COMPETITOR:
JURNAL PENDIDIKAN KEPELATIHAN OLAHRAGA
e-ISSN: 2657-0734 & p-ISSN: 2085-5389 ‖ Volume 17, Number 1, 2025 ‖ P.278-292
DOI: 10.26858/cjpko.v17i1.71202

The Effect of Wrist Flexibility and Arm Muscle Strength On The Accuracy of Backhand Backspin Service At The Pingpong Community Club of Bulukumba Regency

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ABSTRACT

This study aims to determine whether or not there is an influence of Wrist Flexibility, Arm Muscle Strength and Hand-Eye Coordination on the Accuracy of Backhand Backspin Service of Pingpong Community Club, Bulukumba Regency: The population in this study were athletes of Pingpong Community Club, Bulukumba Regency with a sample of 5 athletes using a purposive sampling technique. The research instruments used were descriptive analysis, data normality test, linearity test, hypothesis test and model suitability test with the help of SPSS version 21.00. The results of the study showed that; (1) There is a direct influence of wrist flexibility on hand eye coordination of athletes of Pingpong Community Club, Bulukumba Regency by 121.1%; (2) The direct influence of arm muscle strength on hand eye coordination of athletes of Pingpong Community Club, Bulukumba Regency by 73.2%; (3) There is a direct influence of wrist flexibility on the accuracy of backhand backspin service of athletes of Pingpong Community Club, Bulukumba Regency by 322.7%; (4) There is a direct influence of arm muscle strength on the accuracy of backhand backspin service strokes of athletes from the Bulukumba Regency pingpong community club by 158.2%; (5) There is a direct influence of hand-eye coordination on the accuracy of backhand backspin service strokes of athletes from the Bulukumba Regency pingpong community club by 3727.8%; (6) There is an influence of wrist flexibility through hand-eye coordination on the accuracy of backhand backspin service strokes of athletes from the Bulukumba Regency pingpong community club by 0.005%; (7) There is an influence of arm muscle strength through hand-eye coordination on the accuracy of backhand backspin service strokes of athletes from the Bulukumba Regency pingpong community club by 121.8%.

ARTICLE HISTORY
Received: 2025/02/21
Accepted: 2025/02/25
Published: 2025/02/28

KEYWORDS
Wrist Flexibility;
Arm Muscle Strength;
Hand-Eye Coordination;
Backhand Backspin Service;
Table Tennis.

AUTHORS' CONTRIBUTION
A. Conception and design of the study;
B. Acquisition of data;
C. Analysis and interpretation of data;
D. Manuscript preparation;
E. Obtaining funding

Cites this Article : Manoppo, Nursartika Putri; Ramli, Ramli; Hakim, Hikmad; Hudain, Muh. Adnan; Bismar, Ahmad Rum. (2025). The Effect of Wrist Flexibility and Arm Muscle Strength On The Accuracy of Backhand Backspin Service At The Pingpong Community Club of Bulukumba Regency. **Competitor: Jurnal Pendidikan Kepelatihan Olahraga**. 17 (1), p.278-292

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INTRODUCTION

Table tennis is a racket sport played on a table using a small racket and a light ball. It is usually played by two people (one on one) or four people (two on two). The goal of the game is to hit the ball to the opponent's table so that the opponent cannot return it. This game is fast and requires reflexes, precise hand-eye coordination, and spin techniques such as topspin, backspin, and sidespin. (Sunarto, 2010) argues that table tennis is a table tennis game played by two or four people using a bat (a wooden racket covered in rubber) and a ball the size of a lime.

(Tomoliyus, 2017) the basic idea of table tennis is to serve the first ball by first bouncing the ball on the serving table, and the ball must pass over the net and enter the opponent's table target and also return the ball after bouncing on the table using a bat to hit the ball, the result of the ball hit passes over the net and enters the opponent's table target

Serving is the main move in table tennis, to generate an advantage, either through direct points or creating attack opportunities. One of the service techniques is the backhand backspin, where the player uses the back of the racket to hit the ball with a movement that produces reverse rotation. This technique is useful for controlling the game and confusing the opponent because the rotation of the ball makes it difficult to predict.

