

Examination of the Effects of Autogenic Training on the Reaction Time Performance of the National Badminton Athletes

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ABSTRACT

Background: Although there is a consensus among researchers that autogenic training has positive effects on the psychological state of athletes, there have not been enough studies on its effects on physical performance yet. Therefore, the effects of autogenic training on physical performance is an important question that remains to be clarified. The fact that there is no research examining the effects of autogenic training on reaction time performance constitutes the original value of the study.

Aim: The aim of the study is to examine the effects of autogenic training applied during 8 weeks on the visual and auditory reaction time performances of national badminton athletes.

Methods: 15 male (experimental group=8 and control group=7) national badminton player between the ages of 18-23 residing in the province of Malatya participated in the study voluntarily. In addition to the training program, autogenic training was applied to the experimental group for 8 weeks, 3 days a week, after warming up. The control group continued their regular training. In order to determine the effects of the training, the pre-test and post-test was applied to the participants. SPSS 23 Package Program was used for the analysis of the data. The data were evaluated with the Mann-Whitney U test, one of the Non-Parametric tests. The significance level was taken as $p < .05$.

Results: The mean age of the experimental group (N=8) was 19.88 ± 1.81 , the mean height was 173.75 ± 4.10 , and the mean body weight was 68.13 ± 5.52 . The mean age of the control group (N=7) was 19.72 ± 1.80 , the mean height was 175.72 ± 7.87 , and the mean body weight was 67.58 ± 6.61 . It was observed that there was no statistically significant difference between the right and left hand visual reaction times and the right and left hand auditory reaction times of the experimental and control groups ($p > .05$).

Conclusion: As a result, autogenic training does not have a statistically significant effect on the visual and auditory reaction time of national badminton athletes.

Keywords: Autogenic training, badminton, reaction time

INTRODUCTION

Badminton, which is one of the popular racket sports today, requires a fast reaction time because it is played with a high-speed ball in a short and narrow area¹. Reaction time is defined as the amount of time it takes to respond to a sudden stimulus².

Reaction time is a determining factor in many sports. Studies conducted for many years have revealed that physical training can shorten the reaction time³⁻⁸. However, Bicer and Aysan (2008) and Espen et al. (2013) reported that it would be beneficial to use mental methods as well as physical methods in the field in order to optimize the reaction time^{9,10}. Mental training methods; It consists of various imagery, breathing, meditation, focusing, concentration techniques and autogenic practices^{11,12}.

Autogenic training is a method applied by creating a feeling of relaxation from the mind to the muscles. This method, which is carried out in an environment that is not affected by external factors such as light and noise¹³, consists of six trainings, such as weight feeling training, warmth sensation training, heart training, breathing training, abdominal region training and head training¹⁴. When the literature is examined, it is seen that autogenic training is mostly psychological¹⁵⁻²¹ and its physiological effects²²⁻²⁷ has been investigated. However, a limited number of studies have been found examining the effects of autogenic training on physical performance parameters^{28,29}. In this context, it is important to determine the effects of autogenic

training on physical performance.

Aim of the study: This study aims to examine the effects of autogenic training applied during 8 weeks on the visual and auditory reaction time performances of national badminton athletes.

MATERIAL AND METHODS

Participants: National badminton players aged 18-23 (15=male) residing in Malatya participated in the study voluntarily. Participants were divided into two groups as experimental group (n=8) and control group (n=7). In studies on reaction time, it has been observed that training plans are generally made for 8 weeks and 3 days a week^{30,31}. Therefore the autogenic training was applied to the experimental group for 8 weeks, 3 days a week. The control group continued their regular training. Participants were given detailed information about the training program and tests, and a voluntary consent form was signed.

Measurements: Measurements and Tests: The validity and reliability of the participant's body weight was measured using the Tanita-BC 418 MA brand device made by Kelly and Metcalfe (2012)³². The height of the participants was measured in centimeters.

Reaction time measurements were taken in a noise-free environment between 09.30 and 11:00 in the morning. The results were recorded on the forms prepared for each athlete. Participants were seated in a chair and their hands

Table 1. Autogenic Training Application

Exercises	Six standard sentences	Duration
Weight feeling exercises	My hands, feet and torso are heavy	1 min
Warmth feeling exercises	My hands, feet and torso are warm	1 min
Heart exercises	My heartbeat is calm and regular	1 min
Breathing exercises	My breath is deep and relaxed	1 min
Abdominal exercises	My stomach is warm	1 min
Head exercises	My forehead is cool	1 min

were placed at a distance of 10 cm from the button on the table. When the stimulus (sound or light) was given, the athlete was asked to press the button as soon as possible. Ten applications were made separately for the right and left hands of the participants. The first 5 of each application were recorded as trial time and the last 5 as reaction time.

Autogenic Training Protocol: Autogenic training is a method applied by creating a feeling of relaxation from the mind to the muscles¹³. The implementation takes place by repeating six standard sentences in a quiet environment and comfortable body position¹⁴. Autogenic training was applied to the experimental group in accordance with the protocol.

In addition to the training programs, 3 days a week for 8 weeks, autogenic training was applied to the experimental group after the warm-up phase. The control group, on the other hand, continued their regular training.

The autogenic training application applied to the experimental group is given in Table 1.

Statistical Analysis: Analysis of the data was done in SPSS 23 Package Program. The Kolmogorov-Smirnov test was used to determine whether the data were normally distributed or not. Data that did not show normal distribution were evaluated with the Mann-Whitney U test, one of the Non-Parametric tests. The significance level was taken as $p < .05$.

