The impact of short run distances to the final results of the decathlon at the 2019 Athletic World Championships

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ABSTRACT

Athletic operates on the basis of a particular system of knowledge that has in its content the theoretical and methodological foundations of sport training (Rashiti N, Nika F, Bekolli L, Heta G.) 2017. Athletic is one of the types of sports, with complex and applicable character, consisting of large groups, which include different athletic types, with similar characteristics among them; our treatment is athletic decathlon.(Dibra F.)2006. The decathlon is a complex combined event in athletic consisting of ten track and field events. Olympic men's decathlons are divided into a two-day competition. The evaluation is done by points. Men's decathlon consists of: 100m, Long jump, Shot put, High jump, 400m (Day 1); 110m hurdles, Discus throw, Pole vault, Javelin throw, 1500m(Day 2).

The main purpose of this paper was to verify that from the disciplines of the Decathlon: Long jump, Shot put, High jump, Discus throw, Pole vault, Javelin throw and1500m,as predictor (independent) variables will have an impact on the performance of specific motor tasks, respectively the execution of disciplines pertaining to short-distance running: 100m, 110m hurdles and 400mas well as to determine the impact of these short-distance running to the final result of the decathlon knowing that these disciplines in athletics are largely genetically determined.(Misja B.) 2012

The sample for the purposes of this paper will include 10 first contestants of decathlons World Championship: September 27 and October 6, 2019 in Doha, Qatar. In this research, after obtaining a statistically significant multiple correlation (R = 0.936) it is necessary to search for the coefficient in the (Beta) column as well as the (t-test) value indicating the influence of each

predictor variable (independent) in the dependent or criterion variable 400m.We can emphasize that the test (F-test) is always more valuable if the multiplex correlation is greater, in this case it is significant (Sig = 0.000), because the value of the F-test is 15,347.A statistically significant multiple correlation was obtained (R = 0.958); it is necessary to search for the coefficient in the (Beta) column as well as the (t-test) value indicating the influence of each predictor (independent) variable in the dependent variable or criterion 110m.

In this research, after obtaining a statistically significant multiple correlation (R = 0.958), it is necessary to search for the coefficient in the (Beta) column as well as the (t-test) value indicating the influence of each predictor variable (independent) in the dependent or criterion variable) 100m.

Key words: Decathlon, World Championships, Regression Analysis, Elite Athletes.

METHODS FOR PROCESSING RESULTS

In order for scientific research to provide a satisfactory solution, it is necessary to use appropriate, right and comparative procedures that are of the nature of this given problem.

Considering all these facts, for the purpose of this research the procedures have been selected, to which they are considered and correspond to the nature of the problems being researched.

For each specific motor variable, the following values will be calculated: Basic central and distribution parameters: Minimum and Maximum Values (R.min-R.max), Arithmetic Mean (Ma), Deviation (Ds), and Asymmetry Parameters (SKEW and KURT).

The curve of the distribution or distribution is tested by means of the asymmetry coefficient ("Skewness"), and the degree of curvature of the top of the curve scattered results(distribution height) through the flat coefficient ("'kurtosis").

Relationship ratios between variables in manifest space, as well as correlations between variables system. Regression analysis will be applied to validate the influence of predictor (independent) variables on the criterion(dependent) variables.

PURPOSE OF RESEARCH

The main purpose of this paper is to prove that the disciplines of the Decathlon: Long jump, Shot put, High jump, Discus throw, Pole vault, Javelin throw and1500m,as predictor (independent) variables will have an impact on the performance of specific motor tasks, respectively the execution of disciplines pertaining to short-distance running: 100m, 110m hurdles and 400m, as well as to determine the impact of these short-distance run to the final results of the decathlon, knowing that these athletic disciplines are largely genetically determined to elite athletes.

The secondary purpose of this paper is: How much of the 100m, 110m hurdles and 400mhave influenced to the final result during 2019.

SAMPLE OF THE POPULATION

For the purposes of this paper the sample will include10 first contestants of decathlons World Championship: 2019- London. The results wisll be obtained from the networks and the official website: IAAF - International Association of Athletics Federations | iaaf.org.'

BASIC STATISTICAL PARAMETERS

In the following text, the basic statistical, asymmetry, and normal distribution parameters for each decathlon discipline applied in this paper will be presented and analyzed according to the order. Table 1 presents the basic statistical characteristics of the applied system of specific motor variables (decathlon): Min values (Min), Max values (Max), Arithmetic mean (Mean), Standard deviation (Std. Dev),Asymmetry parameters (SKEW and KURT) and coefficient of variation (Kv).All distribution variables in Table 1 have normal extension and all variables are homogeneous.