To get the best results from the backhand backspin serve when playing table tennis, wrist flexibility, arm muscle strength and hand-eye coordination are very important. According to (Vai. Aref. Et al., 2018) "Flexibility is needed by many sports, however, there are differences in flexibility requirements for each appearance. In table tennis, wrist flexibility is used to perform a service hit. In the discussion of the term flexibility (Sukadiyanto, 2002) it includes two interrelated things, namely flexibility is closely related to the condition of bones and joints, while flexibility is closely related to the level of elasticity of muscles, tendons, and ligaments. So flexibility is very important in performing service techniques because with good flexibility you will get a good serve and be able to kill your opponent. Poor flexibility can be caused by a lack of training, injury, or age factors that reduce body elasticity. So flexibility is very important in performing service techniques because with good flexibility you will get a good service and be able to kill your opponent. Absolute flexibility tests only measure the flexibility of one movement required by a performance goal (Ismaryati, 2006).

Arm muscle strength is very important in table tennis because it functions to perform various game techniques, such as serving, forehand strokes, backhand strokes, and smashes. (Bafirman, H. B., & Wahyuni, 2019) Argue that the physical ability to do work or produce the force needed to fight or overcome resistance is known as strength. (Depdikbud, 2002) defines strength as power based on one's physique. Strength is very important for table tennis because it helps to perform various techniques, such as hitting, moving quickly, and holding a position. If the arm muscle strength is not optimal, it can occur due to lack of physical exercise, muscle or nerve injuries, fatigue or poor

physical condition. According to (Harsono, 2017), Strength is very urgent so that our bodies are healthy and strong.

Coordination means being able to control different parts of the body and make them move smoothly and successfully to achieve goals (Kamadi, 2020). According to (Ikadarny, & Karim, 2020) coordination is the ability to move that comes from coordinated muscle movements in groups. (Mahendra, 2007) explains that coordinated motor skills include eye-hand coordination related to the ability to select an object and coordinate it (objects seen with regulated movements). According to (Handayani, 2018), coordination is a component that influences various muscle groups in performing tasks. Good coordination is very important in backhand backspin serves, because it allows players to direct and control hand movements with precision based on vision. Poor eye-hand coordination is often caused by a lack of motor skill training, age factors, stress, or fatigue.

Meanwhile, wrist flexibility, arm muscle strength, and suboptimal eye-hand coordination in this study can be influenced by various factors. Poor results in these three variables can be caused by internal factors, such as the individual's physical condition or health, as well as external factors, such as improper measurement techniques or lack of targeted training. Research shows that wrist flexibility, arm muscle strength, and eye-hand coordination affect table tennis performance, especially in backhand backspin serves. In the Pingpong Community Club in Bulukumba Regency, many athletes have great potential but have difficulty producing consistent and accurate backhand backspin serves.

This study presents an innovation by exploring the influence of wrist flexibility, arm muscle strength, and eye-hand coordination on the accuracy of backhand backspin serves in pingpong club athletes in Bulukumba Regency. The approach taken is different from previous studies that focused on factors separately, by integrating the three aspects. The purpose of this study is to develop a training program that can improve the overall quality of the service. Thus, this study not only provides practical solutions but also enriches the sports literature through an integrated approach to athlete development, both beginners and advanced.

METHODS

The research method used in this study is quantitative with a path analysis approach, the aim of which is to determine how wrist flexibility, arm muscle strength and hand-eye coordination affect the accuracy of backhand backspin service of pingpong community club athletes in Bulukumba Regency using multiple linear regression tests. According to (Creswell, 2014) "Quantitative research is a method for testing certain theories by examining the relationship between variables. Wrist flexibility (X1) and arm muscle strength (X2) are independent variables, and hand-eye coordination (Y) is an intervening/mediator variable. While Backhand Backspin Service Accuracy (Z) is the dependent variable.

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(Sugiyono, 2011) said "Population is a generalization such as an object or subject that has qualities and characters determined by the researcher to be studied and conclusions drawn. The population in this study were all athletes of the Bulukumba Regency Pingpong Community Club. The sample is part of a population and has its characteristics (Sugiyono, 2011). According to (Sugiyono, 2017) the sampling technique is a sampling technique, to determine the sample to be used in the study. The sampling technique of this study is purposive sampling, namely taking sample members from the population if they meet certain criteria that are following the research topic with the criteria, namely the 2022 female Porprov athletes in Bulukumba Regency, willing to collect data, and athletes who have the best skills in doing backhand backspin serves, this is intended so that the samples used in this study are truly in the best condition in terms of backhand backspin table tennis service strokes. The number to be studied is 5 athletes. The data of this study were obtained through tests, wrist flexibility using a goniometer/protractor, arm muscle strength tests by doing push-ups, hand-eye coordination tests by throwing the ball to the wall towards the target, and backhand backspin service accuracy tests using a service test towards the target. Then, data analysis was carried out in the form of descriptive analysis, normality test, linearity test, data hypothesis test and model suitability test.

