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Physiological Parameters with the throwing performance among the Softball Players

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Abstract: The primary purpose of the research is to analyze the relationship between softball players' physiological characteristics and their throwing performance. Philosophy conversations about how to increase performance are of interest to many in the sports world, including coaches, instructors, physicians, psychologists, and players. Softball is a worldwide phenomenon, with fans and players on every continent. When it comes to softball, relatively little study has been done on the many factors that continue to contribute to high performance. There is a lack of written information in the sport of softball, and many various aspects of the game need investigation and analysis. Sporting triumphs are rewarding for the athletes themselves, as well as for their families, communities, and countries. It's possible to lose games while spending a lot of time and energy coaching yourself and your squad. There has been a great deal of study on the factors that contribute to successful softball play and performance.

Keywords: psychological variables, softball playing, sports, playing skill

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INTRODUCTION

Throughout the last century, softball has gone from obscurity to international fame. Pitching, hitting, fielding, catching, and throwing are just a few examples of the many softball-related motor skills that need a high level of concentration and physical fitness. Softball players can't go very far without mastering these basics. No matter what position you play in softball, you need to have these abilities down pat. The fundamentals of speed, strength, and stamina are all required for a successful softball career. Offensive and defensive prowess in softball and baseball depend heavily on a player's strength and power.

The ability to throw accurately and consistently is essential for success on the softball field. While the overhead throw is the most common in softball, the sidearm and underhand options are also common. An athlete needs high levels of neuromuscular efficiency, synchronization of muscle activation, flexibility, and strength to complete the overhead throwing action. An intense motion requiring physical strength, the softball throw is a natural phenomenon. Both velocity and strength contribute to overall power. In particular, softball throwers must have strength. Having a solid foundation in overall strength and maximum strength is also crucial for developing muscular strength and stamina. The ability to throw effectively depends on a combination of shoulder, back, and rotator cuff strength. The power of the legs and the muscles in the body's center (hips and abdominals) also factor towards the success of a throw. Softball pitchers and catchers need a lot of upper-body muscular balance due to the unique demands of underarm pitching and overhand throwing. When it comes to hitting, pitching, and throwing, the forearm is often regarded as being crucial by both coaches and players.

LITERATURE REVIEW

Onose, Ionut & Abalasei (2020) To determine whether kids should get instruction in a certain activity, we need to look at how they're growing physically and how skilled they are with their bodies. The goal of the study was to examine the students' motor talents in relation to their Body Mass Index (BMI) in order to channel them towards certain sectors of the sports world. Methods: The study was conducted on a sample size of 220 students from the fifth grade in the Moldavian Region. Based on the national standards for each grade level, we have calculated the body mass index (BMI) and assessed the students' motor abilities. The highest significant results were found in Suceava County (18.48 0.45 for males and 18.06 0.48 for girls) out of the three counties analyzed. Although most students have a healthy body mass index (75.45%), the findings demonstrate that there are notable disparities in student growth. 8.63% of students received a score lower than 5, and there were significant regional differences (the highest values were recorded in Iasi at 11.05 1.00 for boys and 9.93 0.97 for girls; in Suceava it was 7.98 0.89 for boys and 4.18 0.46 for girls; and in Vrancea it was 9.97 0.48 for boys and 7.70 0.33) on the push-ups test. 59.09% of the class rated the difficulty of the softball throw as a 10, indicating that it was executed perfectly. A only 30.45 percent of students achieved a perfect score of 10 in the standing long jump. There were statistically significant differences between all groups and all motor skills tests, as shown by the p-values for the gathered differences. The results show that children's physical development and motor ability vary greatly from county to county; this variation is a significant factor in the selection of youth for high-level athletic competition.

Anwar, Choiroel & Budiono, Irwan & Pamot, Hermawan (2019) Children's schools may be able to slow the rising rate of childhood obesity by reintroducing more traditional games. There will need to be tweaks made and maybe even some guidelines established before the game is ready for the general audience. The research aims to determine whether or not playing a slightly altered form of softball might help primary school students become more physically active and eat healthier. With the aid of a development research design, a new model of the adapted softball game was created. Twenty-seven fifth graders from an elementary school participated in field trials utilizing a before-and-after one-group intervention design. Measures of body mass index and fitness were compared before and after the intervention to establish the method's efficacy (Z score). The results of this research back up the validity and applicability of the modified softball game model for analyzing physical education programs. Primary school students who participated in a program that had them play an adapted form of softball showed considerable increases in both their diet and fitness levels. While thinking about how to address the problem of childhood obesity, it is recommended that schools and other key stakeholder organizations regularly use the model of the modified softball game.

