

## Comparison of Some Coordinative Abilities in Terms of Team and Individual Sports

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### Abstract

The purpose of this research is to compare some coordinative abilities in terms of team and individual sports. A total of 112 athletes were included in the research, of which 60 athletes were from individual sports (Athletics=20, Archery=20, Karate=20) with mean age of  $15.02 \pm 0.813$  years, mean body height of  $1.64 \pm 0.88$  meters and mean body weight of  $54.80 \pm 11.196$  kilograms and 52 athletes were from team sports (Football Player=32, Basketball Player=20) with mean age of  $14.98 \pm 0.727$  years, mean body height of  $1.67 \pm 0.90$  meters and mean body weight of  $58.10 \pm 9.770$  kilograms. Numbered medicine ball run test, backward medicine ball throw test and sprint at the given rhythm test were used to evaluate performances related to coordinative abilities. When our results are examined, it is seen that averages of the participants in team sports category in terms of rhythm, orientation and differentiation abilities are at better level than averages of the participants in individual sports category. It has been seen that individuals in team sports category have significantly better performance than athletes in individual sports in terms of their orientation and differentiation abilities. On the other hand, no significant difference was found for rhythm ability. Consequently, results of the study confirm our pre-research expectations. On the other hand, when literature is examined, it is significant that results obtained from other studies examining coordinative abilities of the athletes in individual sports and team sports categories are similar to our results. It has been seen in the studies in the literature that some results are not similar. It can be thought that different results are caused by age differences and differences in types and branches of sports in which athletes participate.

**Keywords:** coordinative abilities, team sports, individual sports, differentiation, orientation, rhythm

### 1. Introduction

A successful performance for sports branches can only be achieved with a carefully planned and applied training method based on scientific grounds methodically and theoretically. Nowadays, there are new developments in sports branches at the international level. Increase in the speed of the game, tougher tackling and tactical developments are some of them especially in team sports. All technical, tactical and conditional performance components need to be trained and practiced for highly advanced performance (Minz, 2003).

In addition to these performance components, another factor called coordinative abilities is important for successful performance. Coordinative abilities are of vital importance for a movement or a few successive movements to be performed in a more effective and quality manner. Coordinative skills need to be well developed for various situations such as learning skills fast, preservation of skills learned and benefiting from technical and tactical skills at maximum level (Singh, 1991). Effects of coordinative abilities on sports branches also vary. Showing maximal performance in a short time, exhibiting frequent movements successively in moments requiring power and explosiveness, teaching technique in sports requiring advanced technical capacity and making it permanent are related to development level of coordinative abilities in sports requiring high strength (Minz, 2003). In addition to performance development, coordinative abilities play an important role in demonstration of tactical skills in situations showing changes constantly in team sports (Kalb, 1989).

It is known that physical, physiological and motoric performance components differ in team sports and individual sports. It is stated that development level of different coordinative abilities is important in application of different movement techniques, creation of some motoric performance elements, demonstration of technical and tactical skills in different situations during sportive performance. When literature has been examined, it has been seen that coordinative abilities

are compared between two different individual sports branches and between two different team sports however, there was no comparison between individual and team sports. Therefore, purpose of this research is to compare some coordinative abilities in terms of team and individual sports. During competitions related to team sports, players encounter some actions more when compared to individual sports, these are; situations such as adapting to conditions changing constantly in the game, perceiving position of teammate, opponent player and ball and where they are in the field of play and making decision accordingly, being balanced and fastmoving. When these situations are considered, it is thought that athletes in team sports should have more advanced coordinative abilities and therefore, results of the research are expected to differ in favor of team sports.