RESULTS AND DISCUSSION

Result

Descriptive analysis is intended to obtain a general overview of the research data, so descriptive data analysis is used for wrist flexibility data, arm muscle strength, hand-eye coordination, and backhand backspin service accuracy in table tennis games for Pingpong Community Club athletes in Bulukumba Regency. This is intended to give meaning to the results of the analysis that has been carried out. The results of the descriptive analysis of the data can be seen in the following table:

Table 1.
Descriptive analysis results

Variable	N	Mean	Std. Dev	Min	Max	Sum
Wrist Flexibility	5	88,60	2.966	85	92	443
Arm Muscle Strength		22	1.871	20	25	110
Hand-Eye Coordination		7,8	0,837	7	9	39
Backhand Backspin Service Hit Accuracy		55	2.915	51	59	275

The conclusions of the results in the table above are explained in more detail as follows:

a. For wrist flexibility data on athletes of Pingpong Community Club, Bulukumba Regency, from 5 samples, a total value of 443 was obtained and an average of 88.60 was obtained with a standard deviation of 2,966 from a data range of 7 between a minimum value of 85 and 92 for the maximum value.

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b. For arm muscle strength data on athletes of Pingpong Community Club, Bulukumba Regency, from 5 samples, a total value of 110 was obtained and an average of 22 was obtained with a standard deviation of 1,871 from a data range of 5 between a minimum value of 20 and 25 for the maximum value.
c. For hand-eye coordination data on athletes of Pingpong Community Club, Bulukumba Regency, from 5 samples, a total value of 39 was obtained and an average of 7.8 was obtained with a standard deviation of 0.837 from a data range of 2 between a minimum value of 7 and 9 for the maximum value.
d. For the data on the accuracy of backhand backspin service in athletes of the Bulukumba Regency Pingpong Community Club from 5 samples, a total value of 275 was obtained and the average obtained was 55 with a standard deviation result of 2,915 from a data range of 8 between a minimum value of 51 and 59 for the maximum value.

Table 2.
Data Normality Test Results

Variable	N	KS-Z	Sig	α	Ket.
Wrist Flexibility	5	0,282	0,200	0,05	Normal
Arm Muscle Strength		0,300	0,161	0,05	Normal
Hand-Eye Coordination		0,231	0,200	0,05	Normal
Backhand Backspin Service Hit Accuracy		0,166	0,200	0,05	Normal

Based on the table of results of the data normality test above using the Kolmogorov-Smirnov Test, the results for each variable can be seen as follows:

a. The normality test of the speed of the Pingpong Community Club athletes of Bulukumba Regency shows a Kolmogorov-Smirnov value of 0.282 with a significant value of 0.200, which is greater than α0.05. This shows that the athlete's speed is normally distributed.
b. The normality test of eye-foot coordination in the Pingpong Community Club athletes of Bulukumba Regency shows a Kolmogorov-Smirnov value of 0.300 with a significant value of 0.161, which is greater than α0.05. This shows that the athlete's eye-foot coordination is normally distributed.
c. The normality test of eye-hand coordination in the Pingpong Community Club athletes of Bulukumba Regency shows a Kolmogorov-Smirnov value of 0.231 with a significant value of 0.200, which is greater than α0.05. This shows that the athlete's eye-hand coordination is normally distributed.
d. The normality test of the accuracy of the backhand backspin service in the Pingpong Community Club athletes of Bulukumba Regency showed a Kolmogorov-Smirnov value of 0.166 with a significant value of 0.200, which is greater than α0.05. This shows that the accuracy of the backhand backspin service is normally distributed.

Because the research data is normally distributed, parametric statistical tests will be used to test the hypothesis.

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Table 3.
Results of Linearity Analysis of Flexibility Against Hand-Eye Coordination of Pingpong Community Club Athletes, Bulukumba Regency

Variable	N	P	α	information
Wrist Flexibility Hand-Eye Coordination	5	0,512	0,05	Linear

The results of the analysis showed that flexibility towards eye-hand coordination in athletes of the Pingpong Community Club, Bulukumba Regency had a significant value (P) of 0.512, which was greater than α 0.05 (0.512 > 0.05). This means that flexibility has a linear relationship with the eye-hand coordination of the athlete.

