EFFECT OF MOTOR ABILITY AND SELF-CONFIDENCE ON TRIPLE JUMP SKILLS IN YOUTH AGED 18–20: PATH ANALYSIS STUDY AMONG STUDENTS AT UNIVERSITY COLLEGE

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Abstract
The purpose of the study is to analyze the impact of motor skills and self-confidence on triple jump skills.
Materials and methods. The study participants (n = 41) were male college students aged 18–20 years. Regression analysis (path analysis) was used to analyze the interrelationship between motor skills variable variables, self-confidence (exogenous variables) and triple jump skills (endogenous variables).
Results. The analysis indicated that there is an influence of motor skills towards triple jump skills with = ($r \geq 0.711$; $p < 0.000$; significant) and a linear determination coefficient ($R^2 \geq 0.506$) contributing 50.60%. There is an influence of self-confidence on triple jump skills with = ($r \geq 0.707$, $p < 0.000$; significant) and a linear determination coefficient ($R^2 \geq 0.50$) contributing 50.00%. There is an influence of motor skills on self-confidence with = ($r \geq 0.693$, $p < 0.000$; significant) and a linear determination coefficient ($R^2 \geq 0.480$) contributing 48.00%. There is an influence of motor skills and self-confidence on triple jump skills with = ($r \geq 0.771$, $p < 0.000$; significant) and a linear determination coefficient ($R^2 \geq 0.594$; $p < 0.005$; significant), the total exogenous variable contribution is 59.40%.
Conclusions. Motor skills and self-confidence must be considered by educators or trainers during the training process. Good motor skills and high self-confidence will affect triple jump skills.
Keywords: triple jump skills, motor ability, self-confidence.

Introduction

Triple jump is defined as a series of runs, jumps with quick movements from a predetermined jump or support that are two times the same foot hop and one other leg with a simultaneous movement (Djumidar, 2004). Athletic transmissible jump has basic technique elements consisting of approach, hop, step, and jump (Panoutsakopoulos & Kollias, 2008). The triple jump is a complex movement consisting of three separate phases, combined with a single movement in an effort to maximize the farthest distance (Wilson, Simpson, & Hamill, 2009). This jump consists of three stages: take-off hop, step, and jump (Mohammed, Idris, Ali, & Nasreddin, 2016).

Physical activity in sports really requires skills in its practice to be able to give the best performance. The acquisition of motor skills is fundamental for human life (Zhu, Poolton & Masters, 2012). Motor refers to movement, bio shows the biological nature (body) of ability (Bompa & Buzzichelli, 2014). This form can be grouped as: speed, strength, endurance, agility and fatigue (Jerábek, 2003). Motor competence has been defined as the skill level in various motor tasks and coordination of movements and controls that underlie the results of certain movements (Cattuzzo et al., 2014). Movement speed is one of the components of complex motor abilities (Horička, Hianik & Šimonek, 2014), the triple jump relies heavily on speed in its basic technical abilities. The best jump depends on the run-up. The purpose of the run-up is to make athletes reach the optimum position for landing at a controlled speed in that jump technique (Emel Çetin & Özgür Özdemir,

2013), so that the distance of the track to jump determines the result of the jump in the triple jump (Lmuzaini & Leck, 2008).

Psychological aspects of self-confidence are a supporting factor in mastering the basic techniques of jumps. Confidence is a belief that you have strength in yourself, especially ability, to achieve success (Brewer, 2009). High self-competence and good self-confidence can reduce worries in oneself and will give positive feelings in doing the activities (Badami, Vaezmousavi, Wulf, Vegas, & Namazizadeh, 2012). Confidence is an important element to be able to create strength in yourself (Dureja & Singh, 2011). Triple jump has a basic technique that is of very high complexity, so one must have strong self-confidence so as not to hesitate in doing hop, step and jump techniques. To gain sports achievements, psychology must make the increase of athletic self-confidence the most fundamental thing. The analysis of scientific literature revealed the need for further research on motor skills and self-confidence.

Materials and methods

Study participants

The study participants were youth aged 18–20 years (n = 41).

Research organization

The analysis technique used in this research were literature analysis, test and measurement, and methods of mathematical statistics.

Testing procedure

Triple jump skill. Distance jump in meters (m) was used. Further, the motor ability test had the following 7 test items: Standing Broad Jump Jumping Test (Strength, explosive leg power), Standing Triple Jump Jumping Test (Strength, explosive leg power), Overhead Back Throw Throwing Test (Strength, Coordination), Sit and Reach (Flexibility), Sprint 30 m Running Test (Stength and Speed), Sprint 150 m Running Test (Strength, Speed and Endurance), Shuttle Run Running Test (Speed and Agility).