## 2. Method

### Participants

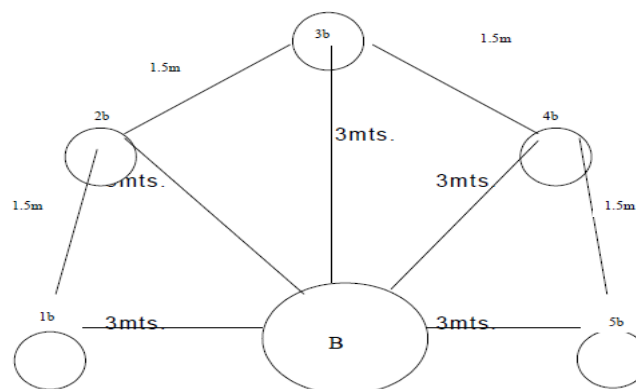
A total of 112 athletes were included in the research, of which 60 athletes were from individual sports (Athletics=20, Archery=20, Karate=20) with mean age of  $15.02 \pm 0.813$  years, mean body height of  $1.64 \pm 0.88$  meters and mean body weight of  $54.80 \pm 11.196$  kilograms and 52 athletes were from team sports (Football Player=32, Basketball Player=20) with mean age of  $14.98 \pm 0.727$  years, mean body height of  $1.67 \pm 0.90$  meters and mean body weight of  $58.10 \pm 9.770$  kilograms by taking consent of their families. All risks and benefits related to the research were explained to the parents of the athletes and they were asked to sign the university approved voluntary consent form.

### Measurements

Numbered medicine ball run test, backward medicine ball throw test and sprint at the given rhythm test were used in order to determine orientation, differentiation and rhythm performances of research participants related to coordinative abilities.

#### Numbered medicine ball run test

This test is used to measure orientation ability. As shown in Figure 1, five medicine balls each weighing 3 kg, one medicine ball weighing 4 kg were placed on the ground. Medicine balls were positioned in a way to form pentagon shape. While medicine ball weighing 4 kg was at the center of the base edge, medicine balls weighing 3 kg were placed around the medicine ball weighing 4 kg. While distance between medicine balls weighing 3 kg was 1,5 meters and their distances to medicine ball which was at the center of base edge were adjusted as 3 meters. Before the start of test, the subjects were asked to stand behind the photocell which was put right behind the 6 medicine balls facing towards the opposite direction. On signal, the subject who started the test turned from his/her position, started the test crossing photocell, touched the medicine ball weighing 4 kg in front of him/her and that moment, tester directed him/her to one of the medicine balls weighing 2 kg by calling its number. Subject touched the ball whose number was called and run back to section where medicine ball weighing 4 kg was put, positioned facing towards the opposite direction however, there was no reason to stop crossing photocell. Tester started the test for the second time without allowing the subject to wait and after the subject returned again, he/she touched the ball weighing 4 kg first and then, was directed by tester to one of the numbered balls again. This process was repeated 3 times in a row and for the last repetition, the subject coming to section where medicine ball weighing 4 kg was put at the center completed the test by crossing photocell. Each subject had 1 practice trial and then, the actual test was performed. The time taken to complete the test was noted in seconds. Test was administered to the subjects twice and the better score was recorded (Chib 2000;Minz 2003;Singh 2004).



B – Medicine Ball Weighing 4 Kg.

b – Medicine Ball Weighing 3 Kg.

Figure 1. Numbered medicine ball run test

### Backward Medicine Ball Throw Test

This test is used to measure differentiation ability. A gymnastic mat which is three meters in length and 6 meters in width, was placed 1,5 meters away from the starting line as shown in figure 2. A circle of 40 cm radius was drawn in the middle of the mat and a medicine ball weighing 2 kg was placed in this circle. Subjects were asked to wait behind the starting line facing the opposite direction. Subjects were asked to throw medicine ball weighing 1 kg over their heads to hit the medicine ball which is in the circle by using both hands without looking back. Subjects repeated the test twice after 1 practice trial and the better one was recorded as score.

Scores are kept as follows;

When the ball thrown by the subject touched the mat, 1 point

When the ball thrown by the subject touched the circle line, 2 points

When the ball thrown by the subject fell inside the circle, 3 points

When the ball thrown by the subject hit the other medicine ball in the circle, 4 points.

Sum of all points obtained by throwing 5 balls constituted individual score (Chib 2000;Minz 2003;Singh 2004).