Table 4.
Results of Linearity Analysis of Strength Against Eye-Hand Coordination of Pingpong Community Club Athletes in Bulukumba Regency

Variable	N	P	α	information
Arm Muscle Strength Backhand Backspin Service Accuracy	5	0,428	0,05	Linear

The results of the analysis showed that flexibility towards eye-hand coordination in athletes of the Pingpong Community Club, Bulukumba Regency had a significant value (P) of 0.428, which was greater than α 0.05 (0.428 > 0.05). This means that flexibility has a linear relationship with the eye-hand coordination of the athlete.

Table 5.
Results of Linearity Analysis of Strength Against Backhand Backspin Service Hit Accuracy of Pingpong Community Club Athletes in Bulukumba Regency

Variable	N	P	α	information
Wrist Flexibility Backhand Backspin Service Accuracy	5	0,365	0,05	Linear

The results of the analysis showed that wrist flexibility on the accuracy of backhand backspin service in Pingpong Community Club athletes of Bulukumba Regency had a significant value (P) of 0.365, which was greater than α 0.05 (0.365 > 0.05). This means that wrist flexibility has a linear relationship with the accuracy of service in these athletes.

Table 6.
Results of Linearity Analysis of Arm Muscle Strength Against Backhand Backspin Service Accuracy of Pingpong Community Club Athletes in Bulukumba Regency

Variable	N	P	α	information
Arm Muscle Strength Backhand Backspin Service Accuracy	5	0,247	0,05	Linear

From the results of the table above, the strength of the accuracy of the backhand backspin service in the Pingpong Community Club athletes of Bulukumba Regency obtained a significant value (P) of 0.247 greater than α0.05 (0.247>0.05). So, the flexibility of the accuracy of the service in the Pingpong Community Club athletes of Bulukumba Regency obtained has a relationship or linear.

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Table 7.

Results of Linearity Analysis of Eye-Hand Coordination on Backhand Backspin Service Accuracy of Pingpong Community Club Athletes in Bulukumba Regency

Variable	N	P	α	information
Hand-Eye Coordination Backhand Backspin Service Accuracy	5	0,539	0,05	Linear

From the results of the table above, coordination on the accuracy of backhand backspin service in athletes of the Bulukumba Regency Pingpong Community Club obtained a significant value (P) of 0.539 greater than α0.05 (0.539>0.05). So, the flexibility on the accuracy of service in athletes of the Bulukumba Regency Pingpong Community Club obtained has a relationship or linear. In sequence, the hypothesis in this study can be expressed as follows:

The structural equation model of this study is as follows:

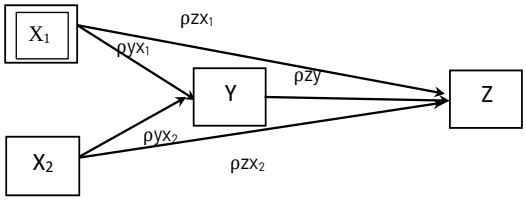

Figure 1.

Structural Equation Model

$\rho yx_1, \rho yx_2, \rho zx_1, \rho zx_2, \rho zy$: structural equation coefficient

Based on the structural equation model above, in this study, the structural equation model is divided into 2 structures. The structural equation is an equation model between the variables of wrist flexibility, arm muscle strength, hand-eye coordination and backhand backspin service accuracy. The structural model can be seen in the following figure:

Structural 1

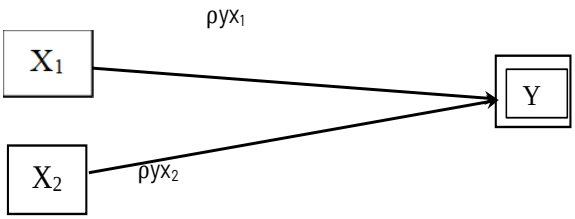

Figure 2.