Then the self-confidence questionnaire test statement was compiled using a questionnaire with a Likert scale model.

Statistical analysis

The analysis technique used in testing the hypothesis of this research was path analysis. The path analysis model was used to analyze the pattern of relationships between variables in order to determine the direct or indirect effects of a set of exogenous variables (motor ablity and self-confidence) towards endogenous variables (triple jump skills). The path testing used Rsquare regression with a significance level (sig 0.05). The spss version 23 application was used for statistical analysis.

Results

Hypothesis Model: motor ability and self-confidence contributes simultaneously towards triple jump skills.

Structure Model : $\text{TJS} = p_{TJSMA}\,\text{MA} + p_{TJSSC}\,\text{SC} + p_Y\varepsilon_1$
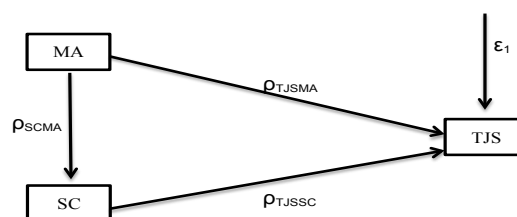

Fig. 1. Path constellation analysis of multiple jump skills

The principle of testing is significant: The SPSS version 23.0 program is indicated by Model Summaryb.

In Table 1, Model Summary[b], above, $R_{square} = 0.594$ was obtained and in the Anova Table, we obtained F value of 27.811 with a probability value (sig) = 0.000 because the value of sig is <0.05, then the decision is Ha accepted. Therefore, motor ability and self-confidence contribute simultaneously to triple jump skills.

In Table 2, Anova[b], F value of 27.811 was obtained, with probability value (sig) = 0.000 because the value (sig) is 0.000 <0.05, then the decision is Ho is rejected and Ha is accepted. Therefore, individual testing can be done.

Table 1. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.771[a]	.594	.573	.70346	.594	27.811	2	38	.000

a. Predictors: (Constant), Self-Confidence, Motor Ability

b. Dependent Variable: Triple Jump Skills

According to the individual test shown in the Coefficients Table, the path coefficient result is $p_{TJSMA} = 0.000$.

Table 2. ANOVA[a]

	Model	Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	27.525	2	13.762	27.811	.000b
	Residual	18.804	38	.495		
	Total	46.329	40			

a. Dependent Variable: Triple Jump Skills

b. Predictors: (Constant), Self-Confidence, Motor Ability

a. Motor ability contributes towards triple jump skills

Table 3. Coefficients[a]

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3.517	.825		4.262	.000
	Motor Ability	.012	.002	.711	6.320	.000

a. Dependent Variable: Triple Jump Skills

In Table 3, Coefficients, sig value. 0.000 was obtained. Apparently, the sig. value 0.000 is smaller than the value of a probability of 0.05 or value 0.05 > 0.000, then Ha is accepted, meaning that the path analysis coefficient is significant. So motor abilities contribute to triple jump skills.

The following table shows how much influence the motor ability has on triple jump skills:

In Table 4, Model Summary[b], $R_{square} = 0.506 \times 100 = 50.60\%$ was obtained. And in the Anova Table, we obtained value Fchange = 39.949 with probability value (sig) = 0.000, because sig value is 0.000 < 0.05, then the decision is Ha is accepted. So motor ability contributes to triple jump skills.

Self-confidence contributes towards triple jump skills

In the Table Coefficients, the individual test shows that the path coefficient result is $p_{TJSMA} = 0.000$.

In Table 5, Coefficients, sig. value 0.000 was obtained. Apparently, the value of Sig. 0.000 is smaller

Table 5. Coefficients[a]

	Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-2.377	1.775		-1.339	.188
	Self-Confidence	.054	.009	.707	6.241	.000

a. Dependent Variable: Triple Jump Skills

than probability value of 0.05 or value 0.05 > 0.000, then Ha is accepted meaning that the path analysis coefficient is significant. So self-confidence contributes to triple jump skills.

The following table shows how much influence self-confidence has on triple jump skills.

In Table 6, Model Summaryb, above, $R_{square} = 0.500 \times 100 = 50.00\%$ was obtained and in the Anova Table, we obtained values Fchange = 38.947 with probability (sig) = 0.000 because the value of sig is 0.000 < 0.05, then the decision is that H0 is rejected and Ha is accepted. So self-confidence contributes to triple jump skills.

Motor ability contributes towards self-confidence.