Saraya, Arif & Sugiyanto, Sugiyanto & Doewes (2018) Height, arm length, arm muscle strength, hand-eye coordination, balance, and reaction time are all examples of anthropometric characteristics and general physical condition. Reaction time and equilibrium are two other important factors. The major purpose of this study is to determine which anthropometric traits and levels of physical fitness best predict softball hitters' success. A quantitative approach to the design of a confirmatory factor analysis is employed in this research technique. Subjects in this research are softball players enrolled in a sports education program at the University of Rhode Island. One hundred people were surveyed by a simple random sample technique.

A battery of tests is applied to the used data to check both the independent and dependent variables. KMO and Bartlett's Test were used as confirmatory factors in this research, and SPSS was used to analyze the data. It was shown that arm length (r=0.788), arm muscle strength (r=0.851), and time response (r=0.773) were the most significant anthropometric elements influencing physical condition and determining batting ability in the sport of softball. The findings of this investigation were as follows: Softball hitting skill is mostly determined by a player's arm length, arm muscle strength, and time reaction, all of which are anthropometric factors.

Lear, Aaron & Patel, Niraj (2016) While the windmill softball pitch is executed, the athlete's shoulder and elbow are subjected to significant stresses from all directions. Overuse injuries tend to be the most prevalent problem for pitchers in softball, and there don't seem to be as many softball-related injuries as there are baseball-related ones. This article will discuss the several factors that might lead to softball pitchers becoming hurt, as well as softball pitching strategies, the kinetics and kinematics of the windmill pitch, the epidemiology of softball pitchers, and more.

RESEARCH METHODOLOGY

This investigation is a study that looks at how various psychological factors affect the game results of male softball players. For the study, we needed data on a wide range of factors, including mental health and softball ability. In this chapter, the author details the study's methodology, including the selection of participants, variables, and instruments, the data collecting process, scoring, and the statistical methods used to analyze and interpret the findings. The popularity of softball has led to its widespread adoption as a sport across the world. The various factors that continue to contribute to successful performance in softball have only been the subject of a limited number of studies. There is a lack of written resources in softball, and the sport might benefit from in-depth research and analysis in a variety of areas.

Psychological factors are evaluated based on how individuals perceive a specific situation, unlike the other two categories of variables. Questionnaires must be sent in order to gather data on a topic like Decision Making. All of the criteria, procedures, and benchmarks that were employed are made very apparent.

Table 1: The Use of Certain Psychological Scales, Tests, and Standards

Sl. No.	Variables	Tool	CriterionMeasures
1	Depth Perception	Dolman's depth perceptiondevice	Centimeter
2	Reaction Time	Nelson Reaction Timer	Second
3	Decision Making	Questionnaire by French DJ	Points

Psychological Variables:

1. Using Dolman's apparatus, the subject's depth perception was assessed; errors were recorded to the nearest 0.1 centimeter.
2. Using the Nelson reaction time formula, we were able to convert the subject's score in centimeters to a time value.

$$\text{R.T.} = \sqrt{\frac{2 \times \text{distancethestick(timer)falls (inft)}}{32\ \text{(Accelerationgravitionalconstant)}}}$$

3. The participants' ability to make sound decisions was measured by having them complete a French DJ questionnaire; their replies were then converted to quantitative form using answer keys.

DATA ANLYSIS

Relationship between Psychological Factors and Outcome

➢ **Relationship with Depth Perception and Performance**

Table 2 : Analyzing the Relationships Between Psychological Variables, Depth Perception, and Performance Using Pearson's Product Moment Correlation

Variable 1	Variable 2	Pearson Correlation	Significance
Depth PerceptionApproach	Performance	-.448	.001
Depth PerceptionReproach	Performance	-.198	.030

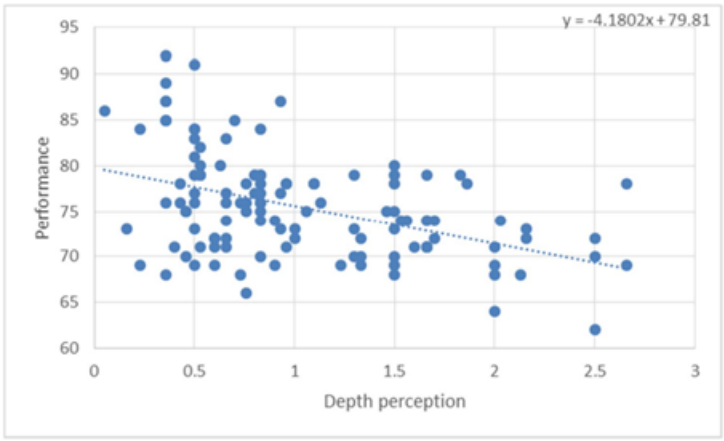

Figure 1: Deep Thinking and Results: A Scatter Plot

Depth Perception Approach and Performance: It was discovered that using the Depth Perception Method was inversely related to effectiveness. It was found that the -.448 Pearson correlation was statistically significant. When the Depth Perception Approach was increased, we noticed a linear and very significant drop in performance.

