accuracy of athletes shooting 10-meter air rifles at the Bantul Branch Management (Pengcab) even though the range is small.

CONCLUSION

Based on this study's findings, the conclusion is that there is a significant effect of autogenic meditation training and internal imagery on the concentration of athletes shooting a 10-meter air rifle at the Bantul Branch Management (Pengcab). There is a significant effect of autogenic meditation training and internal imagery on the shooting accuracy of the athletes shooting the 10-meter air rifle at the Bantul Branch Management (Pengcab). There is a significant difference between autogenic meditation training and internal imagery on athletes' concentration shooting 10-meter air rifles at the Bantul Branch Management (Pengcab). There is no significant difference between autogenic meditation training and internal imagery on the shooting accuracy of the athletes shooting the 10-meter air rifle at the Bantul Branch Management (Pengcab). However, this study proves that autogenic meditation is better at improving shooting accuracy than internal imagery. On the other hand, for increasing concentration, internal imagery is better than autogenic meditation. This can be a reference for coaches in choosing the type of mental exercise that is good for a purpose.

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