According to the individual tests shown in the Coefficients Table, the path coefficient result is $p_{TJSMA} = 0.000$.

In Table 7, Coefficients, sig value. 0.000 was obtained. Apparently, the value of sig. 0.000 is smaller than the probability value of 0.05 or the value of 0.05 > 0.000, then Ha is accepted and Ho is rejected, meaning that the path analysis coefficient is significant. So, motor ability contributes towards self-confidence.

The influence of the motor ability on self-confidence is as follows.

In Table 8, Model Summaryb, above, $R_{square} = 0.480 \times 100 = 48.00\%$ was obtained and in the Anova Table, we obtained the value of $F_{change} = 35.996$ with a probability value (sig) = 0.000 because the value of sig is 0.000 < 0.05, then the decision is that H_0 is rejected and H_a is accepted. So motor abilities contribute to self-confidence.

The framework of the empirical causal relationship between MA and SC towards TJS can be made through the structural equation Model as follows:

Table 4. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.711a	.506	.493	.76605	.506	39.949	1	39	.000

a. Predictors: (Constant), Motor Ability

b. Dependent Variable: Triple Jump Skills

Table 6. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.707a	.500	.487	.77095	.500	38.947	1	39	.000

a. Predictors: (Constant), Self-Confidence

b. Dependent Variable: Triple Jump Skills

Table 7. Coefficients[a]

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	138.506	11.049		12.535	.000
Motor Ability	.158	.026	.693	6.000	.000

a. Dependent Variable: Self-Confidence

Model Structure:

TJS = p_{TJSMA}MA + p_{TJSSC}SC + $p_{TJS}\varepsilon_1$ = 0.000MA + 0.000SC + 0.406 ε_1

Value of $R^2_{TJS.SC.MA}$ or R_{square} can be seen in Table 1, Model Summary[b]. The value of $p_y\varepsilon_1$ (residual variable) is determined by the formula as follows:

Formulation:

$p_{TJS}\varepsilon_1 = 1 - R_{square} = 1 - 0.594 = 0.406$

Discussion

Based on the testing result of all the hypotheses that have been done, there is a significant simultaneous effect of motor ability and self-confidence towards triple jump skills. Structural equation from the results of path analysis of leg muscle explosive power and transmissible jump results in triple jump skills = 0.000MA + 0.000SC+ 0.406 ε_1

The amount of the motor ability contribution and self-confidence variables together to triple jump skills is equal to Rsquare = 0.594 × 100 = 59.40%, while the remaining 40.60% is the influence of other variables apart from the motor ability variable and self-confidence.

The contribution of motor ability variable (MA) to triple jump skills (TJS) is directly the same with R_{square} = 0.506 × 100 = 50.60%. It is because of the maximum strength and speed in the basic technique of the prefix. Strength is a motor ability that greatly determines movement skills (Lukić, Bijelić, Zagorc & Zuhrić-Šebić, 2011). Self-confidence variable (SC) has a direct contribution of R_{square} = 0.500 × 100 = 50.00% to triple jump skills. Furthermore, the influence of the motor ability on self-confidence is equal to R_{square} = 0.480 × × 100 = 48.00%.

The basic technique of transmissible jumping which has high complexity makes students hesitate in its implementation. Athletes with a high level of doubt in sports activities show a very low confidence (Koivula & Hassme, 2002). This is based on self-confidence which expresses individual's belief in his/her general ability to control conditions and situations (Besharat & Pourbohlool, 2011).

This finding shows that to improve triple jump skills, athletes must have good motor skills and self-confidence, both of which contributing 59.40% to be able to improve triple jump skills. Thus, there was found a significant effect of motor ability and self-confidence on triple jump skills after testing hypotheses together or testing individually.

Conclusions

In this research, it has been proved that there is a positive influence of motor ability variables towards triple jump skills, there is a positive effect of self-confidence on triple jump skills, and there is a positive influence of motor ability towards self-confidence. With the motor ability variable (MA), self-confidence (SC) has a very significant influence on improving triple jump skills (TJS) by 59.40%. While the remaining 40.60% are the effects of variables outside of the motor ability and self-confidence variables. Educators or trainers must consider the variable of motor abilities and self-confidence in an effort to develop triple jump skills.

Table 8. Model Summary[b]

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.693a	.480	.467	10.25801	.480	35.996	1	39	.000

a. Predictors: (Constant), Motor Ability

b. Dependent Variable: Self-Confidence

Conflict of interest

The author declares no conflict of interests.