Table 1. Basic statistical parameters of asymmetry and normal distribution of specific variables (decathlon) of the 20 athletes with the best results of the 2019 World Championship

Variables	N	Min	Max	Mean	Std. Dev.	Skew.	Kurt	Kv
VR100M	10	786.00	985.00	874.80	67.44018	.346	-.998	8.17
KRCGJA	10	767.00	925.00	886.80	49.25173	-1.890	3.684	5.79
HEGJYL	10	674.00	862.00	777.90	63.46731	-.004	-.946	6.97
KRCLAR	10	740.00	934.00	808.60	58.71816	.866	1.180	7.42
VR400M	10	753.00	959.00	865.50	67.57095	-.271	-.912	7.69
V110MP	10	791.00	994.00	908.40	59.65121	-.543	.459	6.95
HEDISK	10	621.00	876.00	788.30	77.93737	-1.129	1.182	6.73
KRCSHK	10	790.00	972.00	877.00	50.50413	.058	.795	6.11
HESHTI	10	665.00	876.00	796.00	74.75293	-.557	-1.113	9.26
V1500M	10	645.00	846.00	738.00	70.06663	.125	-1.430	8.61
Points	10	8158.00	8607.00	8321.30	160.14858	.800	-.839	1.90

The Relationship and Influence of Specific Motor Variables (Athletic Decathlon Disciplines) in 100m Running (run. 100m)

Through regression analysis in athletes of decathlonin 2019 WCH, the value of the relationship between the group of specific motor variables (decathlon disciplines as independent variables and dependent variable (criterion) - 100m run (Run.100m) is obtained.

Table 2. Regression analysis - the correlation and impact of specific motor variables (athletic decathlon disciplines) in 100m running (Run. 100m)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.958[a]	.918	.897	21.0449

Model		Sum of Squares	df	Mean Square	F	Sig.
	Regression	153452.908	8	19181.614	43.436	.000[b]
1	Residual	13689.867	31	441.609		
	Total	167142.775	39			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
	(Constant)	-451.624	185.938		-2.429	.021
	KRCGJA	-.382	.104	-.299	-3.685	.001
	HEGJYL	-.320	.126	-.209	-2.545	.016
	KRCLAR	-.327	.063	-.274	-5.211	.000
1	HEDISK	-.221	.068	-.248	-3.254	.003
	KRCSHK	-.398	.056	-.431	-7.067	.000
	HESHTI	-.420	.049	-.502	-8.603	.000
	V1500M	-.319	.091	-.250	-3.525	.001
	PIKËT	.392	.030	1.216	13.190	.000
a. Dependent Variable: VR100M						

Regression analysis on decathlon athletes indicates that the value of the correlation between the group of independent predictor variables (decathlon athletic variables or disciplines) and the dependent criterion variable - 100m Run (Run. 100m) is obtained.

Correlation of the entire system of independent predictor variables (athletic decathlon disciplines): Long jump, Shot put, High jump, Discus throw, Pole vault, Javelin throw,1500 meters and Total Points (Criteria) and Criterion Dependent Variables - 100 meters Run (Run. 100m), is confirmed by multiple correlation.

Multiple correlation coefficient has the value R = 0.958 which explains the common variability between the predictor variables system and the criterion variable around 91% (R Square = 0.918).

Distribution (F is obtained as the distribution of quotient of the two variances, and in these cases it is sometimes necessary to assign the two degrees of freedom. The first degree of freedom is equal to the number of predictor variables (df = n) respectively (df = 8) and the second is performed so that the number of subjects (40) is reduced by the number of predictor variables minus 1 (df = N). - n - 1) respectively (df = 40 - 8–1).

We can emphasize that the test (F-test) is always more valuable if the multiple correlation is greater, in this case it is significant (Sig = 0.000), because the value of the F-test is 43.43.In this research, after obtaining a statistically significant multiple correlation (R = 0.958), it is necessary to search for the coefficient in the (Beta) column as well as the (t-test) value indicating the influence of each predictor variable (independent)) in the dependent or criterion variable).Predictor variables that have an impact on 100m running (Run. 100m) are: Long jump(LJ) p<0.05,Shot put(ShP) p<0.05,High jump(HJ) p<0.05, Discus throw(DTh) p<0.05,Pole vault(PV) p<0.05,Javelin Throw(JTh) p<0.05,1500 meters running(Run. 1500m) p<0.05 and Total Points(Points)p<0.05.