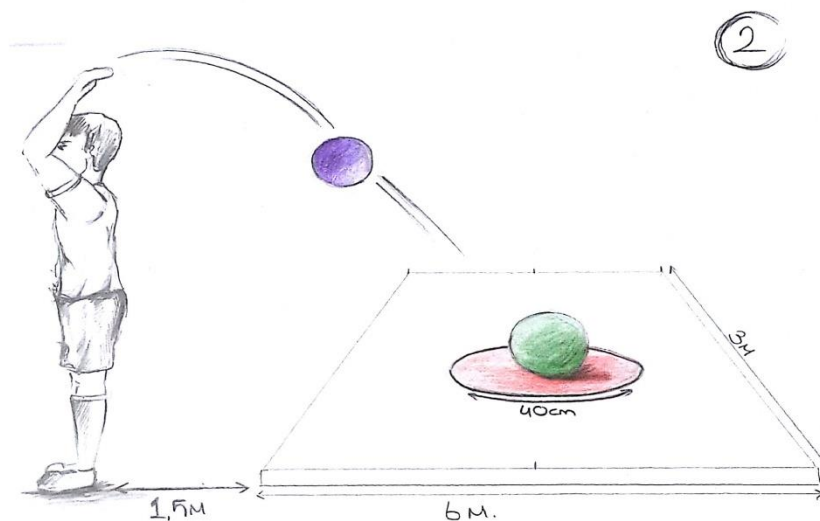


Figure 2. Backward Medicine Ball Throw Test

### Sprint at the Given Rhythm Test

This test is used to measure rhythm ability. 11 gymnastic hoops were placed systematically as shown in figure 3. First 3 hoops were kept in a sequence adjacent to each other at a distance of 5 meters from the starting line. Similarly, the other 3 hoops were placed at a distance of 5 meters from the finishing line. Remaining 5 hoops were placed adjacent to each other in the middle of the running distance. Distance between starting line and finishing line is 30 meters. In addition, two photocells were placed in starting and finishing points of 30-meter line in order to determine time. Test was demonstrated and explained to the subjects before it was administered. Then, subjects ran a distance of 30 meters straight as fast as possible, independent of gymnastic hoops. Subjects ran at a particular rhythm with maximum speed through 11 hoops which were arranged systematically by stepping between each hoop by adjusting the rhythm. Each subject practiced once at first. Then, subjects ran a distance of 30 meters normally twice and ran a distance of 30 meters rhythmically twice. The better score was recorded for each attempt. Difference between first attempt and second attempt was recorded as rhythm score (Chib, 2000;Minz 2003;Singh, 2004).

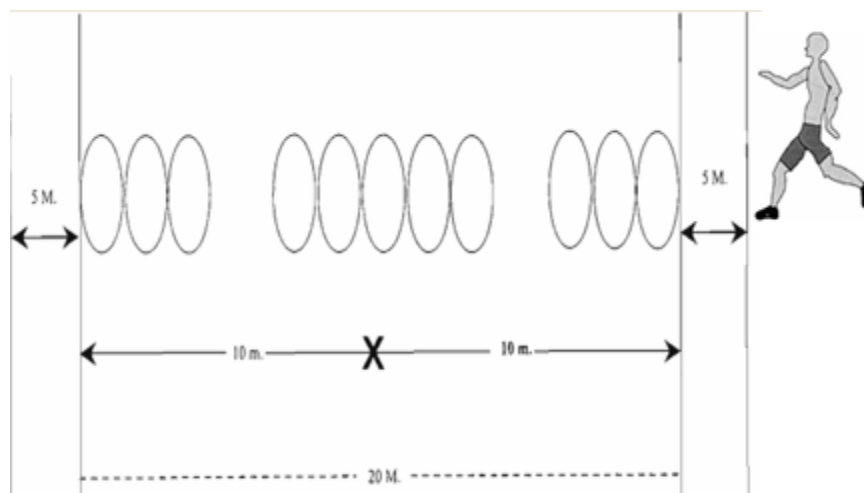


Figure 3. Sprint at the Given Rhythm Test

**Data Analysis**

SPSS 22 program was used to analyze data obtained. Before rhythm periods, orientation periods and differentiation scores of the participants were compared according to type of sports that they engaged in, it was examined whether data distributed normally or not. According to the results of One Sample Kolmogorov-Smirnov test, it was determined that data related to rhythm periods distributed normally and data related to orientation periods and differentiation scores did not distribute normally. For this reason, Independent Samples T test was used to compare data related to the rhythm periods according to type of sports while Mann Whitney U test was used to compare data related to orientation periods and differentiation scores according to type of sports.