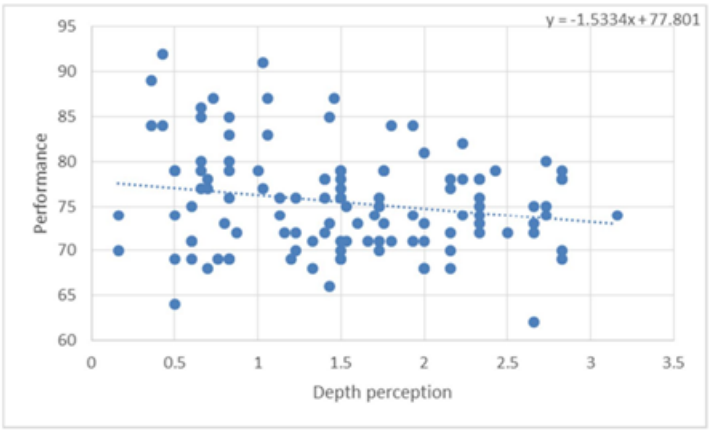

Figure 2: Scatter gram between Depth Perception-Reproach and Performance

Depth Perception - Reproach and performance: Statistical analysis revealed a negative correlation between Depth Perception Reproach and overall effectiveness. The -.198 Pearson correlation was significant at the.030 level of significance. Inversely, when the value of the Depth Performance Reproach increased, performance deteriorated.

➢ **Relationship With Reaction Time and Performance**

Table 3: The relationship between RT and performance, as measured by Pearson's r, is explored

Variable 1	Variable 2	Pearson Correlation	Significance
Reaction time	Performance	-.578	.001

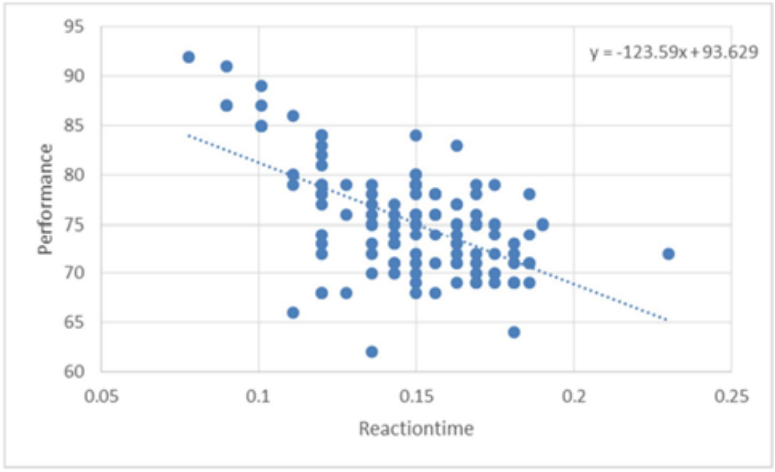

Figure 3: Scatter gram between Reaction Time and Performance

Reaction time and performance: There was a statistically significant inverse relationship between response time and efficiency. The -0.578 Pearson correlation was found to be significant at the.001 level. This indicates that there was a strong and negative correlation between reaction time and results.

➢ **Relationship With Decision Making And Performance**

Table 4: Correlations among Psychological Factors, Choice, and Outcome as Measured by the Pearson Product Moment Coefficient

Decision Making Dimensions	Variable 2	Pearson Correlation	Significance
Thoroughness	Performance	.300	.001
Control	Performance	.284	.002
Hesitancy	Performance	-.116	.207
Social resistance	Performance	.082	.374
Optimizing	Performance	.104	.257
Principled	Performance	.080	.386
Instinctiveness	Performance	.222	.015
Total	Performance	.251	.006