RESULTS

The findings of the experimental and control groups are given in tables below.

Table 1: Average Values of Participant's Age, Height, and Body Weight Variables

Variables	Experimental Group		Control Group	
	Mean	SD	Mean	SD
Age	19,88	1,81	19,72	1,80
Height	173,75	4,10	175,72	7,87
Body Weight	68,13	5,52	67,58	6,61

Table 2: Participants' Right Hand Visual Reaction Time

Grup	N	Mean Rank	Sum of Ranks	U	p
Experimental Group	8	6,75	54	18	,21
Control Group	7	9,43	66		

In Table 1, the mean age of the experimental group (N=8) was 19.88 ± 1.81 , the mean height was 173.75 ± 4.10 , and the mean body weight was 68.13 ± 5.52 . The mean age of the control group (N=7) was 19.72 ± 1.80 , the mean height was 175.72 ± 7.87 , and the mean body weight was

67.58 ± 6.61 .

According to Table 2, the mean rank value of the experimental group is 6.75 and the sum of ranks value is 54. The mean rank value of the control group is 9.43 and the sum of ranks value is 66. It was observed that there was no statistically significant difference between the righthand visual reaction time of the experimental and control groups ($U=18, p > .05$). Accordingly, it can be said that autogenic training has no effect on the right hand visual reaction time of national badminton athletes.

Table 3: Left Hand Visual Reaction Time of Participants

Grup	N	Mean Rank	Sum of Ranks	U	p
Experimental Group	8	7,81	62,50	26,50	,85
Control Group	7	8,21	57,50		

Table 4: Right Hand Auditory Reaction Time of Participants

Grup	N	Mean Rank	Sum of Ranks	U	p
Experimental Group	8	8,56	68,50	23,50	,59
Control Group	7	7,36	51,50		

According to Table 3, the mean rank value of the experimental group is 7.81 and the sum of ranks value is 62.50. The mean rank value of the control group is 8.21 and the sum of ranks value is 57.50. It was observed that there was no statistically significant difference between the left hand visual reaction time of the experimental and control groups ($U=26.50, p > .05$). Accordingly, it can be said that autogenic training has no effect on left hand visual reaction time of national badminton athletes.

According to Table 4, the mean rank value of the experimental group is 8.56 and the sum of ranks value is 68.50. The mean rank value of the control group is 7.36 and the sum of ranks value is 51.50. It was observed that there was no statistically significant difference between the right hand auditory reaction time of the experimental and control groups ($U=23.50, p > .05$). Accordingly, it can be said that autogenic training has no effect on the right hand auditory reaction time of national badminton athletes.

Table 5: Left Hand Auditory Reaction Time of Participants

Grup	N	Mean Rank	Sum of Ranks	U	p
Experimental Group	8	7,56	60,50	24,50	,68
Control Group	7	8,50	59,50		

According to Table 5, the mean rank value of the experimental group is 7.56 and the sum of ranks value is 60.50. The mean rank value of the control group is 8.50 and the sum of ranks value is 59.50. It was observed that there was no statistically significant difference between the left hand auditory reaction time of the experimental and control groups ($U=24.50, p > .05$). Accordingly, it can be said that autogenic training has no effect on the left hand auditory reaction time of national badminton athletes.

DISCUSSION

In badminton, the athlete is expected to respond accurately and quickly according to the angle of arrival of the ball. In addition, the unique trajectory of the ball increases the importance of reaction time. In this context, it is expected that the reaction time performances of badminton athletes during the competition will be as fast as possible³⁰.

Mental training is important in order to achieve high

performance in various sports branches³⁴. In this study, the mental training methods, reaction time performances of badminton athletes, and the effects of autogenic training on visual and auditory reaction times were determined.

Autogenic training has no statistically significant effect on right-hand and left-hand visual reaction time performances of national badminton athletes ($p > .05$). When the literature was examined, no study was found that directly examined the effects of autogenic training practices on reaction time. Therefore, studies examining the effects of autogenic and other mental training practices on the physical and psychological conditions of athletes have been mentioned.

Colakoglu et al. (1993) reported that the use of mental methods would be beneficial in maximizing the reaction time as a result of their study³. When the literature is examined, very few studies have been found that examine the effects of autogenic training on the physical performance of athletes³. Gros Lambert et al. (2003) reported that autogenic training practices had a positive effect on the shooting performance of biathlon athletes³⁵.

Nambinarayanan et al. (1992) found that relaxation-based yoga practices such as autogenic training shortened the reaction time³⁶. Kulak et al. (2011) applied a training program consisting of autogenic training, visualization and regular breathing exercises together with physical training in football players aged 10-12²⁸. Tonnessen et al. (2013) reported that mental training can affect the start line performance of sprinters⁵. In addition, Gros Lambert et al. (2003) and Linden (2007) reported that autogenic training can increase body control, postural control and concentration. There are various studies examining the effects of autogenic training on the psychological state of athletes in addition to these studies^{35,37}.

Hashim et al (2011) found that autogenic training positively affects mental states such as depression, burnout, and tension in young football players³⁸. Singh et al. (2018) investigated the effects of autogenic training and progressive muscle relaxation technique on mental skills, and revealed that both techniques are effective in increasing concentration ability³⁸. In studies conducted on different groups; it has been reported that autogenic training reduces the level of anxiety^{20,40-43}. In the light of this information, although there is a consensus that autogenic training has positive effects on the psychological state of athletes, more studies are needed because there is not enough study on its effects on physical performance.

CONCLUSION

As a result, autogenic training does not have a statistically significant effect on the visual and auditory reaction time of national badminton players.

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