**3. Findings**

Table 1. Frequency and Percentage Distributions of Participants Doing Team Sports and Individual Sports

Type of sports	f	%
Team sports	52	46,4
Individual sports	60	53,6
Total	112	100,0

When Table 1. is examined, it is seen that 46,4% of the participants do team sports and 53,6% of them do individual sports.

Table 2. Descriptive Statistics Related to Ages, Body Heights and Body Weights of Participants Doing Team Sports and Individual Sports

Variables	Team sports		Individual sports	
	X	Ss	X	Ss
Age	14,98	,727	15,02	,813
Body height	1,67	,090	1,64	,088
Body weight	58,10	9,770	54,80	11,196

When Table 2. is examined, it is seen that mean age of participants doing team sports is  $14,98 \pm 0,727$ , their mean body height is  $1,67 \pm 0,090$  m and mean body weight is  $58,10 \pm 9,770$  kg, mean age of participants doing individual sports is  $15,02 \pm 0,813$ , their mean body height is  $1,64 \pm 0,088$  m and mean body weight is  $54,80 \pm 11,196$ .

Table 3. Comparison of Rhythm Periods of Participants Doing Team Sports and Individual Sports

Type of sports	N	X	Ss	t	p
Team sports	52	1,47	,630	-1,249	,214
Individual sports	60	1,62	,637		

When Table 3. is examined, it is seen that rhythm periods of the participants doing team sports are at better level than those doing individual sports but rhythm periods of the participants do not differ significantly according to types of sports they do ( $p > 0,05$ ).

Table 4. Comparison of Orientation Periods of Participants Doing Team Sports and Individual Sports

Type of sports	N	X	Ss	Mean rank	Rank sum	U	p
Team sports	52	9,40	2,456	49,87	2593,0	1215,0	,044*
Individual sports	60	10,13	2,191	62,25	3735,0		

When Table 4. is examined, it is seen that orientation periods of the participants doing team sports are at better level than those doing individual sports and orientation periods of the participants differ significantly according to types of sports they do ( $p < 0,05$ ).

Table 5. Comparison of Differentiation Scores of Participants Doing Team Sports and Individual Sports

Type of sports	N	X	Ss	Mean rank	Rank sum	U	P
Team sports	52	12,42	4,174	68,85	3580,0	918,0	,000*
Individual sports	60	9,52	3,202	45,80	2748,0		

When Table 5. is examined, it is seen that differentiation scores of the participants doing team sports are at better level than those doing individual sports and differentiation scores of the participants differ significantly according to types of sports they do ( $p < 0,05$ ).

#### 4. Discussion and Conclusion

When results of the research are examined, it is seen that averages of the participants in team sports category in terms of rhythm, orientation and differentiation abilities are at better level than averages of the participants in individual sports category. It has been seen that individuals in team sports category have significantly better performance than individuals in individual sports category in terms of their orientation and differentiation abilities. On the other hand, no significant difference was found for rhythm ability.

Rhythm ability allows athletes to perceive an externally given rhythm and to reveal it during an action. In addition to this, athletes can reproduce a rhythm which is in the motor memory due to their rhythm abilities (Minz 2003).

Orientation is defined as ability to detect changing movement and position of the body in time and space related to movement to be performed. In other words, it is ability to identify position of the whole body or a part of the body, positions of teammate, opponent player, ball and field of play in regard to gravity (Holmann 1980).

Differentiation is based on voluntary and clear difference between space and time variables influenced by movement process that exists in athletes' minds. Differentiation ability allows athletes to perceive the finest details about direction, time, spatial dimension and dynamism related to movement while performing the movement (Minz 2003).