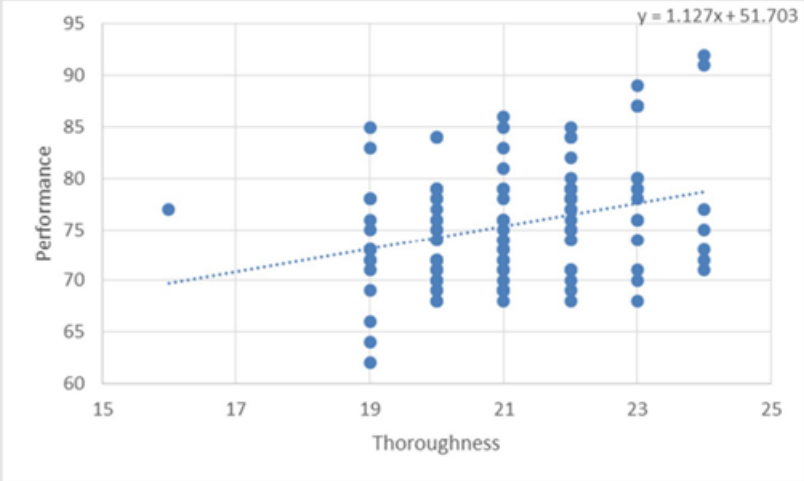

Figure 4: Scatter gram between Thoroughness and Performance

Thoroughness and Performance: The association between thoroughness and success was found to be statistically significant. The Pearson correlation coefficient was significant at the.300 level, indicating a robust link. That is, a direct correlation exists between Thoroughness and results.

CALCULATING THE CORRELATION BETWEEN PHYSICAL CHARACTERISTICS AND PLAYING PROWESS

Descriptive Analysis

Indicators of softball players' health and fitness were correlated with their performance in statistically meaningful ways. The average and standard deviation of the tested subjects' physiological parameters are shown in Table 5.

Table 5: Displaying Descriptive Statistics for Study-Relevant Physiological Variables

Variables	Mean	Std. Deviation	N
Resting Pulse Rate	62.74	4.09	50
Mean Arterial Blood Pressure	97.37	4.05	50
Percent Body Fat	11.48	0.99	50
Anaerobic Power	74.98	10.25	50
Vital Capacity	3112.00	368.47	50
Respiratory Rate	25.66	2.06	50

The findings are shown in Table 5, with a mean value of 62.74 and a standard deviation of +4.09. The mean blood pressure was 97.37 mm Hg, and the SD was +4.05. Standard deviation was 0.99, and the mean percentage of body fat was 11.48. There was a mean of 74.98 in anaerobic power and a range of +10.25. The mean VC was 3110.00 and the standard deviation was +368.47. Variation in heart rate was 2.06 beats per minute, with a mean of 25.66 beats per minute.

Analysis of Coefficient of Correlation

The data was analyzed statistically to find out whether there was a connection between the subjects' physiological states and how well they performed. The results are summarized in Table 6.

Table 6: Indicating the Coefficient of Correlation (R) between Physiological Parameters and Subjects' Playing Abilities

S.No.	Variables	Correlation Coefficient	Level of Sig.
	Playing Ability Vs		
1	Resting Pulse Rate	-0.152	NS
2	Mean Arterial Blood Pressure	0.098	NS
3	Percent Body Fat	0.065	NS
4	Anaerobic Power	0.038	NS
5	Vital Capacity	0.186	NS
6	Respiratory Rate	0.280*	<0.05

The resultant 'r' values in Table 6 are statistically greater than the 'r' value required for significance at the 0.05 level, demonstrating a substantial correlation between playing ability and respiratory rate (-0.280). An individual's ability to play the game is correlated with their resting heart rate (-0.152), mean arterial blood pressure (0.098), body fat percentage (0.071), hemoglobin (0.065), and anaerobic power (0.038). The calculated values of 0.186 for vital capacity lacked statistical significance since they fell short of the required table value of 0.273 at the 0.05 level.

CONCLUSION

Sports were formerly seen as something to be done for fun. Sports have been an integral part of many societies throughout history. Professional sports have become more serious endeavors in recent decades.

Success in sports is determined by a wide range of factors. When professionalization took hold, the trend toward specialization emerged. Softball is one of the most widely followed sports in the world. Philosophical conversations about how to increase performance are of interest to many in the sports world, including coaches, instructors, physicians, psychologists, and players. Winning in sports is good for everyone involved: the players, their fans, and their nation. It's possible that even with extensive self- and team-coaching, you still may not win every match. There has been a great deal of study on the factors that contribute to successful softball performance. The study's authors were interested in comparing female softball players' psychological and physiological well-being. The data was evaluated using descriptive statistics including mean, standard deviation, and error bars. The raw softball performance scores were converted into standardized scores.

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