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ВПЛИВ РУХОВИХ ЗДІБНОСТЕЙ ТА ВПЕВНЕНОСТІ У СОБІ НА ФОРМУВАННЯ НАВИЧОК ПОТРІЙНОГО СТРИБКА У МОЛОДІ 18–20 РОКІВ: ДОСЛІДЖЕННЯ З ВИКОРИСТАННЯМ ПАТ-АНАЛІЗУ СЕРЕД СТУДЕНТІВ КОЛЕДЖУ УНІВЕРСИТЕТУ

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Метою дослідження є аналіз впливу рухових навичок та впевненості у собі на розвиток навичок потрійного стрибка.

Матеріали і методи. Учасниками дослідження (n = 41) були студенти коледжу чоловічої статі віком 18–20 років.

Регресійний аналіз (пат-аналіз) використовувався для аналізу взаємозв'язку між змінними ру-

ихових навичок, впевненістю у собі (екзогенні змінні) та навичками потрійного стрибка (ендогенні змінні).

Результати. Аналіз показав, що рухові навички впливають на навички потрійного стрибка ($r \geq 0{,}711$; $p < 0{,}000$; значення достовірні) та лінійний коефіцієнт детермінації ($R^2 \geq 0{,}506$) із внеском 50,60%. Впевненість у собі впливає на навички

потрійного стрибка ($r \geq 0,707$, $p < 0,000$; значення достовірні) та лінійний коефіцієнт детермінації ($R^2 \geq 0,50$) із внеском 50,00%. Рухові навички впливають на впевненість у собі ($r \geq 0,693$, $p < 0,000$; значення достовірні) та лінійний коефіцієнт детермінації ($R^2 \geq 0,480$) із внеском 48,00%. Рухові навички та впевненість у собі впливають на навички потрійного стрибка ($r \geq 0,771$, $p < 0,000$; значення достовірні) та лінійний коефіцієнт детермінації ($R^2 \geq 0,594$;

$p < 0,005$; значення достовірне), загальний внесок екзогенної змінної 59,40 %.

Висновки. Педагоги або тренери мають враховувати важливість рухових навичок та впевненості у собі під час тренувального процесу. Добре розвинені рухові навички та високий рівень впевненості у собі впливають на розвиток навичок потрійного стрибка.

Ключові слова: навички потрійного стрибка, рухові здібності, впевненість у собі.

ВЛИЯНИЕ ДВИГАТЕЛЬНЫХ СПОСОБНОСТЕЙ И УВЕРЕННОСТИ В СЕБЕ НА ФОРМИРОВАНИЕ НАВЫКОВ ТРОЙНОГО ПРЫЖКА У МОЛОДЕЖИ 18–20 ЛЕТ: ИССЛЕДОВАНИЕ С ИСПОЛЬЗОВАНИЕМ ПАТ-АНАЛИЗА СРЕДИ СТУДЕНТОВ КОЛЛЕДЖА УНИВЕРСИТЕТА

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Целью исследования является анализ влияния двигательных навыков и уверенности в себе на формирование навыков тройного прыжка.

Материалы и методы. Участниками исследования (n = 41) были студенты колледжа мужского пола в возрасте 18–20 лет.

Регрессионный анализ (пат-анализ) использовался для анализа взаимосвязи между переменными двигательных навыков, уверенностью в себе (экзогенные переменные) и навыками тройного прыжка (эндогенные переменные).

Результаты. Анализ показал, что двигательные навыки влияют на навыки тройного прыжка ($r \geq 0,711$; p $< 0,000$, значение достоверны) и линейный коэффициент детерминации ($R^2 \geq 0,506$) с вкладом 50,60%. Уверенность в себе влияет на навыки тройного прыжка ($r \geq 0,707$; $p < 0,000$, значение достоверны) и линейный коэффициент детерминации

($R^2 \geq 0,50$) с вкладом 50,00%. Двигательные навыки влияют на уверенность в себе ($r \geq 0,693$; $p < 0,000$, значение достоверны) и линейный коэффициент детерминации ($R^2 \geq 0,480$) с вкладом 48,00%. Двигательные навыки и уверенность в себе влияют на навыки тройного прыжка ($r \geq 0,771$; $p < 0,000$, значение достоверны) и линейный коэффициент детерминации ($R^2 \geq 0,594$; $p < 0,005$, значение достоверное), общий вклад экзогенной переменной 59,40%.

Выводы. Педагоги или тренеры должны учитывать важность двигательных навыков и уверенности в себе во время тренировочного процесса. Хорошо развитые двигательные навыки и высокий уровень уверенности в себе влияют на развитие навыков тройного прыжка.

Ключевые слова: навыки тройного прыжка, двигательные способности, уверенность в себе.

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