Structural Model 1

Structural 2

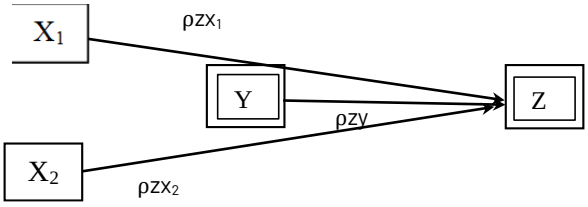

Figure 3,

Structural Model 2

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Based on the description of the structural model above, where there are two structural models in hypothesis testing in this study. The results of hypothesis testing for each structure presented are as follows:

Structural hypothesis testing 1

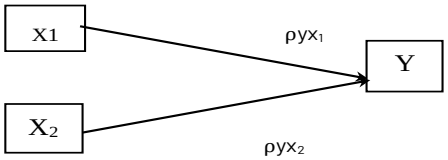

Figure 4.
Structural Hypothesis Testing Model 1

Based on the structural hypothesis testing model 1 in the figure, there are two research hypotheses proposed. The hypotheses are:

1) H0: There is no effect of wrist flexibility on hand-eye coordination.
2) H1: There is an effect of wrist flexibility on hand-eye coordination.
3) H0: There is no effect of arm muscle strength on hand-eye coordination.
4) H1: There is an effect of arm muscle strength on hand-eye coordination.

Based on the structural model 1, the hypothesis is then tested. The results of the structural model hypothesis testing 1 are as follows:

Structural Individual Hypothesis Test I

The statistical hypothesis is formulated as follows:

a) $H_0 : \rho yx_1 = 0$
   $H_1 : \rho yx_1 \neq 0$
b) $H_0 : \rho yx2 = 0$
   $H_1 : \rho yx_2 \neq 0$

In sentences as follows:

a) H0: There is no effect of wrist flexibility on hand-eye coordination.
   H1: There is an effect of wrist flexibility on hand-eye coordination.
b) H0: There is no effect of arm muscle strength on hand-eye coordination.
   H1: There is an effect of arm muscle strength on hand-eye coordination.

Hypothesis testing of the data of each variable presented in the hypothesis was carried out using SPSS. The results obtained can be seen in the coefficient table of structural model 1 as follows:

Table 8.
Results of Multivariate Analysis of Structural Regression 1

Variable	N	Beta	P	α
Wrist Flexibility Against Hand-Eye Coordination	5	-1,104	0,132	0,05
Arm Muscle Strength Against Hand-Eye Coordination		0,856	0,196	0,05

From the table above it can be concluded that:

1. The beta coefficient value for the wrist flexibility variable on hand-eye coordination is -1.104 with a significant value obtained is ρ_value = 0.132 / 2 =

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0.066. Because the significant value is less than α0.05 (0.066 <0.05) then it can be decided that H0 is rejected. This means that there is a significant influence of wrist flexibility on hand-eye coordination. The influence is shown by the value (-1.104) 2 = 1.218 = 121.8%. So H1 is accepted.

2. The beta coefficient value obtained for the wrist flexibility variable on hand-eye coordination is 0.856 with a significant value obtained is ρ_value = 0.196 / 2 = 0.098. Because the significant value is less than α0.05 (0.098 <0.05) then it can be concluded that H0 is rejected. This means that there is a significant influence of wrist flexibility on hand-eye coordination in athletes. The influence is shown by the value (0.856)2 = 0.732 = 73.2%. So H1 is accepted.

Table 10.
Determination Coefficient of Sub Substructure 1 (Results of Determination Coefficient Analysis) Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.871[a]	.759	.519	.580

a. Predictors: (Constant), strength, flexibility

From the table above, the error coefficient can be calculated:
$\varepsilon_1 = \sqrt{1 - R^2} = \sqrt{1 - 0{,}796} = \sqrt{0{,}892} = 0{,}944$, Thus the path diagram for substructure 1 changes to the following:

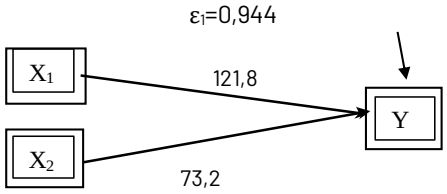

Figure 5.
Substructure path diagram 1

Structural hypothesis testing 2

The second model proposed in hypothesis testing in the study is structural model 2. The description of this model can be seen in the following image:

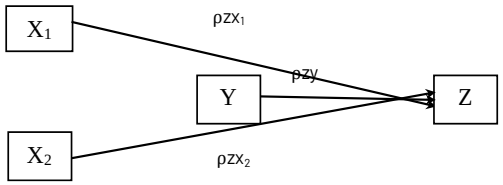

Figure 6.
Structural Hypothesis Testing Model 2

Based on the structural hypothesis testing model 2 in the figure, there are three research hypotheses proposed. The hypotheses are as follows:

a. H0: There is no effect of wrist flexibility on the accuracy of the backhand backspin serve.
H1: There is an effect of wrist flexibility on the accuracy of backhand backspin serve.