The correlation and Influence of Specific Motor Variables (Athletic Decathlon Disciplines) in 400 meters run (Run. 400m)

Through regression analysis on athletes of athletic decathlon in WCH 2019, the correlation value was obtained between the group of specific motor variables (decathlon disciplines) as independent variables and dependent variable (criterion) - 400m Run (Run. 400m).

Table 3. Regression analysis - correlation and impact of specific motor variables (athletic decathlon disciplines) in 400m running (Run. 400m)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.936ᵃ	.877	.845	22.96872

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	116593.955	8	14574.244	27.626	.000ᵇ
	Residual	16354.420	31	527.562		
	Total	132948.375	39			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-121.619	203.230		-.598	.554
	KRCGJA	-.140	.113	-.123	-1.237	.225
	HEGJYL	-.288	.137	-.211	-2.097	.044
	KRCLAR	-.342	.069	-.321	-4.992	.000
	HEDISK	-.342	.074	-.430	-4.592	.000
	KRCSHK	-.212	.062	-.258	-3.454	.002
	HESHTI	-.240	.053	-.322	-4.503	.000
	V1500M	-.037	.099	-.032	-.369	.714
	PIKËT	.274	.032	.954	8.444	.000
a. Dependent Variable: VR400M						

Regression analysis on decathlon athletes shows that the value of the correlation between the group of independent predictor variables (decathlon athletic variables or disciplines) and the dependent criterion variable - 400m Run (Run. 400m) is obtained.

Correlation of the entire system of independent predictor variables (athletic decathlon disciplines): Long jump(LJ),Shot put(ShP),High jump(HJ), Discus throw(DTh),Pole vault(PV),Javelin Throw(JTh),1500 meters run(Run. 1500m) and Total Points(Points) and Criterion Dependent Variables - 400m Run (Run. 400m), is proved by multiple correlation.

Multiple correlation coefficient has the value R = 0.936 which explains the common variability between the predictor variables system and the criterion variable around 87% (R Square = 0.877).

Distribution (F) is obtained as the quotient distribution of the two variants, and in these cases it is always necessary to designate the two degrees of freedom.The first degree of freedom is equal to the number of predictor variables (df = n) respectively (df = 8) and the second is performed so that the number of subjects (20) is reduced by the number of predictor variables minus 1 (df = N). - n - 1) respectively (df = 40 - 8–1).

We can emphasize that the test (F-test) is always more valuable if the multiple correlation is larger, in this case it is significant (Sig = 0.000), because the value of the F-test is 27.62.

In this research, after obtaining a statistically significant multiple correlation (R = 0.936), it is necessary to search for the coefficient on the (Beta) column as well as the (t-test) value indicating the influence of each predictor variable (independent) in the dependent or criterion variable. Predictor variables that have an impact on the realization of 400m running (Run. 400m) are: Shot put(ShP) $p<0.05$,High jump(HJ) $p<0.05$, Discus throw(DTh) $p<0.05$,Pole vault(PV) $p<0.05$,Javelin Throw(JTh) $p<0.05$,and Total Points (Points) $p<0.05$.

The Relationship and Impact of Specific Motor Variables (Athletic Decathlon Disciplines) in the realization of 110m running (Run. 110m)
Through regression analysis to the decathlon athletes of athleticWCH 2019, of specific motor variables (decathlondisciplines) as independent variables and dependent variable (criterion) - 110m Run (R. 110m)the correlation value between group is gained.

Table 4. Regression analysis - correlation and impact of specific motor variables (athletic decathlon disciplines) in the realization of 110 m running (Run. 110m)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.894[a]	.798	.746	26.13864

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	83883.520	8	10485.440	15.347	.000[b]
	Residual	21180.080	31	683.228		
	Total	105063.600	39			

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	112.084	231.277		.485	.631
	KRCGJA	-.564	.129	-.557	-4.373	.000
	HEGJYL	-.383	.156	-.315	-2.448	.020
	KRCLAR	-.257	.078	-.272	-3.300	.002
	HEDISK	-.209	.085	-.295	-2.465	.019
	KRCSHK	-.313	.070	-.428	-4.475	.000
	HESHTI	-.324	.061	-.487	-5.328	.000
	V1500M	-.341	.113	-.338	-3.034	.005
	PIKËT	.332	.037	1.299	8.981	.000
a. Dependent Variable: VR110P						

Regression analysis on decathlon athletes shows that the value of the correlation between the group of independent predictor variables (decathlon athletic variables or disciplines) and the dependent criterion variable - 110m Hurdles(H. 110m) is obtained.
Correlation of the entire system of independent predictor variables (athletic decathlon disciplines):Long jump(LJ),Shot put(ShP),High jump(HJ), Discus throw(DTh),Pole vault(PV),Javelin Throw(JTh),1500 meters run(R. 1500m) and Total Points(Points) and Criterion Dependent Variable - 110m Hurdles(H. 110m), is proved by multiple correlation.
Multiple correlation coefficient has the value R = 0.894 which explains the common variability between the prediction variables system and the criterion variable around 79% (R Square = 0.798).