We especially chose different sports with different characteristics to categorize branches as individuals sports and team sports. Team sports have a structure that requires adaptation to everchanging conditions in the game and includes perception of the positions of opponent player, teammate and ball. Also in team sports, it is needed to recognize changes in movement in a short field and in a short period of time and to give right decisions according to these changes. Team sports require a series of rhythmic movements done with the ball to be smooth and balanced. In line with this information, the result we expected before the study is coordinative abilities of the participants in team sports category to be significantly higher than coordinative abilities of the participants in individual sports category. It is seen that results of the study confirm our expectations.

In a study examining relationship between agility and orientation abilities of judoists, orientation ability mean of 67 young judoists with mean age of  $10.34 \pm 1.40$  years was determined as  $11.09 \pm 1.04$  seconds (Taşkın et al. 2017).

20 young karate players with mean age of  $14.60 \pm 0.82$  years were involved in a research conducted by Peker and Vural (2018). According to research results: orientation ability mean was determined as  $11.69 \pm 1.61$  seconds and rhythm ability mean was determined as  $1.82 \pm 0.64$  seconds.

In a study conducted in order to analyze relationship between basketball ability and coordinative abilities. Adult basketball players' orientation ability mean was determined as  $7.9 \pm 0.57$  seconds, rhythm ability mean was determined as  $0.87 \pm 0.14$  seconds and differentiation ability mean was determined as  $10.7 \pm 3.19$  points (Singh and Saini 2017).

In another study conducted on volleyball players and handball players whose ages vary between 15-22, volleyball players' orientation ability mean was determined as  $12.84 \pm 1.83$  seconds, rhythm ability mean was determined as  $2.46 \pm 1.22$  seconds and differentiation ability mean was determined as  $9.72 \pm 3.32$  points. On the other hand, handball players' orientation ability mean was determined as  $11.2 \pm 1.11$  seconds, rhythm ability mean was determined as  $3.23 \pm 1.26$  seconds and differentiation ability mean was determined as  $9.55 \pm 2.77$  points (Lohchab 2014).

According to the results of a research conducted in order to determine role of coordinative abilities in racket sports; orientation ability mean of badminton players whose ages vary between 18-25 is  $7.54 \pm 6.60$  seconds, their rhythm ability mean is  $6.61 \pm 0.52$  and differentiation ability mean is  $10.10 \pm 2.65$  points. On the other hand, orientation ability mean of table tennis players who are in the same age category is  $11.61 \pm 1.56$  seconds, their rhythm ability mean is  $11.12 \pm 1.47$  seconds and differentiation ability mean is  $7.00 \pm 1.41$  points (Rana and Rajpoot 2013).

Peker et al. (2018) conducted a study to analyze effect of exercise on coordinative abilities. In the research conducted, young football players with ages between 11-12 were divided into two groups as experimental and control groups. When preliminary test results were examined before exercise, experimental group's orientation ability mean was found as  $8.47 \pm 0.77$  seconds, rhythm ability mean was found as  $1.46 \pm 0.26$  seconds and differentiation ability mean was found as  $8.75 \pm 3.76$  points respectively. Control group's orientation ability mean was determined as  $10.80 \pm 0.75$  seconds, rhythm ability mean was determined as  $1.67 \pm 0.28$  seconds and differentiation ability mean was determined as  $8.67 \pm 3.33$  points.

Results of the research confirm our expectations before the study. On the other hand, when literature is examined, results of the research conducted in individual and team sports categories are similar to results of our study. There are also studies whose results are different from our results. It is thought that these differences are caused by use of different study groups and different age categories. In conclusion, it may be advised to conduct a norm study that reveals appropriate level of coordinative ability in different age categories specific to sports branches after a study to be conducted with a larger sample group. It might be suggested that researchers study on relationship between sportive success and performance related to coordinative abilities in these different sport branches with different characteristics. Additionally, It may be suggested to compare coordinate abilities in different sports and examined relationship between characteristic structure of sports and performance related to coordinative abilities.

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