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b. H0: There is no effect of hand-eye coordination on the accuracy of the backhand backspin serve.
   H1: There is an effect of hand-eye coordination on the accuracy of backhand backspin serve.
c. H0: There is no effect of hand-eye coordination on the accuracy of the backhand backspin serve.
   H1: There is an effect of hand-eye coordination on the accuracy of backhand backspin serve.

Based on the hypothesis proposed in structural model 2, the hypothesis testing is then carried out using SPSS. The results of the hypothesis testing are as follows:

Structural Individual Hypothesis Test 2

a) H_0: $\rho zx_1 = 0$
   H_1: $\rho zx_1 \neq 0$
b) H_0: $\rho zx_2 = 0$
   H_1: $\rho zx_2 \neq 0$
c) H_0: $\rho zy = 0$
   H_1: $\rho zy \neq 0$

In sentences as follows:

a) H0: There is no effect of wrist flexibility on the accuracy of the backhand backspin serve.
   H1: There is an effect of wrist flexibility on the accuracy of backhand backspin serve.
b) H0: There is no effect of arm muscle strength on the accuracy of backhand backspin serve.
   H1: There is an effect of arm muscle strength, and wrist flexibility on the accuracy of backhand backspin serve.
c) H0: There is no effect of hand-eye coordination, or wrist flexibility on the accuracy of backhand backspin serve.
   H1: There is an effect of hand-eye coordination, and wrist flexibility on the accuracy of backhand backspin serve.

Based on the hypothesis proposed above, the results of data processing using the SPSS program for the hypothesis can be seen in the following table:

Table 11.
Results of Multivariate Analysis of Structural Regression 2

Variable	Beta	P	α
Flexibility Towards Accuracy of Backhand Backspin Service	0,282	0,200	0,05
Strength Towards Accuracy of Backhand Backspin Service	1,258	0,030	0,05
Hand-Eye Coordination Towards Accuracy of Backhand Backspin Service	-1.931	0,018	0,05

From the table above it can be concluded that:

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1. The beta coefficient value for the wrist flexibility variable on the accuracy of the backhand backspin service is 1.796, the significant value obtained is ρ_value 0.025/2=0.0125. Because the significant value is less than α0.05 (0.0125<0.05), it can be decided that H0 is rejected. This means that there is a significant influence of wrist flexibility on the accuracy of the backhand backspin service. The influence is shown by the value (1.796)2 = 3.225 = 322.5%. So H1 is accepted.
2. The beta coefficient value for arm muscle strength on the accuracy of the backhand backspin service is 1.258 with a significant value obtained ρ_value 0.030/2=0.015. Because the significant value is less than α0.05 (0.015<0.05), it can be decided that H0 is rejected. This means that there is a significant influence of arm muscle strength on the accuracy of the backhand backspin service. The influence is shown by the value (1.258)2 = 1.582 = 158.2%. So H1 is accepted.
3. The beta coefficient value for hand-eye coordination on the accuracy of backhand backspin service is -1.931 with a significant value obtained ρ_value -1.931/2=-0.9655. Because the significant value is less than α0.05 (-0.9655<0.05) then the decision can be taken that H0 is rejected. This means that there is a significant influence of hand-eye coordination on the accuracy of backhand backspin service. The influence is shown by the value (-1.931)2 = 3.7278 = 3727.8%. So H1 is accepted.
4. The value for wrist flexibility on the accuracy of backhand backspin service through hand-eye coordination is -2.09303 with a Sobel Z value = -2.462 < 1.96 and a Sobel P value = 0.013 < 0.05, meaning that there is a significant influence of wrist flexibility on the accuracy of backhand backspin service through hand-eye coordination by mediating the relationship between X1 and Y. (5) The value for arm muscle strength on the accuracy of backhand backspin service through hand-eye coordination is -2.57759 with a Sobel Z value = -1.912 < 1.96 and a Sobel P value = 0.055 < 0.05, meaning that there is an insignificant influence of arm muscle strength on the accuracy of backhand backspin service through hand-eye coordination by mediating the relationship between X2 and Y.