Distribution (F) is obtained as the quotient distribution of the two variants, and in these cases it is always necessary to designate the two degrees of freedom. The first degree of freedom is equal to the number of predictor variables (df = n) respectively (df = 8) and the second is performed so that the number of subjects (20) is reduced by the number of predictor variables minus 1(df = N – n – 1) respectively (df = 40 – 8– 1).

We can emphasize that the test (F-test) is always more valuable if the multiple correlation is greater, in this case it is significant (Sig = 0.000), because the value of the F-test is 15.347. In this research, after obtaining a statistically significant multiple correlation (R = 0.958), it is necessary to search for the coefficient in the (Beta) column as well as the (t-test) value indicating the influence of each predictor variable (independent)) in the dependent or criterion variable) (Table 8).Predictor variables that have an impact in the realization of 110m Hurdles(H. 110m)are: Long jump(LJ) p<0.05,Shot put(ShP) p<0.05,High jump(HJ) p<0.05, Discus throw(DTh) p<0.05,Pole vault(PV) p<0.05,Javelin Throw(JTh) p<0.05,1500 meters run (Run. 1500m) p<0.05 and Total Points(Points)p<0.05.

CONCLUSION

Decathlon is athletic discipline that involves many disciplines and is one of the disciplines that requires very high physical preparation(Bowerman, Freeman, & Gambeta, 2012).
The word "ten" means a discipline that involves ten different athletic disciplines, four of which are running races, three jumping and three throwing. When an athlete starts practicing decathlon, he should be prepared to spend his entire life being prepared, as the ten disciplines cannot be mastered in any time. The decathlon athletes should not have weak disciplines as they affect in the end result. First, it is necessary to dedicate to the weaker disciplines, and when a certain result is achieved, move on to the most successful ones. Each discipline is linked to one more, so the order of the training disciplines should be the same as that of the competition.
The results are taken from the electronic networks and the official website:**IAAF - International Association of Athletics Federations | iaaf.org.** In this research the following athletic decathlon variables were applied: Long jump(LJ),Shot put(ShP),High jump(HJ), Discus throw(DTh),Pole vault(PV),Javelin Throw(JTh),1500 meters run (Run. 1500m) and Total Points(Points), 100m Run (R. 100m), 110m Hurdles (H. 110m) and 400m Run (R. 400).

After processing the results we can conclude that:
Athletic running, as a set of physical circular character, realizes the displacement in space and time through steps with the lower sides (legs) at high speed. Each type of run has the same technical and biomechanical basics, but with some features of the shape defined by:
- Runner's condition (length of lever, body weight, level of physical and technical preparation, etc.);
-            The technical stages of a race (starting momentum, distance running, etc.);
-            Size parameters - steps density, their pace and endurance in different running races.
1. We are focused on this to treat athletic decathlon, of the 10 elite World Championship athletes and we have come to a conclusion (ascertainment)that all decathlon variables of the basic parameters in table no. 1. are homogeneous.
2.Specific motor variables in table no. 2. (the disciplines of the decathlon) as independent variable and dependent variable (criterion) - 100m run (R. 100m), is confirmed by multiple correlation.Multiple correlation coefficient has the value R = 0.958 which explains the common

variability between the predictor variables system and the criterion variable around 91% (R Square = 0.918).

3.Specific motor variables in table no. 3. (the disciplines of the decathlon) as independent variable and dependent variable (criterion) - 400m run (R. 400m), is confirmed by multiple correlation.Multiple correlation coefficient has the value R = 0.936 which explains the common variability between the predictor variables system and the criterion variable around 87% (R Square = 0.877).

4.Specific motor variables in table no. 4 . (the disciplines of the decathlon) as independent variable and dependent variable (criterion) - 110m hurdles (H. 110m), is confirmed by multiple correlation.Multiple correlation coefficient has the value R = 0.894 which explains the common variability between the predictor variables system and the criterion variable around 79% (R Square = 0.798).

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