Table 12

Coefficient of determination of substructure 2 (Results of determination coefficient analysis)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	1.000[a]	.999	.997	.158

From the table above, the error coefficient can be calculated:

$$\varepsilon_2 = \sqrt{1 - R^2} = \sqrt{1 - 0{,}999} = \sqrt{0{,}001} = 0{,}0316$$

Thus the path diagram for substructure 2 becomes as follows:

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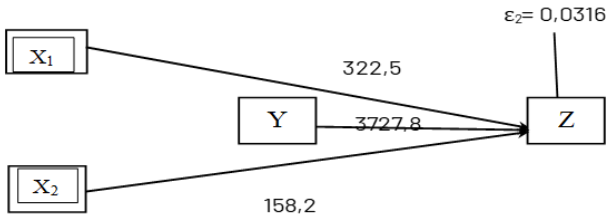

Figure 7.

Substructure path diagram 2

Based on the test results for Structure 1 and Structure 2, the results of the overall path diagram of the variables are as follows:

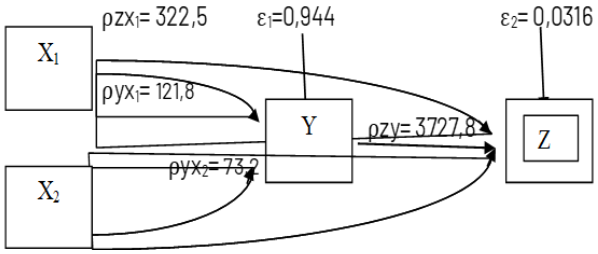

Figure 8.

Model of sub-structure 1 and sub-structure 2 test results.

After the structural equation model from the path analysis is obtained, the model suitability test is first carried out with the statistical research data W Test, where the test hypothesis is as follows:

Ho: R=R: The estimated correlation matrix is the same as the sample correlation matrix (the model is appropriate).

Ha: R ≠ R: The estimated correlation matrix is not the same as the sample correlation matrix (the model is not appropriate).

From the calculations shown in the appendix, the required statistical values are obtained, namely the Wcount value = -15 and the X2 table value d = 0 and α = 0.05 of 11.07. Because the Wcount value is smaller than the X2 table value, it can be concluded that Ho is accepted, which means that the estimated correlation matrix is the same as the sample correlation matrix. In this case, the structural equations of models 1 and 2 follow the research data, so they can be used to explain the relationship or influence that occurs between the variables studied in this study.

Discussion

There is an influence of wrist flexibility on hand-eye coordination in table tennis games at the Pingpong Community Club, Bulukumba Regency.

Based on the results of the hypothesis test conducted, the significant value obtained is 0.066 because the significant value is smaller than 0.05 (0.066 <0.05) so the proposed hypothesis is accepted. Based on the results of the study, show that there is an influence of wrist flexibility on hand-eye coordination in athletes at the Pingpong Community Club, Bulukumba Regency by 1.218 or 121.8%. This result shows an analysis that flexibility is needed to improve hand-eye coordination.

There is an influence of arm muscle strength on hand-eye coordination in table tennis games at the Pingpong Community Club, Bulukumba Regency.

The second hypothesis is that there is an influence of arm muscle strength on hand-eye coordination. Based on the results of the hypothesis test conducted, the significant value obtained is 0.098 because the significant value is smaller than 0.05 (0.098 <0.05) so the proposed hypothesis is accepted.

Based on the results of the study, shows that there is an influence of arm muscle strength on hand-eye coordination in athletes of the Pingpong Community Club, Bulukumba Regency, amounting to 0.732 or 173.2%. This result shows an analysis that arm muscle strength is needed to improve hand-eye coordination.

There is an influence of wrist flexibility on the accuracy of backhand backspin service in table tennis games at the Pingpong Community Club, Bulukumba Regency.

The third hypothesis is that there is an influence of wrist flexibility on the accuracy of backhand backspin service in table tennis games. Based on the results of the hypothesis test, the significant value obtained is 0.0125 because the significant value is smaller than 0.05 (0.0125 <0.05), so the proposed hypothesis is accepted. Based on the results of the study, show that there is an influence of wrist flexibility on the accuracy of backhand backspin service in athletes of the Pingpong Community Club, Bulukumba Regency, 3.225 or 322.5%. This result shows an analysis that the flexibility of a table tennis athlete's wrist is needed to improve his accuracy in doing backhand backspin service.

There is an influence of arm muscle strength on the accuracy of backhand backspin serve in table tennis games at the Pingpong Community Club in Bulukumba Regency.

The fourth hypothesis is that there is an influence of arm muscle strength on the accuracy of backhand backspin serve in table tennis games at the Pingpong Community Club in Bulukumba Regency. Based on the results of the hypothesis test conducted, the significant value obtained is 0.015 because the significant value is less than 0.05 (0.015 <0.05) so the proposed hypothesis is accepted. These results indicate that there is an influence of arm muscle strength on the accuracy of backhand backspin serve in table tennis games at the Pingpong Community Club in Bulukumba Regency by 1.582 or 158.2%. These results show an analysis that the arm muscle strength of a table tennis athlete is needed to improve his/her accuracy in performing backhand backspin serve.

There is an influence of hand-eye coordination on the accuracy of backhand backspin serve in table tennis games at the Pingpong Community Club in Bulukumba Regency.

The fifth hypothesis is that there is an influence of hand-eye coordination on the accuracy of backhand backspin serve. Based on the results of the hypothesis test conducted, the significant value obtained is -1.931 because the significant value is smaller than 0.05 (-1.931 <0.05) then the proposed hypothesis is accepted. Based on the results of the study, show that there is an effect of hand-eye coordination on the accuracy of backhand backspin service in Pingpong Community Club athletes in

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Bulukumba Regency of 3.7278 or 3727.8%. This result shows the analysis that hand-eye coordination is needed to improve their accuracy in performing backhand backspin service.

There is an effect of wrist flexibility through hand-eye coordination on the accuracy of backhand backspin service in the Pingpong Community Club table tennis game in Bulukumba Regency.

The sixth hypothesis is that there is an effect of wrist flexibility through hand-eye coordination on the accuracy of backhand backspin service. The value for wrist flexibility on the accuracy of backhand backspin service through hand-eye coordination is -2.09303 with a Sobel Z value = -2.462 <1.96 and a Sobel P value = 0.013 <0.05, meaning that there is a significant effect of wrist flexibility on the accuracy of backhand backspin service through hand-eye coordination by mediating the relationship between X1 and Y.

These results show the analysis that wrist flexibility through hand-eye coordination of a table tennis athlete is needed to improve their accuracy in performing backhand backspin service.

There is an effect of arm muscle strength through hand-eye coordination on the accuracy of backhand backspin service in the table tennis game of the Pingpong Community Club, Bulukumba Regency

The seventh hypothesis is that there is an effect of arm muscle strength through hand-eye coordination on the accuracy of backhand backspin service. The value for arm muscle strength on the accuracy of backhand backspin service through hand-eye coordination is -2.57759 with a Sobel Z value = -1.912 <1.96 and a Sobel P value = 0.055 <0.05, meaning that there is an insignificant effect of arm muscle strength on the accuracy of backhand backspin service through hand-eye coordination by mediating the relationship between X2 and Y. These results show an analysis that the accuracy of backhand backspin service in table tennis games that is influenced by arm muscle strength will not experience a significant increase if it is also influenced by hand-eye coordination.

CONCLUSION

Based on the results of the research and discussion that have been presented, the following conclusions can be drawn:

1. There is an influence of wrist flexibility on hand-eye coordination of Pingpong Community Club athletes in Bulukumba Regency.
2. There is an influence of arm muscle strength on hand-eye coordination of Pingpong Community Club athletes in Bulukumba Regency.
3. There is an influence of wrist flexibility on the accuracy of backhand backspin service in Pingpong Community Club athletes in Bulukumba Regency.
4. There is an influence of arm muscle strength on the accuracy of backhand backspin service in Pingpong Community Club athletes in Bulukumba Regency.
5. There is an influence of hand-eye coordination on the accuracy of backhand backspin service in Pingpong Community Club athletes in Bulukumba Regency.

6. There is an influence of wrist flexibility through hand-eye coordination on the accuracy of backhand backspin service in Pingpong Community Club athletes in Bulukumba Regency.
7. There is an influence of arm muscle strength through hand-eye coordination on the accuracy of backhand backspin service in Pingpong Community Club athletes in Bulukumba Regency.

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